



Gondia Education Society's

**J. M. PATEL ARTS, COMMERCE & SCIENCE COLLEGE
BHANDARA – 441 904 (M.S.)**

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● Phone No. 07184 – 252364, 256883 (R) 252288 Fax : 07184 -253268 Email : principaljmpc@rediffmail.com website : www.jmpatelcollege.com

**3.3.2.1 TOTAL NUMBER OF BOOKS AND CHAPTERS IN EDITED VOLUMES/BOOKS
PUBLISHED AND PAPERS IN NATIONAL/INTERNATIONAL CONFERENCE
PROCEEDINGS YEAR WISE DURING LAST FIVE YEARS 2019- 2024.**

2024

Sl. No.	Name of the teacher	Title of the book/chapters published	Title of the paper	Year of publication	ISBN/ISSN number of the proceeding	Page No.
1	Dr. Pankaj B. Gour		Role of Isolated Compounds from Spices and Herbs in Natural Medicinal Care or Therapy - A Review	2024	ISSN - 9780735447714	1-10
2	Mr. Palash Feddewar		A Review of two Deep Learning Model Models for Video Processing CPS - 394-397	2024	ISBN - 9788119435616	11-18



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3	Mrs. Priyanka Sharma		Today's Challenges, Trends and Applications of Natural Language Processing(NLP) CPS - 155-158	2024	ISBN - 9788119435616	19-26
4	Dr. Sayeda Parveen Qureshi		Role of Biofertilizers in Sustainable Agriculture and an Environmental Development pp : 140-144	2024	ISBN - 9788119931255	27-35
5	Dr. Aparna M. Yadav	Text Book of Botany Palaeobotany, Pteridophytes, Gymnosperms and Soil Analysis B. Sc. Semester - II (Theory) Paper-I		2024	ISBN - 9878195157426	36-39
6	Dr. Aparna M. Yadav	Text Book of Botany Morphology of Angiosperms & Floriculture B. Sc. Semester - II (Theory) Paper-II		2024	ISBN - 9788195157426	40-43



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7	Dr. Bhavana M. Rai	Literature and Identity: Exploration of literature's role in shaping cultural identity, social change and political movements		2024	ISBN- 13: 978-81- 973086-2-8	44-58
8	Dr. Anand A. Muley	Junior Assistant Accountant (Kanishtha Sahayaak Lipik) Sampurna Margadarshak for Electricity Department		2024	ISBN-978- 81-19931-04- 0	59-61
9	Dr. Prashant A. Manusmare	Financial Mathematics		2024	ISBN-978- 93-5840-724- 2	62-65



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2023

Sl. No.	Name of the teacher	Title of the book/chapters published	Title of the paper	Year of publication	ISBN/ISSN number of the proceeding	Page No.
10	Dr. Anand A. Muley	Holistic Development, B. Com., Sem-III		2023	ISBN-978-93-93973-37-5	66-68
11	Dr. Anand A. Muley	Organisation Behaviour, B.Com., Sem-IV		2023	ISBN-978-81-19931-17-0	69-71
12	Dr. Anand A. Muley	Skill Development, B.Com., Sem.-II		2023	ISBN-978-81-961893-8-9	72-74
13	Dr. Anand A. Muley	Statistics and Business Mathematics		2023	ISBN-978-81-961893-7-2	75-77



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14	Dr. Shyam W. Dafare	Practical Chemistry for Undergraduate Students, PP:1-32		2023	ISBN - 9789387558304	78-81
15	Dr. Ajay M. Ghatole,	Practical Chemistry for Undergraduate Students, PP:33-60		2023	ISBN - 9789387558304	82
16	Dr. Girdharilal B. Tiwari	Practical Chemistry for Undergraduate Students, PP: 61-88		2023	ISBN - 9789387558304	83
17	Dr. Sunil B. Zanje	Practical Chemistry for Undergraduate Students, PP: 89-122		2023	ISBN - 9789387558304	84
18	Dr. Samina K. Tadavi	Practical Chemistry for Undergraduate Students, PP: 155-179		2023	ISBN - 9789387558304	85
19	Dr. Pankaj B. Gour	Research and Reviews in Pharmaceutical and Health Sciences Volume II		2023	ISBN - 9789395847902	86-90



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20	Dr. Samina K. Tadavi	Recent Advances of NANOTECHNOLOGY in Chemical Science Volume - 1 , Recent Trends in Characterization of Nanoparticals PP : 141-151		2023	ISBN - 9789355159274	91-96
21	Dr. Sunil B. Zanje	Recent Advances of NANOTECHNOLOGY in Chemical Science Volume - 1 , Recent Trends in Characterization of Nanoparticals PP : 141-151		2023	ISBN - 9789355159274	91-96
22	Dr. Shyam W. Dafare	Recent Advance of NANOTECHNOLOGY in Chemical Science Volume - 1 , Recent Trends in Characterization of Nanoparticals PP : 141-151		2023	ISBN - 9789355159274	91-96
23	Dr. Sunil B. Zanje	Recent Advance of NANOTECHNOLOGY in Chemical Science Volume - 2 , Methods for the Synthesis of Nanomaterials PP : 169-181		2023	ISBN - 9789358425932	97-102
24	Dr. Samina K. Tadavi	Recent Advance of NANOTECHNOLOGY in Chemical Science Volume - 2 , Methods for the Synthesis of Nanomaterials PP : 169-181		2023	ISBN - 9789358425932	97-102



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25	Dr. Shyam W. Dafare	Recent Advance of NANOTECHNOLOGY in Chemical Science Volume - 2 , Methods for the Synthesis of Nanomaterials PP : 169-181		2023	ISBN - 9789358425932	97-102
26	Dr. Sayeda Parveen Qureshi	Research Trends in Life Science Volume I "Green Energy - Current Status and future Potentials" PP : 60-65		2023	ISBN - 9789388901994	103-106
27	Dr. Aparna M. Yadav	Research Trends in Science and Technology Volume V		2023	ISBN - 9789395847032	107-109
28	Dr. Ajay S. Deokate	Environmental Issues "Romantic Ecology in "The Hungry Tide" and "The God of Small Things" : Exploring Nature's Role in Human Relationships		2023	ISBN - 9789358999846	110-112



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29	Dr. A. M. Yadav	Emerging Trend in Basic and Applied Sciences Search and Rescue of BUTEA MONOSPERMA VAR LUTEA (WITT) Maheshwari (Yellow Palash) and Endangered Medicinal Plant Species		2023	ISBN - 9789388901246	113-119
30	Dr. A. M. Yadav	Frontiers in Life Science Metagenomics: A Comprehensive Review of its Applications in Environmental Science		2023	ISBN - 9789388901345	120-140
31	Dr. A. M. Yadav	Botany, Semester-6 Paper-1, Biochemistry, Biotechnology and Herbal Technology, Paper-2, Phytogeography, Utilization of Plant		2023	ISBN - 9789395008570	141-146



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32	Dr. P. S. Rao	Advances in Science and Technology, Volume-1 Physicochemical and Microbial Status of Soil Samples of Some Public Gardens Bhandara		2023	ISBN- 9789388901406	147-150
33	Dr. S. K. Tadavi	Recent Advances in Chemical Sciences, Volume 1 Synthesis, Characterization, Crystal Structure and Biological Activity of Transition Metal Complexes of N ₂ O ₂ donor of Salophen Ligand		2023	ISBN - 9783964924964	150-155
34	Dr. S. P. Qureshi	Environmental, Industrialization, Management, Economics, Agricultural, Rural and Urban Development Towards Sustainable Development Women Roles in Environment Management		2023	ISBN - 9788195905003	156-160
35	Dr. Pravin H. Ghosekar	Sahitya Mein Rashtrabodha ke Swar Marathi Sahityache Swantantrya Chalavalitil Yogadaan		2023	ISBN - 9789395104135	161-173



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36	Dr. Sabah Naseem		Quantitative Analysis on Cloud computing service in distributed & business models	2023	ISSN: 2394-8051	174-183
37	Mrs. Priyanka Saurabh Sharma		Study of integration of Cloud Computing and Data Mining	2023	ISSN: 2394-8051	184-186
38	Dr. Pravin H. Ghosekar		Application of Convergence of Big Data and Machine Learning	2023	ISSN: 2394-8051	187-193
39	Mr. Palash P. Feddewar		A Review of Machine Learning Algorithms for Video Processing	2023	ISSN: 2394-8051	194-199
40	Dr. Prashant A. Manusmare	Cost and Management Accounting for BBA, Second Semester Students Cost and Management Accounting		2022	ISBN - 9789354807985	200-203



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2022

Sl. No.	Name of the teacher	Title of the book/chapters published	Title of the paper	Year of publication	ISBN/ISSN number of the proceeding	Page No.
41	Dr. Prashant A. Manusmare	Financial Management for MBA 2nd Semester Financial Management		2022	ISBN - 9789389863420	204-204
42	Dr. Prashant A. Manusmare	Money, Banking and Finance for BBA 4th Semester Money, banking and Finance		2022	ISBN - 9789387483057	205-205



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43	Dr. Prashant A. Manusmare	Financial Reporting, Statements and Analysis for MBA 1st Semester Financial Reporting, Statements and Analysis		2022	ISBN - 9789388708692	206-206
44	Dr. Aparna Yadav	Botany, First Edition B.Sc.Sem - IV Paper I- Cell Biology, Plant Breeding, Evaluation and seed Technology. Paper II - Genetics, Molecular Biology and Plant Nursery		2022	978-93-91201-96-8	207-212
45	Dr. G.B.Tiwari	Chemistry, B.Sc.Sem - III Paper I- Inorganic Chemistry CH-301 Paper II- Organic Chemistry CH-302		2022	978-93-91201-97-5	213-220
46	Dr. A.M.Ghatole	Chemistry, B.Sc.Sem - IV Paper I- Inorganic Chemistry Paper II- Physical Chemistry		2022	978-93-91331-78-8	221-221
47	Dr. Anand Muley	B.Com.Sem V, Financial Accounting (Theory in Marathi & Problem in English)		2022	978-93-95008-03-7	222-222
48	Dr. Anand Muley	B.Com.Sem VI, Financial Accounting (Theory in Marathi & Problem in English)		2022	978-93-95008-04-4	223-227
49	Dr. Anand Muley	NTA-UGC, NET/JRF/SET COMMERCE(PAPER-II)		Jul-05	978-93-91201-53-1	228-228



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50	Dr. Anand Muley	Advanced Commerce		Jul-05	978-81-951835-0-0	229-229
51	Dr. Anand Muley	Commercial Firms		Jul-05	978-93-95008-30-3	230-233
52	Dr. ANAND MULEY	MODERN BANKING SYSTEM IN INDIA: NEW TRENDS & PROSPECTS A Study on Human Resource Development in Co-Operatives		2022	978-93-90699-79-7	235-235
53	Dr. S.W.Dafare	University Chemistry, Volume II A complete Text Book for B.Sc.Sem - IV Paper I- Water Analysis Paper II- Algebra of operators, Laplacian Operator, Hermitian Operator, Dielectric & Magnetic properties of molecules		2022	978-93-5174-69-35	236-236



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54	Dr. S.W.Dafare	University Chemistry, Volume II A complete Text Book for B.Sc.Sem - II Paper I-Unit IV Paper II-Unit IV		2022	978-93-5174-69-35	237-237
55	Shri.Y.U.RATHOD	University Chemistry, Volume II A complete Text Book for B.Sc.Sem - IV Paper I- Water Analysis Paper II- Algebra of Operators, Laplacian Operator, Hermitian Operator, Dielectric & Magnetic properties of molecules		2022	978-93-5174-69-35	236-236
56	Dr. S.B.Zanje	University Chemistry, Volume II A complete Text Book for B.Sc.Sem - II Paper I-Unit IV Paper II-Unit IV		2022	978-93-5174-69-35	237-237



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Sl. No.	Name of the teacher	Title of the book/chapters published	Title of the paper	Year of publication	ISBN/ISSN number of the proceeding	Page No.
57	DR. S. P. QURESHI	Botany,B.Sc.Sem - III Paper I- Angiosperm Systematics,Embryology & Indoor Gardening Paper II - Angiosperm Anatomy and Horticulture		2021	978-93-5495-397-2	239-243



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58	DR. S. P. QURESHI	Botany, Revised Edition B.Sc.Sem - IV Paper I- Cell Biology, Plant Breeding, Evaluation and seed Technology. Paper II - Genetics, Molecular Biology and Plant Nursery.		2021	978-93-5596-162-4	244-249
59	DR. P.S. RAO	University Botany B.Sc.Sem - I Paper I- Viruse, Prokaryotes & Algae Paper II - Fungi, Lichen, Plant Pathology, Bryophyta		2021	978-81-951772-3-3	250-254
60	DR. S.W.DAFRE	Contemporary Multi-Disiplinary Research Trend Chapter No.5 : Impact of Manganese mining on human health with special reference to heavy metals		2021	978-1685861445	255-255
61	Dr. Vijaya Kanhake		Aadiwasi samoril aavhane va samajik vikas : Ek adhayam	2021	2278-9308	256-256
62	DR. VIJAYA KANHAKKE		Badaltya Vatavarnacha Aarogyawar honara Parinam	2021	978-93-82683-88-9	257-257
63	DR. S. P. QURESHI	Socio-Economic Impact Of COVID-19 On Indian Economy	Corona Virus An Introduction Of New Key Terms	2021	978-93-89234-80-0	258-258



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64	DR. S. P. QURESHI	Unveiling The Boundaries Of Gender Issues	The Role Of Women For Sustainable Agriculture In India	2021	978-93-91248-06-2	259-259
65	DR. P.S. RAO	Ecology Research Volume I	Ethno-Ecological Attributes Of Some Weeds Of Family Asteraceae In Crop Fields Of Bhandara District (M.S)	2021	978-93-88901-19-2	260-260
66	DR. ANAND MULEY		Recent Trends of Rural Education in India	2021	ISSN: 2230-9578	261-272
67	DR. VIJAYA KANHAKHE		Gramin bhagatil uccha Sikhani Sanstasamorit Aavhane	2021	978-93-5445-939-9	273-274



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68	Dr. Karthik Panicker	Pearls of Wisdom- B.Sc,B.Sc.(IT) & BCA Part- I Compulsory English TextBook (Editor)		2020	978-93-83132-99-7	276-284
69	Dr. Karthik Panicker	Empowering Minds - B.Sc,B.Sc.(IT) & BCA Part- I Compulsory English TextBook (Editor)		2020	978-93-83132-98-0	285-293



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70	DR. S. P. QURESHI	Botany, Revised Edition B.Sc.Sem - I Paper I- Viruses, Prokaryotes & Algae Paper II - Fungi, Lichen, Plant Pathology, Bryophyta		2020	978-93-5142-719-3	294-300
71	DR. APARNA YADAV	Botany B.Sc.Sem - I Paper I- Viruse, Prokaryotes & Algae Paper II - Fungi, Lichen, Plant Pathology, Bryophyta		2020	978-81-89178-50-5	301-301
72	DR. S. R. SHARMA	BASIC ELECTRONICS For UG Students		2020	978-93-84336-65-3	302-306
73	DR. S.B. ZANJE	A text Book of Environmental Studies for degree courses B. Sc. Sem-IV		2019	978-81-942042-6-8	307-311
74	DR. VEENA MAHAJAN	A text Book of Environmental Studies for degree courses B. Sc. Sem-IV		2019	978-81-942042-6-8	307-311
75	DR. P. S . RAO	A text Book of Environmental Studies for degree courses B.Sc.Sem-IV		2019	978-81-942042-6-8	307-311
76	Dr. Sidharth Meshram	Aadiwasi Upyojanna va Aarthik Vikas		2019	978-93-85882-65-4	312-315

CRITERION – III

RESEARCH, INNOVATION AND EXTENSION

3.3 RESEARCH PUBLICATIONS AND AWARDS

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2024

RESEARCH ARTICLE | JANUARY 24 2024

Role of isolated compounds from spices and herbs in natural medicinal care or therapy-A review

Archana M. Ramteke ; Pankaj B. Gourand; Sanjay M. Malode



AIP Conf. Proc. 2974, 030001 (2024)

<https://doi.org/10.1063/5.0183505>



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Role of Isolated Compounds from Spices and Herbs in Natural Medicinal Care or Therapy- A Review

Archana M. Ramteke^{1,a)}, Pankaj B. Gour^{2,b)} and Sanjay M. Malode^{3,c)}

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Abstract. Spices and Herbs have a long history of medicinal uses. It includes turmeric, basil, mace, cinnamon, ginger, etc. [1]. Spices are not only used in India as well as in other countries right from the kitchen and medicinal uses in homes. Spice is a seed, fruit, root, bark or other plant substance primarily used for coloring, flavoring and preserving food. Herbs are the leaves, flowers and stem from plants used for flavoring, or as garnishing. Medicinal and aromatic plants have also been used therapeutically to improve the health and well-being of animals, most were given for prophylactic purposes and to improve growth rate and feed conversion ratio efficiency [2, 3]. The alternatives to antibiotics as growth stimulators from the group of prebiotics, probiotics, organic acids, essential oils, medicinal plants, or parts of plants such as thyme, basil, oregano, pepper, and plenty of others are numerous [2]. This chapter includes a wide variety of isolated compounds such as phenolic compounds and flavonoids present in spices are now experimentally documented to possess antioxidant, anti-inflammatory, anti-mutagenic, and anti-carcinogenic activities. It also includes a list of spices compounds that are experimentally evidenced to control cardiovascular diseases, diabetes, cataract, cancer, etc.

INTRODUCTION

Spices and herbs are an important part of the human diet to enhance the flavor, color, and aroma of food. They have also been used from ancient times as a traditional medicine to improve the health of animals. Spices and herbs can be classified based on flavor, taxonomy, or part of a plant from where they came. Presently there has been a trend to use natural substances present in fruits, vegetables, oil seeds, and herbs as antioxidants and rational foods [4, 5, 6]. According to the World Health Organization (WHO), essentially 20,000 medicinal plants reside in 91 countries. The premier steps to make use of the biologically active Phytochemicals from plant resources are extraction, pharmacological screening, isolation and characterization of the bioactive compound, toxicological analysis, and clinical evaluation [7]. A brief summary of the general approaches in extraction, isolation, and characterization of bioactive compounds from plant extract is presented in Figure1.

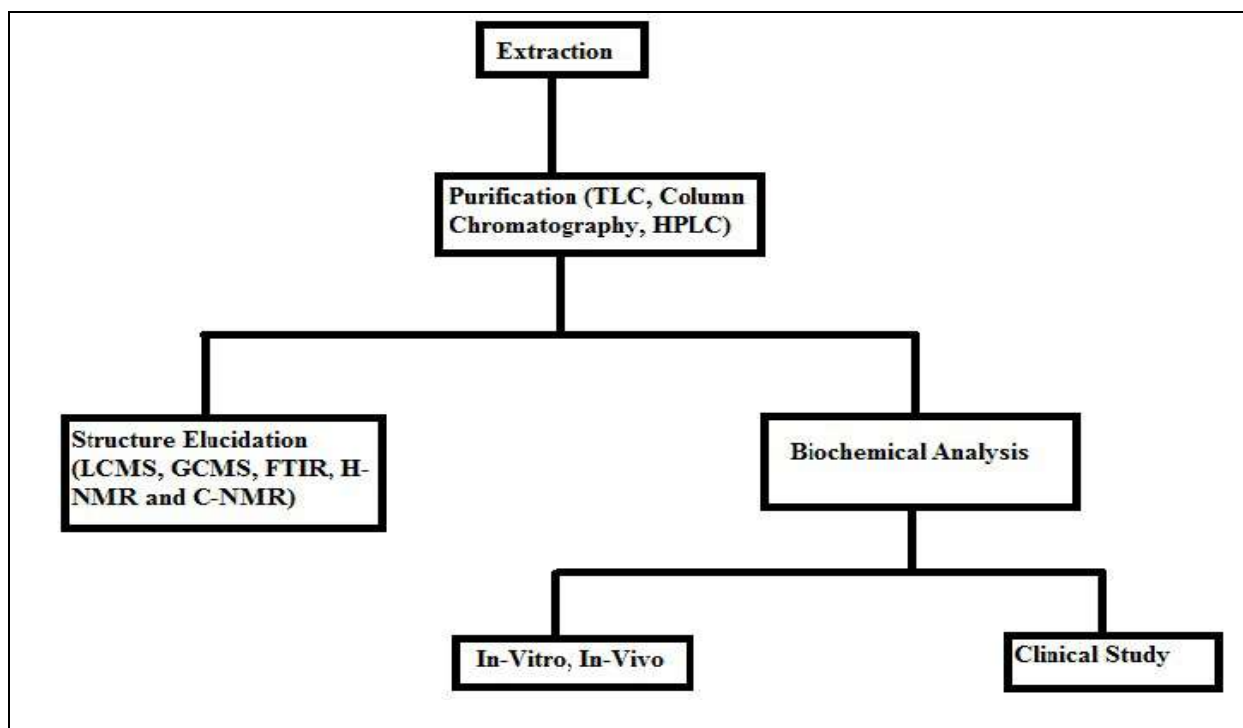


FIGURE 1. Brief summary of the general approaches in extraction, isolation, and characterization of a bioactive compound from plant extracts [8].

Spices and herbs are found to be rich sources of phytochemicals [9, 10, 11, 12]. Phytochemicals are a large group of bioactive derived from plants which have potential protective effects against diseases. This group consists of flavonoids and other phenolic compounds, carotenoids, plant sterols, glucosinolates and other sulphur-containing compounds. There are more than 6000 known flavonoids (Jaganath & Crozier, 2010). Phenolic compounds have various functions in the plant such as structural, defense, as attractants for pollinators and seed-dispersing animals.

Differences Between Spices And Herbs

Spices come from different parts of a plant other than the leaves while herbs come from leaves of a plant. They can be classified into various groups based on taste, taxonomy or part of the plant where they came from.

Based on taste, spices and herbs can be classified into groups:

- Hot spices (black and white peppers, Cayenne pepper, mustard, chillies).
- Mild flavour spices (paprika, coriander), aromatic spices (clove, cumin, dill fennel, nutmeg, mace, cinnamon) and
- Aromatic herbs and vegetables like thyme, basil, onion, garlic etc.

Uses And Benefits Of Spices

TABLE 1. List of Important Spices with its Uses and Benefits [13, 14, 15].

Spices	Uses	Benefits
Asafoetida (Hing)	It is used for seasoning food and has medicinal uses	It can be used as good remedy for whooping cough and stomach ache.
Cardamom (Elaichi)	It give a good flavor and smell. It is also used widely in pharmaceutical sector.	It helps to control bad breath and digestive disorder. Also a whole cardamom chewed is good for Diabetes.
Chilly (Lal Mirch)	It is a main ingredient used for adding hot flavor to the food.	The antioxidants present in chilly help to cope up with cholesterol and also it helps in burning calories.
Cinnamon (<i>Dalchini</i>)	It is used mainly for seasoning food and preparing masala. It has medicinal value too.	It supports natural production of insulin and reduces blood cholesterol.
Clove (Laung)	It is mainly used as a cooking ingredient for seasoning food or preparing masala.	Clove oil is beneficial for coping with tooth ache, sore gums, chest pains, fever, digestive problems, cough and cold.
Coriander (Dhaniya)	Coriander leaves as well as coriander seeds are used in cooking. It also has some medicinal uses.	It can be used on aching joints and rheumatism. It is also good for coping with sore throat, allergies, digestion problems, fever etc.
Cumin (Zeera)	It is used for cooking and it also possesses medicinal properties.	It is a good source of iron and keeps immune system healthy. Water boiled with cumin seeds is good for dysentery.
Curry leaves (<i>Curry Patta</i>)	It is used as a main ingredient for seasoning in some countries. It has many medicinal uses.	These leaves are beneficial for reducing blood sugar. Each part of the plant provides some benefit or the other.
Fenugreek (<i>Methi</i>)	It is mainly used as a green leafy vegetable and seeds are used for seasoning and preparing <i>Masalas</i> . It has medicinal uses too.	Fenugreek seed tea or sweet fudge is good for increasing breast milk. It is also helpful for treating diabetes and lowering cholesterol.
Garlic (<i>Lassan</i>)	It is used for cooking as well as for the medicinal purpose.	It is useful for coping with cough and cold. It also has antibiotic properties.
Ginger (Adrak)	It is used for giving a specific flavor to food and has many medicinal uses.	Helps to avoid digestive problems. It is beneficial for coping with cough and cold.
Mustard (Rye)	It is used for seasoning as well as green leafy vegetable. The use of mustard oil is extensive in India but it is banned in some countries.	Mustard oil is good for body massage and even for getting good hair. It consists of omega-3 fatty acids. It is an excellent source of iron, zinc, manganese, calcium, protein etc.
Nutmeg (Jaiphal)	It is used in powdered form for garnishing and preparing the masala. It is used in making soaps, perfumes, and shampoos. It is also used for medicinal purposes.	It is beneficial for the treatments of asthma, heart disorder and bad breath problems.
Pepper (<i>Kaali Mirch</i>)	It is extensively used in cooking, especially for garnishing. It has many medicinal uses too.	It helps to deal with cold, cough, infections, muscle pains, and digestive problems.
Saffron (Zaffran/Kesar)	It is used for cooking as well as in beauty products. It is mainly used in sweet dishes. It has good medicinal properties.	It helps to cope with skin diseases. It is a good remedy for cough, cold, and asthma.
Star anise (Chakra Phool)	It is used in cooking and for medicinal use.	Star anise oil is beneficial for rheumatism, digestion, and avoiding bad breath.
Turmeric (Haldi)	It is used in cooking and skin care products. It has wide range of medicinal use.	It helps to deal with skin problems, healing cuts and wounds. Also, it makes coping with diabetes easier.

CHEMICAL COMPOUNDS IN HERBS AND SPICES

Anise

Anise is a seed spice derived from a flowering plant belonging to the family *Apiaceae*. Flavor and aroma from anise comes from anethole. Anethole is a phenylpropene derivative found in anise (*Pimpinella anisum*) and fennel (*Foeniculum vulgare*). Anethole occurs naturally in high concentrations in volatile oils such as anise oil (80–90%), star anise oil (over 90%), and fennel oil (80%) [16]. Anethole exists in both a *cis* and a *trans* isomer with the *trans* isomer being more abundant. It is the main component of the anise essential oil (80–90%), with minor components including para-anisaldehyde, estragole, and pseudoisoeugenyl-2-methylbutyrates, among others [17]. Anethole is also used in medicines as an expectorant, an antitussive and an antispasmodic for treating gastrointestinal tract illnesses. As a result, anise is found in a number of pharmaceutical products.

Basil

Basil (*Ocimum basilicum*) is a culinary herb belonging to the botanical family *Lamiaceae*. It has been used traditionally as a medicinal herb in the treatment of headaches, coughs, diarrhea, constipation, warts, worms, and kidney disorders. It is also a source of aroma compounds and essential oils containing biologically active constituents that possess antimicrobial and antifungal properties [18, 19]. Linalool is the main constituent of the essential oil of *O. basilicum* (28.6–60.6%), followed by estragole, methyl cinnamate, epi- α -cadinol, α -bergamotene, γ -cadinene (3.3–5.4%), germacrene D (1.1–3.3%), and camphor (1.1–3.1%). Other compounds such as myrcene, pinene, terpineol, 1,8-cineole, eugenol, and methyleugenol have been identified in basil leaves[20].

Chili pepper

The chili pepper is a fruit spice derived from plants from the genus *Capsicum*, originated in Mexico and brought to Asia by Portuguese navigators during the sixteenth century. Chili peppers are used as food colorants, flavoring agents, as predator repellants, and a source of pain relief. The compounds responsible for the “hot” flavor of chili peppers are called capsaicinoids, with capsaicin being the best known. *Capsicum* contains up to 1.5% (by weight) of pungent compounds, commonly composed of capsaicin, dihydrocapsaicin, and others. Other constituents present in chili peppers are carotenoids, vitamins A, C, and small amounts of volatile oils with more than 125 known components. Another class of capsaicin-like compounds found in chili peppers and non-pungent chili peppers are capsinoids. Many positive health benefits have been ascribed to both capsaicin and capsinoids, including anticancer, anti-inflammatory, and analgesic effects [21].

Cinnamon

Cinnamon is a bark spice obtained from the inner bark of several tree species from the genus *Cinnamomum*. Cinnamon is native to India, Sri Lanka, Bangladesh, and Myanmar, and it was imported to Egypt as early as 4000 years ago [22]. In addition to its common culinary use as a condiment and flavoring material, cinnamon is widely known for its anti-diabetic and glucose-lowering effects [23]. The flavor of cinnamon is due to an aromatic essential oil that is largely composed of cinnamaldehyde (up to 90%); however, there are at least 80 other compounds known to be in cinnamon oil, including cinnamyl alcohol, cinnamyl acetate, eugenol, and various coumarins that contribute to its overall flavor and aroma [24].

Ginger

Ginger (*Zingiber officinale*) is a root or rhizome-based spice derived from the ginger plant, a member of the turmeric family (both are from *Zingiberaceae*). Ginger is believed to have originated in India and is widely used as a culinary additive as a hot, fragrant spice as well as a popular medicine. In addition to ginger’s well-known use as a treatment for nausea, many components in ginger have been found to have anti-inflammatory, antibacterial, antipyretic, anti-lipidemic, anti-tumorigenic, and anti-angiogenic effects [25, 26]. A variety of active components have been identified in the oleoresins of ginger including zingerone, gingerols (6-, 8-, and 10-gingerols), and

shogaols (6-, 8-, and 10-shogaols) [27]. Gingerols (especially 6-gingerol) are the major pungent components in the fresh ginger rhizome.

Nutmeg

Nutmeg is a fragrant flavoring spice coming from the seed of *Myristica fragrans* (belonging to the *Myristicaceae* family), an evergreen tree indigenous to the Banda Islands in the Moluccas (or Spice Islands) of Indonesia. The nutmeg essential oil is obtained by steam distillation of ground nutmeg, and it is used widely in the perfumery and pharmaceutical industries. This volatile fraction typically contains sabinene (21.38%), 4-terpineol (13.92%), and myristicin (13.57%), as well as portions of safrole, elimicin, terpineol, α -pinene d-camphene, limonene, linalool, and isoeugenol [28].

Paprika

Paprika is a ground spice made from the red, air-dried fruits of the larger and sweeter varieties of the plant *Capsicum annuum*, which is also called bell pepper or sweet pepper. Paprika can also be modified with the addition of more pungent chili peppers and cayenne pepper. The red, orange, or yellow color of paprika is due to its content of carotenoids. Paprika carotenoids, particularly capsanthin and capsorubin, have been reported to have a strong antioxidant activity [29]. Based on these results, cucurbitaxanthin A, capsanthin, capsanthone, and cryptocapsin could be potential paprika-specific carotenoid biomarkers. However, further analyses using untargeted MS-based approaches should be conducted to evaluate other possible biomarkers of paprika intake.

Parsley

Parsley (*Petroselinum crispum*) is an herb belonging to the *Apiaceae* family. It is native to the central Mediterranean region. Fresh parsley has a clean, green aroma with a versatile fresh taste that is slightly peppery with an after taste of green apple. Parsley is a source of several flavonoids, especially luteolin and apigenin [30]. Apigenin is associated with anti-inflammatory activities as it appears to downregulate or inhibits cyclo-oxygenase-2 (COX-2). Apigenin has also been identified as a potential cancer chemopreventive agent [31]. The major essential oil found in parsley leaves is 1, 3, 8-*p*-menthatriene, but other components are also present in lesser amounts including myristicin and limonene, among others [32, 33].

Peppermint

Peppermint and spearmint are herbs that belong to the *Lamiaceae* family. Spearmint (*Mentha spicata*) is believed to be the oldest of the mints. The active constituents of spearmint include spearmint oil, various flavonoids (diosmin, diosmetin), phenolic acids, and lignans. The most abundant compound in spearmint oil is carvone, which gives spearmint its distinctive smell. Peppermint has a high menthol content (40.7%), along with menthone (23.4%), and other essential oils such as menthyl acetate (4.2%), 1,8-cineole (5.3%), limonene (2.6%), menthofuran (3.7%), and β -caryophyllene (1.7%) [34]. Peppermint also contains terpenoids and flavonoids such as eriocitrin, hesperidin, and kaempferol 7-O-rutinoside.

Saffron

Saffron is among the world's most costly spices. It comes from the dried flower stigma of *Crocus sativus*. Saffron contains more than 150 volatile and aroma-yielding compounds. Safranal(2,6,6-trimethyl-1,3-cyclohexadiene-1-carboxaldehyde) is the major compound (70%) in the volatile fraction of saffron [35]. Saffron also has a number of non-volatile active components many of which are carotenoids, including zeaxanthin, lycopene, and various α - and β -carotenes. However, the golden yellow-orange color of saffron is primarily the result of the carotenoid α -crocin, a glycosylester of crocetin. Picrocrocin(4-(β -d-glucopyranosyloxy)-2,6,6-trimethyl-1-cyclohexene-1-carboxaldehyde) has also been found in saffron spice from 0.8 to 26.6% on a dry basis. This compound is responsible for saffron's bitter taste. In addition, saffron contains two important vitamins: riboflavin

and thiamine. Saffron extracts and tinctures have been used as antispasmodic agents, gingival sedatives, nerve sedatives, expectorants, stimulants, and aphrodisiacs.

Sage

Sage or *Salvia officinalis* is a medicinal plant belonging to the *Lamiaceae* family. Sage has been used in traditional medicine for the treatment of seizures, ulcers, gout, rheumatism, inflammation, dizziness, tremors, paralysis, diarrhea, and hyperglycemia [36]. Sage has a savory, slightly peppery flavor. It is strongly aromatic, and is characterized by a medicinal, lemony, or bitter taste. It is used for seasoning and flavoring in many different foods including sausages and stuffing. The major components present in sage are α -thujone (11.55–19.23%), viridiflorol (9.94–19.46%), 1, 8-cineole (8.85–15.60%), camphor (5.08–15.06%), manool (5.52–13.06%), β -caryophyllene (2.63–9.24%), α -humulene (1.93–8.94%), and β -thujone (5.45–6.17%) [37]. Some of the major phenolic compounds found in sage are rosmarinic acid, caffeic acid, carnosol, and carnosic acid.

Tarragon

Tarragon (*Artemisia dracunculus*), also known as estragon, is a perennial herb belonging to the *Asteraceae* (daisy) family. It is widespread across much of Eurasia and North America, and is cultivated for culinary and medicinal purposes. In vitro pharmacological studies indicate that tarragon has antibacterial, antifungal, and antiplatelet activity [38]. In vivo pharmacological studies have shown that tarragon has anti-inflammatory, hepatoprotective, antihyperglycemic, and antioxidant activity. The major components of Russian tarragon are reported to be terpinen-4-ol, sabinene, and elemicin. Methyleugenol and estragole are usually present in tarragon oils at about 10 and 3%, respectively. However, estragole is one of the predominant compounds in the essential oil of French tarragon, constituting up to 82% [38]. *Trans*-anethole (21.1%), α -trans-ocimene (20.6%), limonene (12.4%), α -pinene (5.1%), and allo-ocimene (4.8%) are the other main components of tarragon.

Turmeric

Turmeric is a rhizomatous herbaceous perennial plant (*Curcuma longa*) belonging to the ginger family, *Zingiberaceae*. It is a key ingredient in many Asian dishes and is used mainly as a coloring agent. The most notable phytochemical components of turmeric root include compounds called curcuminoids, such as curcumin (diferuloylmethane), demethoxycurcumin (DMC), and bisdemethoxycurcumin (BDMC). Curcumin is a polyphenolic molecule that constitutes 3.14% (on average) of powdered turmeric. Curcumin is what gives the spice its yellow color [39]. The rhizome oils of turmeric contain more than 40 identifiable compounds, with the major constituents being α -turmerone (30–32%), aromatic-turmerone (17–26%), and β -turmerone (15–18%). This interest is likely due to the multiple biological or health activities attributed to it, including antioxidant, anti-inflammatory, and anti-tumor activities. Recent clinical studies with curcumin have demonstrated additional health benefits relating to treating immune deficiencies, improving cardiovascular health, treating depression [40], combating Alzheimer's disease, treating diabetes, arthritis, and inflammatory bowel disease [41].

Oregano, Rosemary and Thyme

Oregano, rosemary and thyme are well known for their beneficial health properties. For example, carnosic acid and some of the diterpenes abundant in rosemary and sage appear to exert anti-obesity effects (including body weight and lipid-lowering effects) [42]. Several compounds found in herbs from the *Lamiaceae* family also exhibit antimicrobial activity, such as thymol, carvacrol, carnosol, rosmanol, and caffeic acid [43]. Oregano also contains polyphenols, including caffeic, *p*-coumaric, and rosmarinic acid, which confer antioxidant activity and prevents lipid peroxidation [44].

Rosemary (*Rosmarinus officinalis*) is native to the Mediterranean and Asia. The leaves are used as a flavoring agent in a variety of foods in traditional Mediterranean cuisine. They have a bitter, astringent taste, and a very characteristic aroma. Rosemary contains a number of phytochemicals, including rosmarinic acid, camphor, caffeic acid, ursolic acid, betulinic acid, carnosic acid, and carnosol [44]. Major essential oils present in rosemary oil are borneol (26.5%), α -terpinene (15.6%), and α -pinene (12.7%).

Thyme (*Thymus vulgaris*) is also a member of the *Lamiaceae* family, and it has been used in foods mainly for flavor, aroma, and food preservation. Thyme has also been used in folk medicine since the times of the ancient Egyptians, Greeks, and Romans. The leafy parts of thyme are often added to meat, fish, and food products and also used as herbal medicinal products. The essential oils of common thyme contain 20–58% thymol and *p*-cymene (15–28%) as the most prevalent compounds, followed by linalool (0.7–6.5%), γ -terpinene (4–10%), carvacrol (1–4%), myrcene (1–3%), 1,8-cineole (0.8%), and borneol (0.7–1.7%) [45]. Thymol is the compound that provides the distinct flavor of thyme. It is also found in oregano and is used as one of many additives in cigarettes.

CONCLUSION

Spices and herbs have been used since the early days of humankind and are still used throughout the world for health promotion and treatment of various diseases. Plants are found to be the source of today's modern medicine and contribute largely to the commercial drug preparation.

However, in many developing countries, herbal medicine is used as traditional medicine. Interests in food compounds from spices and herbs will continue to increase research and technologies which will develop better ways of growing spices and herbs that contain higher amounts of antioxidants. Present study shows several bioactive compounds have been isolated from various spices and herbs, which provides scientific and medicinal basis to include spices and herbs in our diet.

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A Review of Two Deep Learning Models for Video Processing

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Abstract :

In this era when we are under watch every minute. A huge amount of video graphic data is generated every day. But extracting useful information from videos is a very tedious job. Recently Deep Learning techniques have gain quite a lot of interest of researchers. Convolution Neural Network algorithm have gained great height recently. A new branch of CNN named Deep CNN came into existence. Various pre trained models of Deep CNN are been created due to its ability of extracting features by its own and high accuracy in classification. This paper aims to reviews two Deep CNN model VGG16 and Inception(Google LenNet) which are widely used by the researchers for the task of video processing.

Keywords :

Video Processing, Machine Learning, Deep Learning.

1. Introduction :

Twenty first century is a fast-growing world. It is the era of ICT. With the fast advancement in technology, we are more surrounded by gadgets. A lot of ways have come into existence which can be used to capture videos. The video can be captured with the help of cameras, mobile phones, surveillance cameras, etc. So a huge amount of video data is generated. This caught the attention of the researchers and the major work has been concentrated on video processing. The previous decade can be called a decade of image processing. But this decade is moreover a decade of video processing.

A lot of work is going on in the field of video processing. The majority of the work has been focused on the task of action recognition, face recognition, emotion recognition, video summarization, etc. The list of the applications is never ending.

The video data is nothing but the continuous stream of frames. It majorly comprises two features that are spatial and temporal. This is often referred to as spatio-temporal features. Then traditional ways of extracting this feature was based on the handcrafted methods for

feature extraction. Space time interest point (STIP), Scale Invariant Feature Transformation (SIFT), Motion Scale Invariant Feature Transform (MSIFT) are some of the approaches to extract handcrafted features. Descriptors such as Histogram of Oriented Gradient (HOG), Histogram of optic Flow (HOF) were used for the Human Activity Recognition(HAR).

Modern techniques for video processing make use of Machine Learning algorithms. Convolution Neural Network CNN is found out to be very promising when it comes to image and video data. A lot of pre-trained models of CNN are available. This paper aims to review a few pre-trained models of CNN which can help to make a wise decision for further research in the field. Out of the available models this paper will review the VGG16 and Inception(GoogLeNet). These three are the widely and most commonly used pre-trained model of CNN when it comes to the task of video processing.

2. Literature Review :

Peipei Zhou et al. [1] A new input modality, image acceleration field is proposed to better extract the motion attributes. Firstly, each video is framed as RGB images. Secondly, the optical flow field is computed using the consecutive frames and acceleration field is obtained according to the optical flow field. Thirdly, the FightNet is trained with three kinds of input modalities, i.e., RGB images for spatial networks, optical flow images and acceleration images for temporal networks. By fusing results from different inputs, they conclude whether a video tells a violent event or not. To provide researchers a common ground for comparison, they have collected a violent interaction dataset (VID), containing 2314 videos with 1077 fight ones and 1237 no-fight ones. By comparison with other algorithms, experimental results demonstrate that the proposed model for violent interaction detection shows higher accuracy and better robustness.

Heyam M. Bin Jahlan et al. [2] work proposed a novel method to detect violence using a fusion technique of two significantly different convolutional neural networks

(CNNs) which are AlexNet and SqueezeNet networks. Each network followed by separate Convolution Long Short Term memory (ConvLSTM) to extract robust and richer features from a video in the final hidden state. Then, making a fusion of these two obtained states and fed to the max-pooling layer. Finally, features were classified using a series of fully connected layers and softmax classifier. The performance of the proposed method is evaluated using three standard benchmark datasets in terms of detection accuracy: Hockey Fight dataset, Movie dataset and Violent Flow dataset. The results show an accuracy of 97%, 100%, and 96% respectively. A comparison of the results with the state of the art techniques revealed the promising capability of the proposed method in recognizing violent videos.

Irfanullah et al.[3] In their research, multiple key challenges have been incorporated with the existing work and the proposed work contrast. Firstly, violent objects can't be defined manually and then the system needs to deal with the uncertainty. The second step is the availability of label dataset because manually annotation video is an expensive and laborintensive task. There is no such approach for violence detection with low computation and high accuracy in surveillance environments so far. The Convolutional Neural Network's (CNN) models have been evaluated with the proposed MobileNet model. The MobileNet model has been contrasted with AlexNet, VGG-16, and GoogleNet models. The simulations have been executed using Python from which the accuracy of AlexNet is 88.99 and the loss is 2.480 (%). The accuracy of VGG-16 is 96.49 and loss is 0.1669, the accuracy of GoogleNet is 94.99 and loss is 2.92416 (%). The proposed MobileNet model accuracy is 96.66 and loss is 0.1329 (%). The proposed MobileNet model has shown outstanding performance in the perspective of accuracy, loss, and computation time on the hockey fight dataset.

Shakil Ahmed Sumon et al. [4] have explored different strategies to find out the saliency of the features from different pretrained models in detecting violence in videos. A dataset is created which consist of violent and non-violent videos of different settings. Three Image Net models; VGG16, VGG19, ResNet50 are being used to extract features from the frames of the videos. In one of the experiments, the extracted features have been feed into a fully connected network which detect violence in frame level. In another experiment, they had fed the extracted features of 30 frames to a long short-term memory (LSTM) network at a time. Furthermore, they applied attention to the features extracted from the frames through spatial transformer network which also enables transformations like rotation, translation and scale. Along with these models, they designed a custom convolutional neural network (CNN) as a feature extractor and a

pretrained model which is initially trained on a movie violence dataset. In the end, the features extracted from the ResNet50 pretrained model proved to be more salient towards detecting violence. These ResNet50 features, in combination with LSTM provide an accuracy of 97.06% which is better than the other models we have experimented with.

Narges Honarjoo et al. [5] employed pre-trained deep neural networks in order to present a low-complexity method for violence detection. The extracted features from pre-trained models have been pooled and fed into a fully connected network in order to detect whether a violent action has occurred. As pre-trained models, the results of both ResNet-50 and VGG16 are explored in the proposed approach. They evaluate the effectiveness of the method on four public datasets. The experimental results depict the efficiency of the low-complexity proposed approach in comparison with other approaches using time-consuming networks like recurrent ones.

3. Algorithms :

3.1 VGG 16 :

It is a pre-trained model with 3 x 3 filter for convolution layer and 1 stride. It uses 2 x 2 filters and 2 stride for max pooling layer. Same configuration is used for padding also. It does not use any hyper parameter but consists of this simple arrangement. In VGG 16 this arrangement is consistent throughout the architecture. At the end of the architecture there are two fully connected layers which are followed by the softmax function for output. There are all 16 layers in this Deep learning model hence it is called VGG 16. This layer can be extended up to 19 layers which builds the architecture of VGG19. It takes the input from three RGB channels with the size of 244 x 244. The total no of filters in Convolution layer 1 is 64, layer 2 is 128, layer 3 is 256, and layer 4 and 5 have 512 filters.

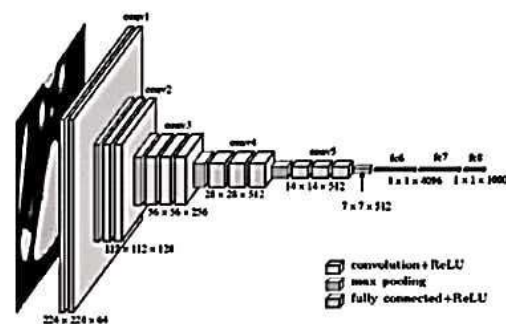


Fig.1 : The standard VGG-16 network architecture as proposed in [6].

The fully connected layers have 4096 and 4096 nodes respectively. The softmax consists of 1000 nodes.

This model is best suited when less training time is required. As it has very few parameters it takes very less time for training while giving quite impressive results.

3.2 Inception (GoogLeNet) :

Another Deep Learning model of CNN is Inception which is proposed by Google. This architecture is total 27 layers deep. It is based on the idea of a sparsely connected network. This architecture consists of convolution layer, followed by a max pooling layer, inception, avg pool, dropout, liner and lastly a softmax function. There are 2 convolution layers, 4 max pool layers, and 9 inception layers which is followed by a dropout, avg pool, linear and a softmax layer. Which makes this architecture huge. The Inception layer is the combination of 1 x 1 convolution layer, 3 x 3 convolution layer, 5 x 5 convolution layer with the output filter to create an image which in turns acts as an input to the next layer of the architecture.

The Inception requires a lot of space as it has this huge architecture. The variable type features need to be extracted by different sizes of kernel. This is rightly done by Inception. It got a small to large kernel implemented in one layer which are perfectly suited for this task.

type	patch size/ stride	output size	depth	# 1x1	# 3x3 reduce	# 3x3	# 5x5 reduce	# 5x5	pool proj	param	ops
convolution	7x7/2	112x112x64	1							2.7K	34M
max pool	3x3/2	56x56x64	0								
convolution	3x3/1	56x56x192	2		64	192				112K	369M
max pool	3x3/2	28x28x192	0								
inception (3a)		28x28x256	2	64	96	128	16	32	32	159K	128M
inception (3b)		28x28x480	2	128	128	192	32	96	64	380K	304M
max pool	3x3/2	14x14x480	0								
inception (4a)		14x14x512	2	192	96	208	16	48	64	364K	73M
inception (4b)		14x14x512	2	160	112	224	24	64	64	437K	88M
inception (4c)		14x14x512	2	128	128	256	24	64	64	463K	100M
inception (4d)		14x14x528	2	112	144	288	32	64	64	580K	119M
inception (4e)		14x14x528	2	256	160	320	32	128	128	840K	170M
max pool	3x3/2	7x7x512	0								
inception (5a)		7x7x512	2	256	160	320	32	128	128	1072K	54M
inception (5b)		7x7x1024	2	384	192	384	48	128	128	1388K	71M
avg pool	7x7/1	1x1x1024	0								
dropout (40%)		1x1x1024	0								
linear		1x1x1000	1							1000K	1M
softmax		1x1x1000	0								

Table 1 : GoogLeNet incarnation of the Inception architecture.[7]

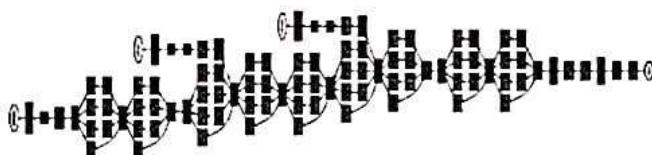


Fig. 2 : GoogLeNet network with all the bells and whistles.[7]



Fig. 3 : Inception module with dimensionality reduction and Inception module, naive version[7]

Conclusion :

In this paper we have reviewed two greatly used pre-trained models of CNN which are used in deep learning. It has been observed that the VGG 16 or VGG 19 (the architecture with 19 layers) requires comparatively less parameters to train and as a result it takes less time to get trained. The Inception pre-trained CNN is a deep architecture of 27 layers. When it comes to the extraction of variable type features the Inceptions is the best choice as it got multiple kernels of different size built in a single layer. But it requires a good amount of space and takes time to get trained.

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Today's Challenges, Trends & Applications of Natural Language Processing (NLP)

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Abstract :

Natural language processing establish communication between humans and machines. It enables computers to understand human language makes interacting with computers much more intuitive for humans. It offers improved accuracy and efficiency of documentation. Enables an organization to use chatbots for customer support as well as make easier for organizations to perform sentiment analysis. An organization can use NLP to better understand social media posts, surveys and reviews also provides an organization with the ability to automatically make a readable summary of a larger, more complex original text. Natural language processing, or NLP, has garnered a lot of attention today as a way to computationally represent and understand human language. Its uses have spread to a variety of sectors, including as machine translation, email spam identification, information extraction, summarization, and the medical field. This paper focuses on the trends, challenges and application in Natural Language Processing.

Keyword :

Natural Language Processing, Sentiment Analysis, Text Summarization, Reinforcement learning, Trends & Challenges.

Natural Language Processing:

These days, communicating using any language i.e. NATURAL LANGUAGE is the primary requirement for understanding one another, whether it be on social media or in any other particular industry. A language may be defined as a set of integrated rules or symbols that are used to broadcast or transfer information. Since not all users are conversant in machine-specific language, natural language processing (NLP) helps users who don't have the time to learn new languages. Actually, training computers to understand words or phrases written in human languages is the goal of the artificial intelligence and linguistics fields of natural language processing (NLP). It was developed to facilitate natural language communication between people and computers and to make user job easier.

Natural language processing used for:

- **Text classification:** Text categorization function using tags, this function groups texts into categories. This can be useful for sentiment analysis, which helps the natural language processing algorithm determine the sentiment, or emotion, behind a text.
- **Text extraction :** This feature discovers key information in text and summarizes it automatically. One example of this is keyword extraction, which pulls the most important words from the text, which can be useful for search engine optimization. This isn't entirely automated when using natural language processing, therefore some programming is needed.
- **Machine translation:** Machine translation in Natural Language Processing (NLP) has several benefits, including Improved communication. Machine translation makes it easier for people who speak different languages to communicate with each other, breaking down language barriers and facilitating international cooperation.
- **Natural Language Understanding :** NLU makes it possible for computers to comprehend natural language and analyze it by removing concepts, entities, emotions, keywords, and other elements. In customer service applications, it's utilized to comprehend issues that consumers report, either orally or in writing. The study of language meaning, language context, and language varieties is known as linguistics. Therefore, it is critical to comprehend the various NLP levels and key terms. Next, we go over a few terms that are frequently used at various NLP levels.
- **Natural language Generation :** The process of creating meaningful words, sentences, and paragraphs from an internal representation is known as natural language generation, or NLG. It is a component of natural language processing and comprises four stages: goal identification, goal planning (based on scenario analysis and available communication sources), goal realization as a text, and goal realization.

Natural Language Processing Trends:

- **Virtual Assistants :** Virtual assistants are becoming more and more popular in gadgets and software since they increase accessibility and offer information whenever needed. But only when the virtual assistants comprehend the question without misinterpreting it can they provide proper information. Startups are using natural language processing (NLP) to create innovative chatbots and virtual assistants. Unlike human virtual assistants, they reduce processing errors and operate continually. NLP-enabled virtual assistants are also useful for helping with academic research, informing manufacturing workers, and many other tasks.
- **Sentiment Analysis:** Text, video, and audio data are produced at exponential rates in our increasingly digitized environment. Natural language processors can digest vast amounts of data, but they are not able to distinguish between neutral, positive, or negative speech. Also, unlike normal NLP models, support agents can modify their dialogue with clients based on their emotional state during interactions. As a result, NLP models that comprehend both the context and the sentimental or emotional content of text data are being developed by entrepreneurs. These NLP models enhance consumer satisfaction and loyalty by providing superior products and experiences.

Multilingual Language Models:

There are approximately 7000 languages spoken in the globe, each with unique nuances, making communication extremely hard. Since the majority of natural language processors on the market today are English-only, they are either ineffective or do not serve other markets well. The creation of NLP models that correctly comprehend unstructured input in several languages is made possible by the availability of sizable training datasets in various languages. Businesses are able to accelerate their translation procedures, expand their brand reach, and improve data accessibility as a result.

Language Transformers:

Natural language solutions require massive language datasets to train processors. This training process deals with issues, like similar-sounding words, that affect the performance of NLP models. Language transformers avoid these by applying self-attention mechanisms to better understand the relationships between sequential elements. Moreover, this type of neural network architecture ensures that the weighted average calculation for each word is unique.

Transfer Learning :

Models cannot generalize what they learn from machine learning challenges since they are domain-specific in nature. This is problematic because, in contrast to training datasets, real-world data is primarily unstructured. This has an impact on the trained models' predictability as a result. Transfer learning, however, allows many language models to share a large portion of their training data in order to maximize the overall deep learning process. The time and expense required to train new natural language processing (NLP) models are greatly decreased by the use of transfer learning.

Text Summarization:

When it comes to interpreting vast amounts of data and comprehending spoken and written human language, natural language processors are incredibly effective. However, when evaluating huge text documents, standard NLP models are unable to distinguish between relevant and irrelevant information. Consequently, companies are using machine learning algorithms to create natural language processing (NLP) models that condense long texts into a coherent, flowing synopsis that includes all the important details. These language processors' primary advantages are the reduction in time required to dissect a document and the boost in output that results from rapid data summarization.

Semantic Search:

Search engines play a crucial role in digital information retrieval operations. Lack of knowledge about the context and intent of the supplied data is one of the obstacles to efficient searches. Semantic search queries that evaluate search intent are made possible by NLP. As a result, search results are more relevant and search accuracy is increased. Semantic search models are therefore useful in a variety of fields, including enterprise knowledge management, eCommerce, and academic research.

Reinforcement Learning:

Presently, NLP-based systems find it difficult to handle circumstances that fall outside of their purview. As a result, it takes a lot of effort to retrain AI models for every unique scenario that they are unable to handle. Through feedback from the environment, reinforcement learning helps NLP models learn how to behave in a way that increases the likelihood of a favorable result. This makes it possible for developers and companies to use a series of reward-based training rounds to continuously enhance the performance of their NLP models. Thus, these learning models enhance NLP-based applications, including chatbots, translation software, and healthcare software.

Natural Language Processing Applications:

- **NLP in the Marketing and Advertising Industry:** NLP helps in analyzing customer opinions and preferences through sentiment analysis. It extracts relevant keywords from customer reviews and feedback to recognize key themes. NLP uses topic modeling to identify emerging topics and customer interests. Named Entity Recognition helps identify brand mentions and influencers. Text classification categorizes customer feedback and queries are also done by NLP.
- **NLP Application in the Finance Industry:** NLP analyzes news and social media sentiments for stock market predictions. Text mining extracts pertinent data from financial reports of industry. Anomaly detection and clustering are used for fraud prevention. NLP-driven chatbots assist in customer service and support. NLP summarizes financial news for quick updates.
- **NLP Applications in Healthcare Industry:** NLP is used for analyzing and processing clinical documents. It aids in predicting diseases and planning treatments. NLP extracts information from medical records and research papers. Mining patient data supports population health management. NLP-driven chatbots assist and support patients.
- **NLP Applications in Human Resources:** NLP is used to analyze resumes for candidate matching. Feedback analysis aids in performance evaluation done by NLP. NLP monitors employee sentiment and engagement. NLP analyzes diversity in job postings also. NLP is applied to monitor compliance and assess risks.
- **NLP Applications in Education :** NLP automates the grading process. Personalized tutoring based on student needs is facilitated through NLP. NLP is used for analyzing textbooks and course materials. NLP helps in detecting and preventing plagiarism. NLP is applied to analyze student engagement and sentiment.
- **NLP Applications in E-Commerce and Retail :** NLP categorizes products for recommendation. Customer feedback is analyzed using NLP. NLP-driven chatbots provide customer support. NLP optimizes inventory and supply chain. NLP aids in detecting and preventing fraudulent activities.
- **NLP Applications in Customer Service:** NLP aids in understanding sentiments from customer feedback. Chatbots driven by NLP assist in handling customer inquiries. Call center voice data is analyzed using NLP. NLP helps in predicting customer behavior. Personalized product recommendations.

Challenges of natural language processing

- **Precision:** Traditionally, humans have had to communicate with computers using a restricted set of explicitly spoken voice instructions or a precise, unambiguous, highly organized programming language. Human speech, on the other hand, is frequently ambiguous and its linguistic structure can be influenced by a wide range of intricate factors, such as social context, regional dialects, and slang.
- **Tone of voice and inflection :** The field of natural language processing is still in its infancy. Semantic analysis, for instance, can still be difficult. The fact that abstract language use is sometimes difficult and sophisticated for programs to comprehend is another challenge. For example, sarcasm is difficult for natural language processing to understand. Understanding the terms being used and their context in a conversation is typically necessary for these issues. Furthermore, the word or syllable that the speaker emphasizes in a statement might alter its meaning. When recognizing speech, NLP algorithms may fail to pick up on minute but significant variations in a speaker's voice. Different accents might also differ in tone and intonation of speech, making it difficult for an algorithm to parse.
- **Evolving use of language :** The fact that language and how people use it is always evolving presents another problem for natural language processing. While there are norms in language, they are not set in stone and can change throughout time. With the changing nature of real-world language, hard computational principles that are currently effective may become outdated in the future.
- **Bias:** When the biases present in their training data are reflected in the NLP systems' processes, bias might arise. This is a problem since hiring practices and the medical industry may prejudice against an applicant.

Conclusion :

NLP is a recent area of research and application. NLP-based information access technologies will continue to be a major area of research and development in information systems now and far into the future.

- **Application:** The most popular applications of Natural Language Processing in this paper. NLP is used in many other areas such as social media monitoring, translation tools, smart home devices, survey analytics, etc. Also understood vast use of NLP in various application improving our daily lives.
- **Trends:** In this research paper we understood about current trends of Natural Language Processing in

many areas like virtual assistant, sentiment analysis, language transformers, reinforcement learning etc.

- **Challenges:** We conclude by discussing the future of NLP and the challenges that the field faces. We believe that NLP has the potential to revolutionize the way we interact with computers and the way we process information. However, there are also some challenges that need to be addressed, such as the lack of interpretability of NLP models and the need for more data.

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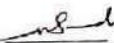
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Role of Biofertilizers In Sustainable Agriculture and an Environmental Development

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ABSTRACT

Producing healthy crops for the fulfilment of the demands of the world's growing population is fully dependent upon kind of the fertilizers being used to provide the plants with all the important nutrients but more dependability on the chemical fertilizers is destroying the environmental ecology and negatively impacting the health of humans. Bio based fertilizers are basically the preparations of living cells or latent of efficient potential microbial strains that assist the plants in nutrient uptake by their associations in the rhizosphere region when supplied to the plants either through the seed or the soil. Thus using microbes as bio inoculants is believed to be the best substitute of chemical fertilizers as eco-friendly manner for plant growth and soil fertility.

KEYWORDS- Bio based fertilizers ; Environmental ; Microbial strains ; Soil fertility.

I-Introduction

The term Biofertilizers denotes nutrient inputs of plant growth which are biological origin. The Biofertilizer restore the soils natural nutrient cycle and build soil organic matter. The role of Biofertilizer in agriculture Production assumes Special significance particularly in the present context of expensive Chemical fertilizers. Moreover it can provide to the farmers a new strategy which is helpful for achieving the goal of increasing productivity. "Bio-Fertilizers refer to various inoculants or Cultures containing a specific microorganisms in concentrated form which are derived either from nodules of plant roots or from the soils of roots of Leguminous Plants or Non Symbiotically (free living) or to transfer native soil nutrients such as P,Zn, Cu, Fe,S etc. from the non usable (fixed) form to usable form through biological processes." Biofertilizer is the need of modern agriculture since demand for safe and residue free food is increasing. Biofertilizer become popular to counter the negative impact of indiscriminate use of chemical fertilizers. Biofertilizers help in fixing atmospheric nitrogen, converting soil phosphate and potash into soluble forms to make them available to plants. Biofertilizers are selective microorganisms. They provide cost effective, eco-friendly and renewable source of nutrients. They improve the nutrient availability to the crops in which biological process is involved.

II- Scope and Importance of Biofertilizers

1. Permanent effect -Chemical fertilizers have temporary effect while Biofertilizers have permanent effect without any production problem.

2. Protection- Biofertilizers provide protection against drought and some soil born diseases.

3. Cheap – Biofertilizers are very cheap as compared to chemical fertilizers because raw material required for the growth of microorganism is very cheap. The infrastructure and equipment required for growth of microorganism is very cheap. Use of biofertilizers is economical with a high cost: benefit ratio, without risk.

4. Simple methods – The production method of Biofertilizer is very simple. It requires low investment, small space and less labour and equipment as compared to production method of chemical fertilizers. They can be manufactured in any simple microbiology laboratory.

5. Natural – Biofertilizers are natural. They are not foreign to the soil so they create no pollution problem.

6. Biocontrol – Few microorganisms used as biofertilizers also controls plant pathogens either developing mechanical barrier for entry of plant pathogens e.g. Mycorrhiza or produce antibiotics killing plant pathogens e.g. *Streptomyces*.

7. Supply nutrient – They may supply other nutrients and increase fertility of soil. The *Azotobacter* added in the soil for nitrogen fixation may have amylolytic or proteolytic activity thus *Azotobacter* also helps in development of humus.

8. Prevents soil erosion – Biofertilizers may prevent soil erosion. Many microbial inoculant may produce extra cellular, capsular polysaccharide which is viscous in nature. This viscous substance adheres to the soil particle and prevents erosion of soil

9. Supply hormones and vitamins – They may supply vitamins and plant growth hormones. Many microorganisms secrete auxins, ethylene, abscisic acid, cytokinin, pantothenic acid, indol acetic acid and gibberellin like substances which promote plant growth.

10. Mobilizes immobilized nutrients – Biofertilizers convert immobilized chemical fertilizers into soluble forms. Soluble inorganic phosphates lost in the soil due to chemical reactions in insoluble inorganic phosphate are again converted to soluble phosphate by biofertilizer. Thus biofertilizer can act as a renewable supplement to chemical fertilizers and organic manures.

11. Provides essential elements and enzymes – Biofertilizer provide essential elements like nitrogen, potash, phosphorous, sulphur etc. by directly supplying them or transforming them into soluble form; in addition, they also help plants to uptake several micronutrients. They supply some important enzymes, hormones and antibiotics that enhance crop growth and crop yields.

12. Protects from adverse environment – Some biofertilizers protect plants against drought, high temperature shock, high salinity etc.

III- Microbes used as Biofertilizers

III-Types of Biofertilizers

Broadly Biofertilizers are divided into seven main categories, these are again divided into subtypes as follow

B. Nitrogen Fixers

The process of converting atmospheric nitrogen into ammonia by the diazotrophic microbes is known as biological nitrogen fixation (BNF). BNF allows the replenishment of total nitrogen content and the fixed nitrogen regulates the crop growth and yield. Chemical fertilizers cause increased nitrogen oxide emission, water eutrophication and soil acidification. Whereas, biologically fixed nitrogen is sustainable and is less available for leaching and volatilization. Nitrogen fixation is more or less limited to bacteria and archaea, which forms a large portion of diazotrophic organisms. Nitrogen-fixing groups include green sulphur bacteria, firmibacteria, actinomycetes, cyanobacteria and all subdivisions of the proteobacteria. However, only methanogens are able to fix nitrogen among archaea. Different bacterial strains are able to carry out nitrogen fixation with different physiologies including: aerobic (for example, *Azotobacter*), anaerobic (*Clostridium*), facultatively anaerobic (*Klebsiella*) or heterotrophs; an oxygenic (*Rhodobacter*) or oxygenic (*Anabaena*)

i) Symbiotic nitrogen fixers – (symbiotic nitrogen fixers live in association with other plant) *Rhizobium*, *Azolla*. etc.

ii) Non Symbiotic nitrogen fixer – (Non symbiotic nitrogen fixers are free living forms) *Azotobacter*, *Azospirillum*, *Anabaena*, *Nostoc*, *Oscillatoria*, *Bacillus*, etc.

B. Phosphate Suppliers

Phosphorous is a vital macronutrient required for the growth and development of a plant. Usually, phosphorous exists in the form of tricalcium, dicalcium phosphate and minerals. The process of solubilization and mineralization in soil i.e., conversion of organic form of phosphate into inorganic form is carried out by phosphate-solubilizing bacteria. Mycorrhiza

also play crucial role in phosphorus mobilization, nutrient cycling and enhancement of microbial biomass. Generally, indigenous arbuscular mycorrhizae (AM) are found in soil, which colonizes the plant roots and stimulate plant growth. Inoculation of low phosphorous soil with mycorrhiza causes a sudden increase in availability of phosphorous.

i) Phosphate solubilising microorganisms – *Bacillus*, *Aspergillus*, *Pseudomonas*

ii) Phosphate absorber – V.A. mycorrhiza (VAM fungi)

C. Sulphur Suppliers

Sulphur is generally regarded as trace element in majority of crop plants. But this is one of the major elements in oilseed crops, some important vegetables (onion, oat, cauliflower etc.) and in some spices (ginger, garlic etc.) it is important element. Sulphur essential for biochemical synthesis of some important glycosides, pungent compound and disease resistant properties. Soil is composed of organic as well as inorganic sulphur and the process of conversion of organic sulphur into plant utilizable inorganic sulphur (i.e., SO_4^{2-}) form is carried out by sulphur-oxidizing bacteria (SOB) including *Xanthobacter*, *Alcaligenes*, *Bacillus*, *Pseudomonas*, *Thiobacillus*. Deficiency of sulphur in agricultural soil could be corrected using sulphur oxidizing bacteria as biofertilizer

D. Potash solubilizing bacteria

Potassium is ranked at third position as crucial plant nutrient after nitrogen and Potassium is available in plentiful amount in the soil but only a small fraction (1–2%) of it is available to plants. Hence, a system of continuous replenishment of potassium in soil solution is needed for its adequate availability to crop plants. Like other nutrients, potassium also influences growth and development of plants. In deficiency of potassium, root growth becomes slow and gets poorly developed, seeds will be of small size and disease susceptibility will be more leading to reduction in crop yield. PGPRs present in the soil and rhizosphere convert the potassium present in insoluble form into soluble form. Some of the potassium solubilizing microbes (KSMs) are *Acidithiobacillus*, *Arthobacter*, *Enterobacter*, *Paenibacillus*, *Aminobacter*, *Pseudomonas*, *Paenibacillus*, *Sphingomonas*, *Bacillus*, *Klebsiella*.

E. Zinc solubilising microbes—Among micronutrients, zinc deficiency is the most widespread nutrient deficiency. The alternative technology for providing zinc to the plant is to inoculate the crop with the zinc-solubilizing microorganisms. A major portion of zinc available to plant is provided by the microbial activity. Microbes produce organic acids, which cause decline in pH and these organic acids act on zinc complexes in soil, thus cause sequestering the zinc cation. Prominent zinc-solubilizing microbes are *Pseudomonas protegens* RY2, *Rhizobium* spp., *Bacillus altitudinis*, *Thiobacillus thiooxidans*, *Azospirillum* and *Gluconacetobacter*.

F. Mycorrhiza—Fungal species like *Aphalosporra*, *Glomous*, *Jaigospora*, *Enterophosphora* etc. penetrates roots of different crops (most commonly found in Litchi) and form specialized structures like Vesicles and Arbuscles within the cortex. For this reason they are popularly known as Vesicular Arbuscular Mycorrhiza or VAM. Almost 90% of plants, including the most important agricultural crops, are associated with VAM fungi. VAM fungi reported increases the uptake of water phosphorous and some other micronutrients like Cu, Zn, Mn, or Fe. Besides these, they possess synergistic interaction with beneficial soil microorganisms such as nitrogen fixing and PSMs. VAM fungi also supply some growth regulators to plants and protect crop plants from high temperature shock, drought and salinity and prevent different disease and nematode attack.

G. Organic matter decomposer – Cellulolytic, Lignolytic, Proteolytic, or amylolytic

Cellulose decomposing inoculants Many soil borne fungal species like *Aspergillus*, *Penicillium*, *Trichoderma*, *Chaetomium* etc. act as activator in the decomposition process of plant bodies containing cellulose or lignin. Plant bodies rich in cellulose and/or lignin are resistant to microbial decomposition and therefore, take long time before they could be used

as organic source of nutrition. High quality compost could be prepared within a short time by applying the mentioned fungal species into organic waste material collected from farm or community

IV-Precaution for use of biofertilizer

1. Biofertilizer containing specific species of microorganism should be applied for specific crop.
2. Biofertilizer packet should not be exposed to direct sunlight for long time, the seeds treated with biofertilizer should be kept for 30 minutes in shady place.
3. For maximum result biofertilizer should always be mixed with bulky organic manures.
4. Biofertilizer should be used before its expiry date.
5. After treating the seeds with biofertilizers, seeds should not be treated with any kind of chemical fertilizer or pesticides.
6. Chemical fertilizers should not be applied one week before or after application of biofertilizer

V-Conclusion

Biofertilizers are one of the key factors in sustainable agriculture that can assist in solving the problems of feeding an increased world population at a time when agriculture is going through various environmental stresses. Hence research should be focussed on new aspects of Biofertilizers. In current agriculture practices, chemical fertilizers have reduced the fertility of soil, making it unsuited for raising crop plants. Additionally, the excessive use of these inputs has also led to severe health and environmental hazards such as soil erosion, water contamination, pesticide poisoning, falling ground water table, water logging and depletion of biodiversity. Biofertilizers spontaneously activates the microorganisms found in the soil in an effective and eco-friendly way, thereby gaining more importance for utilization in crop production, restoring the soils fertility and protecting it against drought, soil diseases and thus stimulate plant growth. Biofertilizers lead to soil enrichment and are suitable with long-term sustainability. Further, they pose no danger to the environment and can be substituted with chemical fertilizers. The application of bio-fertilizers can minimize the use of chemical fertilizers, decreasing environmental hazards, enhance soil structure and promote agriculture.

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About Author



Dr. Aparna M. Yadav is a dedicated academician with an impressive educational background. She holds a Ph.D. in Botany (Palaeobotany), Master's degree in Botany and degree in Bachelor of Education (B.Ed.) and has completed a Master of Philosophy (M.Phil.) program. Currently, Dr. Yadav serves as an Assistant Professor in the Department of Botany at J. M. Patel Arts, Commerce, and Science College in Bhandara. With a teaching experience of 10 years at both undergraduate and postgraduate levels, she has made valuable contributions to the institution's academic endeavors. Dr. Yadav's research prowess is evidenced by her successful completion of a 'Minor Research Project' funded by the University Grants Commission (UGC) and also several of her research papers in National and International journal of repute and proceeding of National and International Conferences. She is recognized as a Supervisor for Ph.D. students in Botany under the Science Faculty of R. T. M. Nagpur University Nagpur, further showcasing her expertise in the field. Her specialization lies in the domain of Palaeobotany.



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B.Sc. Semester - II

(Theory)



Dr. Aparna M. Yadav

Dr. Bipinchandra B. Kalbande

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***Dedicated to all researchers,
academicians and educators***

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8. Literature and Identity: Exploration of literature's role in shaping cultural identity, social change, and political movements

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Literature has always played a very important part in shaping the society. Literature and society share a symbiotic relationship, each influencing and shaping the other in profound ways. Through the pages of literary works, readers are transported into different worlds and perspectives, offering insights into the complexities of human nature and societal structures. It provides a mirror in which individuals and societies can see themselves, as well as a window through which they can view and understand others. It is also a powerful tool for understanding, expressing, and shaping identity on multiple levels. There are several ways in which literature intersects with and influence one's identity. It has also been instrumental in reflecting and influencing social change across various periods.

Role of Literature in Shaping Cultural Identity

Literature plays a pivotal role in shaping cultural identity by reflecting and influencing the values, beliefs, and traditions of a society. It captures and preserves the history, myths, and traditions of a culture, providing a sense of continuity and a connection to the past. Literary works often mirror the values, norms, and issues of the time in which they are written, offering insight into the cultural identity of that era. Through stories and

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characters, literature allows readers to experience different perspectives and understand diverse cultures, promoting empathy and cross-cultural awareness. Reading literature from one's own culture can reinforce a sense of belonging and identity, while exposure to other cultures through literature can broaden one's understanding of the world. Literature provides a platform for cultural expression and innovation, allowing writers to explore new ideas and challenge societal norms, contributing to the evolution of cultural identity. Literary movements often reflect shifts in cultural paradigms, illuminating the dynamic nature of cultural identity.

From the Harlem Renaissance to Magical Realism, each movement brings forth unique perspectives and voices, reshaping our perceptions of identity and belonging. For example, the novel "Crime and Punishment" (1866) by Fyodor Dostoevsky deeply explores Russian identity, morality, and the psychological complexities of its characters. It has significantly influenced Russian literature and thought, shaping how Russians view their cultural and philosophical identity. Another example is Anne Frank's "The Diary of a Young Girl" (1947) which is a personal account of a Jewish girl hiding during the Holocaust has profoundly shaped Jewish identity and the collective memory of the Holocaust, emphasizing themes of hope, resilience, and the human spirit. African Novelist Chinua Achebe's *Things Fall Apart* (1958) is pivotal in shaping and affirming African identity, particularly Nigerian identity. It provides an African perspective on colonialism and its impacts, challenging the Western narrative and offering a profound exploration of pre-colonial African life explored through the life of Okonkwo and the Igbo society. The novel depicts the richness and complexity of Igbo traditions, values, and beliefs, highlighting the ways in which these cultural elements shape individual and collective identity.

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The novel “One Hundred Years of Solitude” (1967) by Gabriel García Márquez is a cornerstone of Latin American literature, embodying the magical realism genre and capturing the complex history, culture, and identity of Latin America. It has influenced how Latin Americans view their own identity and how the world perceives Latin America. “Beloved” (1987) by Toni Morrison explores African American identity, delving into the legacy of slavery and its lasting impact on African American communities. It highlights themes of trauma, memory, and resilience, contributing to the broader understanding of African American history and identity.

Indian literature has also played a significant role in shaping cultural identity by reflecting the diverse linguistic, religious, regional, and ethnic tapestry of India. Writers such as Rabindranath Tagore, Bankim Chandra Chattopadhyay, and Premchand have drawn inspiration from their regional roots to create works that capture the essence of Bengal, Uttar Pradesh, and other regions, respectively. Tagore’s “Gitanjali” has not only earned Tagore the Nobel Prize in Literature but also became emblematic of India's spiritual and cultural heritage, influencing the country's cultural identity on both national and international levels. Works like the ancient epics “Ramayana” and “Mahabharata,” as well as modern novels like Raja Rao's “Kanthapura” (1938) and Salman Rushdie's “Midnight's Children” (1981) provide insights into India's complex history, shaping the collective memory and identity of its people. Writers like Mulk Raj Anand, Arundhati Roy, and Mahasweta Devi have also contributed to the ongoing discourse on cultural identity and social change.

Role of Literature in Bringing Social Change

The ability to encapsulate the spirit of a time period has always existed in literature. Through satire, allegory, and direct criticism,

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literary works can challenge and critique existing power structures and authorities, exposing corruption, hypocrisy, and abuses of power. It has often been used as a tool for resistance against oppressive political regimes. During times of political turmoil, writers have courageously spoken out against tyranny through their works, challenging the status quo and giving voice to the marginalized.

From the works of Harriet Beecher Stowe to Chinua Achebe, literature has served as a powerful instrument for advocating for social change. Writers such as George Orwell and Charles Dickens used their works to critique social injustices and advocate for political reform. Charles Dickens' novels highlighted the struggles of the poor and criticized the inequities of the industrial society. By using vivid imagery and powerful rhetoric, these authors were able to ignite social consciousness and inspire action among the masses. Dickens' novel "Oliver Twist" (1838) follows the life of an orphan, Oliver, who escapes a workhouse and joins a group of juvenile criminals in London. The novel highlights the brutal conditions faced by the poor and the injustices of the workhouse system. His other novel "Bleak House" (1852) explores the themes of Legal system, poverty, and class disparity. Centered on the long-running court case of Jarndyce and Jarndyce, it highlights the inefficiencies and injustices of the Chancery Court and the impact on various characters' lives. His "A Tale of Two Cities" (1859) is set during the French Revolution, it contrasts the lives of characters in London and Paris, exploring themes of resurrection and the impact of social injustice. These novels not only provide gripping narratives but also serve as powerful critiques of the social injustices and inequities of Dickens's time.

Elizabeth Gaskell too, in her works like "North and South" (1855) addressed class conflict and the plight of the working class. Gaskell delves into the harsh working conditions faced by

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factory workers and the struggles they endure. The novel depicts strikes, labor disputes, and the plight of the workers, providing a detailed look at their lives and the challenges they face. It advocates for social responsibility and mutual understanding between classes. Gaskell emphasizes the importance of empathy, communication, and reform to bridge the gap between the rich and the poor, suggesting that social progress is possible through cooperation and understanding.

Thomas Hardy's novels, such as "Tess of the d'Urbervilles" (1891) explored social constraints and the harsh realities faced by women. The novel presents Tess as a victim of the time in which she lives because both men and society treat her in an unfairly harsh way. It has been a powerful influence in the civil rights movement, promoting greater awareness and understanding of racial inequality and injustice. Mary Wollstonecraft's "A Vindication of the Rights of Woman" is the treatise which focused on Women's rights and education and laid the groundwork for the feminist movement, advocating for equal education and opportunities for women. "The Feminine Mystique" by Betty Friedan (1963) which highlighted the dissatisfaction of many housewives in the 1950s and 1960s sparked the second-wave feminist movement, leading to significant advancements in women's rights and gender equality.

Indian English literature has also provided a platform for marginalized groups such as women, Dalits, LGBTQ+ individuals, and minorities to share their experiences and perspectives. One prominent example of Indian literature that has contributed to social change is "The God of Small Things" (1997) by Arundhati Roy. This novel explores themes of caste oppression, social hierarchy, and gender inequality in Kerala, India. The novel depicts the discrimination faced by the lower caste characters, such as Velutha, who is a Paravan, and Ammu, who faces societal backlash for her relationship with him. By

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highlighting the injustices perpetuated by caste hierarchy, Roy brings attention to the need for social reform and equality. These books give readers a thorough understanding of social concerns and foster empathy and awareness in others.

Role of literature in political movements

Literature has also played a significant role in political movements throughout history by informing, inspiring, and mobilizing people. It often documents the experiences of political movements, preserving the stories of struggles and victories for future generations and providing a historical record that can inspire continued activism. Literary works can influence public opinion by shaping the way people think about political issues. Well-crafted stories and arguments can change hearts and minds, swaying public sentiment in favor of a political cause.

Literature was recognized as an important tool for change from time to time. For example, Miss Stowe's "Uncle Tom's Cabin" (1852) was directly responsible for a movement against slavery in literature and life in the USA of those days. The story tells the experiences of Uncle Tom, a loyal and devout African American slave who experienced great suffering and adversity. His character and tragic fate deeply affect readers and ignited abolitionist sentiments in the Pre-Civil War era. Likewise, literary works like Ralph Ellison's "Invisible Man" (1952) and Maya Angelou's "I Know Why the Caged Bird Sings" (1969) illuminate African Americans' experiences living in a racially divided society. These literary works challenged the prevailing narratives of racial inequity and prejudice by capturing the hardships, resiliency, and aspirations of Black people. Readers were given a sense of urgency by these authors through vivid storytelling and moving symbolism, which motivated them to play an active role in the struggle for racial equality.

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Literature has also been an essential component of feminist movements. Literary pieces like “The Yellow Wallpaper” (1892) by Charlotte Perkins Gilman and “A Room of One's Own” (1929) by Virginia Woolf scrutinized the restrictions and limitations imposed on women in patriarchal civilizations. These works, which portrayed the repressive nature of gender norms and argued for women's liberty, not only spurred conversations but also laid the groundwork for feminist activity. They gave women the confidence to challenge social norms, demand equality, and imagine a society free of gender-based discrimination.

Indian literature also played a significant role in the independence movement, serving as a medium to inspire, inform, and mobilize the masses. In the nineteenth century the Indian authors of fiction and poetry started to envision cultural unification through their works. For example, the Hindi author Prem Chand emphasized the growing separation between rural and urban areas in mainstream nationalist movements by bastardizing the schemes of the urban elite and setting his works mainly in rural India. Similarly, Mulk Raj Anand, an English-language writer, set his works among the urban poor who were disempowered by colonialism as well as by the kind of heavy industrialization that Congress encouraged. Bankim Chandra Chatterjee's novel “Anandamath” (1882), featuring the hymn “Vande Mataram,” became a symbol of the freedom struggle. Mahatma Gandhi's autobiography “The Story of My Experiments with Truth” (1929) and other writings articulated the philosophy of non-violent resistance and self-reliance. Gandhi's other book “Hind Swaraj” (1909) is a seminal piece of literature that influenced India's independence movement. In “Hind Swaraj,” Gandhi articulated his vision for India's self-rule and advocated for nonviolent resistance against British colonial rule. The book served as a manifesto for India's struggle for independence and inspired generations of activists around the world. The poetry and speeches of Sarojini Naidu who was also known as the

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"Nightingale of India, were influential in mobilizing support for the freedom struggle. Bal Gangadhar Tilak used his newspapers "Kesari" (1881) in Marathi and "The Mahratta" (1881) in English to spread nationalist ideas. Mahatma Gandhi used his newspaper "Young India" (1919) and the weekly journal "Harijan" (1933) to disseminate his thoughts on independence and social issues.

To conclude, we can argue that literature celebrates the cultural heritage of a society by preserving and promoting its language, traditions, myths, and folklore. Through poetry, prose, drama, and oral storytelling, literature reinforces cultural values, norms, and identities, fostering a sense of belonging and pride among its people. It also explores the complexities of individual and collective identity, including issues of race, ethnicity, gender, religion, and nationality. Literature galvanized resistance movements by documenting injustices, inspiring solidarity, and mobilizing people to take action. By expanding awareness and understanding, literature enables people to recognize their agency, voice their concerns, and participate in civil engagement and activism.

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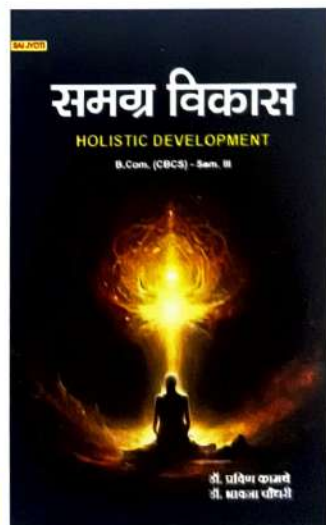
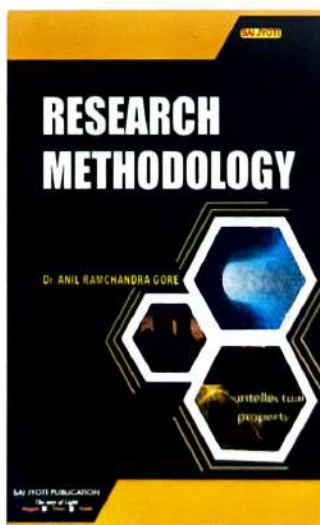
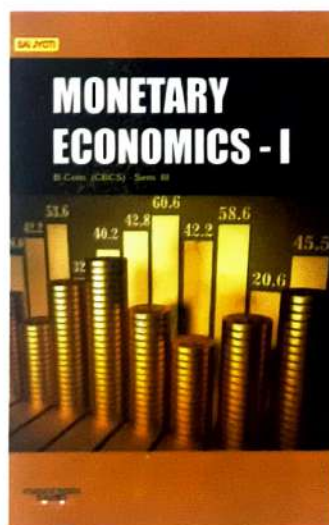


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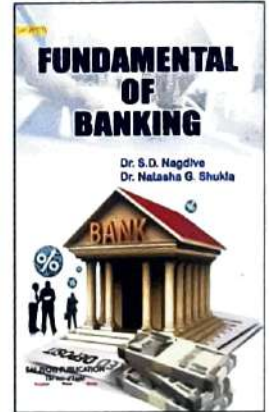
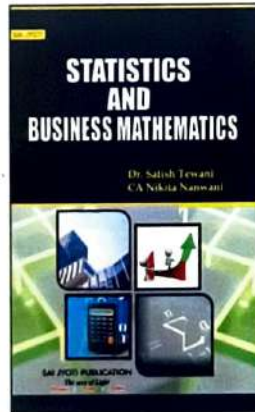
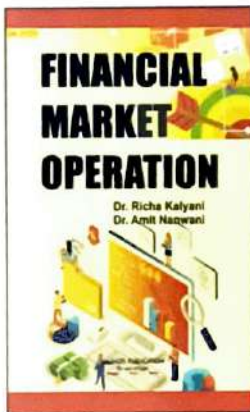
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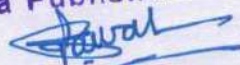
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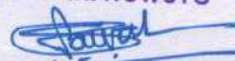
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Editors:

Dr. T. Naga Aparna

Ms. Debajani Naik

Dr. Pankaj Gour

Dr. Ranjana G. Khade



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Volume II

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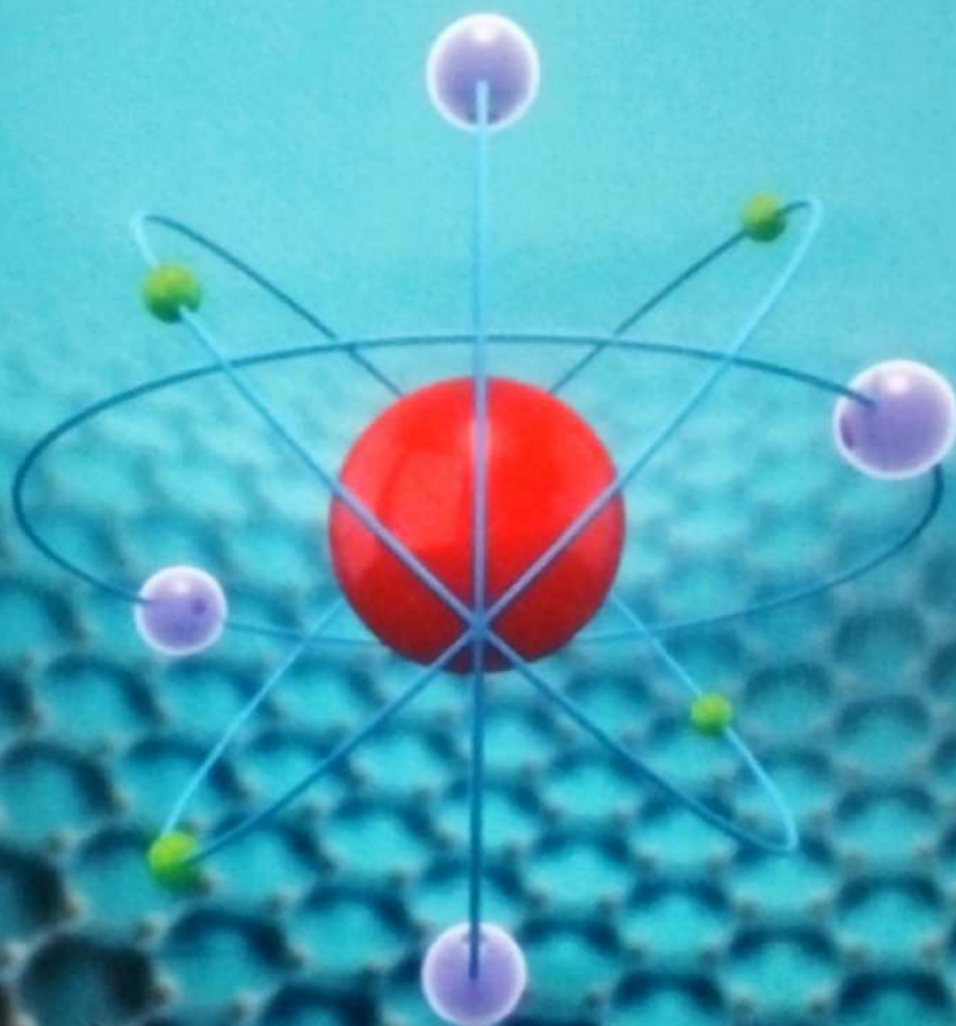
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Recent Trends in Characterization of Nanoparticles

Somina K. Tadavi¹, Sunil B. Zanje², Shyam W. Dafare¹, Yashpal U. Rathod¹, Ramdas N. Huse³, and Wasudao B. Gurnule⁴

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Abstract:

The present-day materials have to be characterized in order to interpret their properties and applications. This chapter illustrates the characterization techniques can be used for macrostructural and microstructural characterization. Recent sophisticated techniques for characterization such as Ultraviolet-Visible (UV-VIS) Spectroscopy, Fourier Transform Infrared Spectroscopy (FT-IR), Nuclear Magnetic Resonance (NMR), Thermogravimetric analysis (TGA), Atomic Force microscopy (AFM), Brunauer-Emmett-Teller (BET), DC Conductivity, Synchrotron, X-ray Diffraction, X-ray photoelectron spectroscopy (XPS), X-ray fluorescence (XRF), X-ray Tomography, Transmission emission microscopy (TEM), Scanning electron microscopy (SEM), Energy-dispersive X-ray spectroscopy (EDX) and few other.

Keywords: NMR, SEM, EDX, TEM, XPS, BET, AFM

Characterization techniques

The present chapter gives a brief account of the various characterization techniques. The fundamental information about various properties of different nanomaterials obtained by using

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Methods for the Synthesis of Nanomaterials

Sanil B. Zanje¹, Samina K. Tadavi², Shyam W. Dafare², Yashpal U. Rathod², Ramdas N. Huse³, and Wasudao B. Gurnule⁴

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Abstract:

In the modern-day of science, the synthesis of nanomaterials is very significant, because the nanomaterials are multidisciplinary science which deals with physics, chemistry, materials science, other engineering sciences. The present chapter highlighted the different types synthesis methods of nanomaterials. Nanomaterials are synthesized by various methods based on the types and nature of the nanomaterials. In a broad sense "top-down" and "bottom-up" are the two important approaches to synthesize nanomaterials. In top-down method bulk materials have been reduced to nanomaterials, and in case of bottom-up method, the nanomaterials are synthesized from elementary level. The different methods which are being used to synthesize nanomaterials are physical methods, chemical methods and biological methods. In this chapter details of these methods are discussed.

Keywords: Nanomaterials, Physical, Biological, Chemical methods.

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RESEARCH TRENDS IN LIFE SCIENCE

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GREEN ENERGY – CURRENT STATUS AND FUTURE POTENTIALS

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Introduction:

Everything which surrounds us is collectively called as the environment. Environment forms a life supporting system for us, since, it is from the environment that we get food to eat, water to drink and air to breathe and all requirements of day-to-day life. In other words, we can say that the basic needs of human life are fulfilled by the materials available in the nature. These materials are air, water, soil, minerals, coal, petroleum, animals and plants. These stocks of nature which are useful to mankind, are called natural resources. Natural resources can be classified into two categories as Renewable resources and Non –Renewable resources.

1. Renewable resources

These resources are present in unlimited quantity in the nature and having the capacity to get replaced by quick recycling through natural cycles. Oxygen in air is renewable resource because it is replaced by the plants by the process of photosynthesis. Some of other resources are solar radiation water and wind. Renewable energy resources are generated directly from nature for example from the sun, rain, wind, tides and it is possible to generate it over and over whenever it is needed. Renewable energy sources are abundant and are definitely the cleanest energy sources in the earth. The advantages of Renewable energy are that wind, sun, ocean and geothermal energy is abundance and completely free of charge. The renewable energy sources have very low or zero carbon emissions, so they are environmental friendly.

2. Non –Renewable resources

Most energy that is used in the world today is generated from non renewable energy sources. This energy can be re-generated over a short period of time. Natural gas and oils are derived from ancient plants and animals remains or fossils. These remain what we have been left with after millions of years of fluctuation in pressure and temperature non renewable energy resources include oil, coal, natural gas and nuclear energy. The advantage non renewable energy sources are it is ready, cheap and easy to use. The non-

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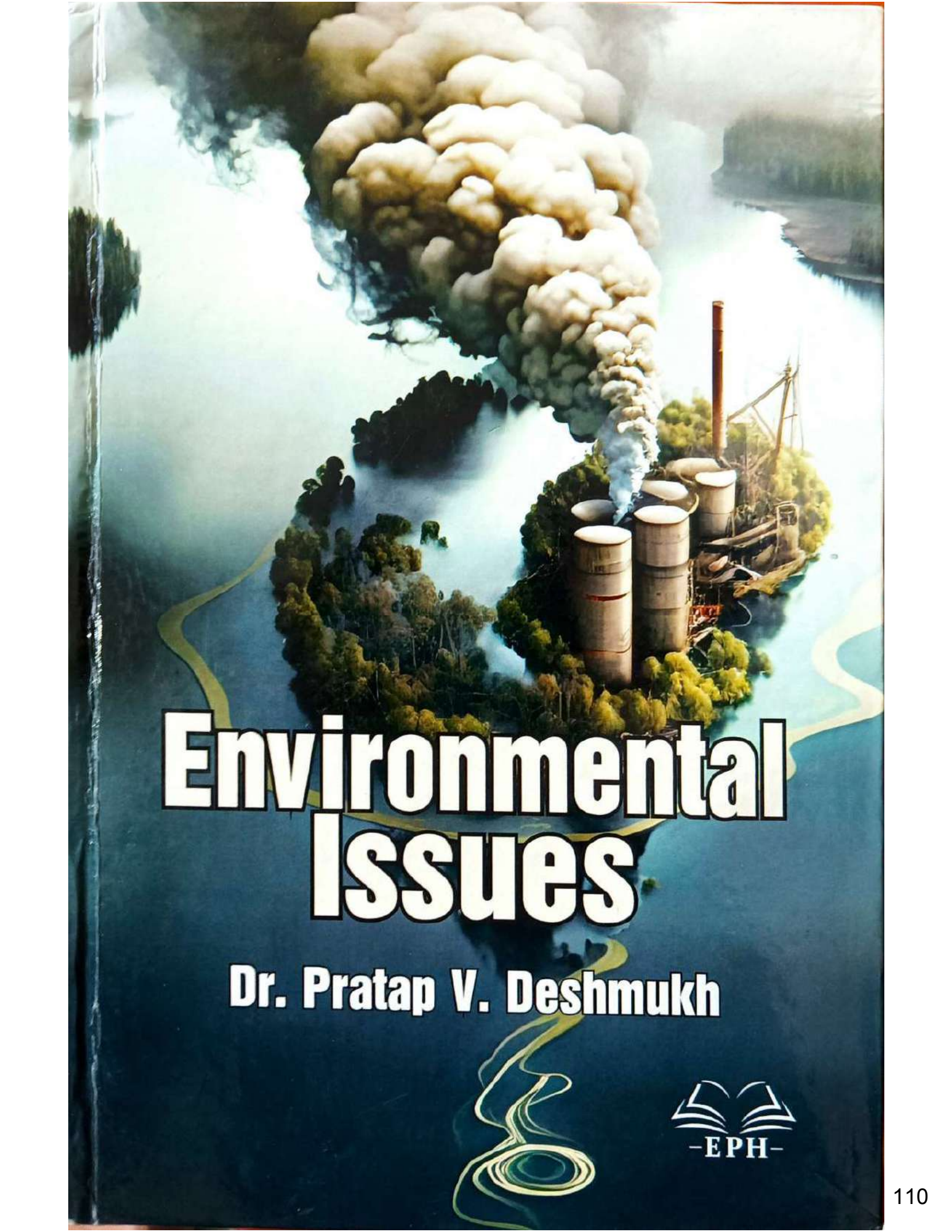
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Environmental Issues

Dr. Pratap V. Deshmukh



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Chapter - 2

Romantic Ecology in “The Hungry Tide” and “The God of Small Things”: Exploring Nature’s Role in Human Relationships

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Abstract

This research article delves into the concept of romantic ecology as portrayed in Amitav Ghosh’s “The Hungry Tide” and Arundhati Roy’s “The God of Small Things.” These two novels offer intricate narratives that interweave human relationships and the environment, highlighting the symbiotic connection between nature and individuals. Drawing on ecocritical and postcolonial perspectives, this study explores how both authors utilize romantic ecological themes to address issues of identity, power dynamics, and social structures within the context of specific landscapes. By analyzing the characters’ interactions with their surroundings, this article uncovers how nature acts as a catalyst for personal growth, liberation, and the reconfiguration of societal norms.

Introduction

The tapestry of literature throughout history has been interwoven with threads of nature’s allure and its profound impact on human emotions and relationships. One of the most captivating and enduring themes in literary exploration is the interplay between the natural world and human experiences—a theme that often takes on the mantle of romantic ecology. This lens, which fuses the romanticization of nature with its entwining with human lives, offers a unique perspective through which

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SEARCH AND RESCUE OF *BUTEA MONOSPERMA* VAR *LUTEA* (WITT) MAHESHWARI (YELLOW PALASH) AN ENDANGERED MEDICINAL PLANT SPECIES

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Abstract:

Butea monosperma var *lutea* (Witt) Maheshwari is an extremely rare and endangered species of the family Fabaceae, often known as "Yellow Palash" or "Golden Butea." For a variety of medical issues, golden butea was used in Ayurvedic, Unani, and Siddha treatment. Every component of the plant has a variety of uses. The IUCN Red List of Threatened Species includes Golden Butea. Our aim is to revive the population of Golden Butea by reintroducing it in the biodiversity. But, for that we have to identify the plants and then implement regeneration protocols. After extensive searched for this plant, we have identified only one plant in Wardha forest. Our next step is to educate locals about the importance of this plant and collect its seeds in the flowering season in coming March. We are also going to adopt *in vitro* multiplication tools for mass production of Golden Butea.

Keywords: Yellow Palash, Golden Butea, *In vitro* Multiplication, Endangered, IUCN Red List.

Introduction:

The Fabaceae family includes *Butea monosperma*, also referred to as the 'Flame of the Forest'. It goes by several other names in the local language, including Palas, Palash, Chichra, Dhak, Bastard Teak, Bijasneha, Bengal Kino, Khakara, and Mutthuga (Firdaus and Mazumder, 2012). A deciduous tree with relatively sluggish growth, *B. monosperma* is identified by its trifoliolate pinnate leaves. In the tropical and subtropical climates of countries like India, Sri Lanka, Thailand, Laos, Bangladesh, Nepal, Myanmar, and Cambodia, it is naturally grown (Kandasamy *et al.*, 2013). The intriguing yellow flowers of *Butea monosperma* (Lam.) Taub. var. *lutea* (Witt.) Fabaceae are beautiful. It stands taller than the well-known *Butea monosperma* var. *monosperma*, or "Flame of the Forest," with its graceful orange-scarlet raceme inflorescence. The plant is quite popular in traditional medicine.



Yellow Palash Tree

Medicinal Importance:

It is used to make dye, wood, resin, and animal feed. The soft, dirty white wood is utilised for water scoops and well curbs because it is waterproof and sturdy. Cattle do not consume the leaves since they are typically quite leathery. The leafless tree blooms profusely and stands out dramatically in the woodland throughout the winter months. The primary pollinators are birds. The huge, vivid orange-red flowers exhibit diurnal anthesis and show signs of avian pollination, including copious amounts of nectar. Jeera powder and stem bark extract are used to treat skin conditions like leucorrhea and jaundice. After childbirth, ladies are reportedly given a tonic made from stem bark decoction. As a contraceptive, one teaspoon of root bark juice can be taken orally every day for three days (Reddy *et al.*, 2001).

Chemical analysis of the species' components revealed flavonoids, chalcones, linoleic acid, and unsaturated fatty acids to be present (Thirupathaiah *et al.*, 2007). Since a very long time ago, Unani, homoeopathy, and traditional system medicine have all used various plant

components and extracts. It helps with liver disorders, diarrhoea, ulcers, diabetes, memory improvement, and irregular periods. *B. monosperma* also possesses antihelminthic, antibacterial, anti-inflammatory, and free radical scavenging capabilities (Yadav *et al.*, 2020). Important naturally occurring polyphenols known as flavonoids are also active biomolecules with potential therapeutic benefits. *B. monosperma* flower and bark contain flavonoids like butin, butrin, isobutrin, and butein (Chauhan and Mahish, 2020).

From many years, almost all plant parts have been employed in medicine and for other things. Because of its efficiency, ease of accessibility, low cost, and relative lack of side effects, herbal treatments are now more widely used than contemporary medications. This medication is extensively mentioned in ancient Ayurvedic literature for the treatment of Krimi Roga (worm infestations). It is incorporated into the formulation of various crucial and often used Ayurvedic drug recipes used to treat Krimi Roga. This medication is mentioned in the Sushruta Samhita under four different categories of herbal remedies, including Rudaradigana, Musakadigana, Amabasadigana, and Nyagrodhabigana, which treat a variety of disorders, including Medoroga, Striroga, and Prameha. It is also said to have Kapha and Pittanasa properties. The Sushruta Samhita contains the earliest reference to its Krimighna quality, and later Ayurvedic writers also discussed its effectiveness in netraroga and its astringent impact under various circumstances. This substance has been mentioned in both early and late Ayurvedic literature, either by itself or as a component of numerous prepared remedies intended to cure Krimi Roga.

In a clinical study on worm infestation, the plant was found to be beneficial in cases of round worm and thread worm infestations, but ineffective in the one case of tapeworm infestation. *Butea monosperma*-containing "Ayurvedic Rasayana" (herbal medicine) was reportedly used to treat giardiasis, possibly through immunomodulation because the "Rasayana" failed to kill the parasite *in vitro*.

Distribution:

The discovery of new plant species always sparks excitement and reveals the wonder of nature. Additionally, it provides a technique to identify its morphological, anatomical, bioactive substance, pharmacological, genetic link with other species, and other traits. It was discovered in areas around Pune, Aurangabad in Maharashtra, Jillella block of Sirsilla woods in Karimnagar, Peddagutta in Nizamabad, Kummarigudem and Mallakpally in the Warangal district of Andhra Pradesh, and Mallakpally in Gujarat (Naqvi *et al.*, 2001; Reddy *et al.*, 2001; Patil and Mahajan, 2018).

In addition, Yellow Palash differs from the well-known *Butea monosperma* in that it contains cyclitols, vital substances proven to treat chronic bronchitis and asthma. The Indian Deccan plateau is home to the endemic *B. monosperma* var. *lutea*. Over the plateau, there are just about 100 plants, which is a relatively low population. The species has been found near Aurangabad, Maharashtra, the Jillella block of the Sirsilla forests in Karimnagar, Peddagutta in Nizamabad, and Kummarigudem and Mallakpally in the Warangal district of Andhra Pradesh (Reddy *et al.*, 2001; Naqvi *et al.*, 2011).

Jadhav *et al.* in 2001 for the first time reported that the Conservation Assessment Management Planning Workshop for Medicinal Plant of Andhra Pradesh has designated Yellow Palash as a highly uncommon and globally endangered medicinal plant. It is a medicinal plant that is extremely rare and has been listed as being internationally endangered by the Conservation Assessment Management Planning Workshop for Medicinal Plants of Andhra Pradesh (Jadhav *et al.*, 2001).

As per the IUCN Red List of Threatened Species-2020, *Butea monosperma* var. *lutea* (Witt) Maheshwari is included in Red List Category, Criteria ver. 3.1 (Least Concern). Conservation and reintroduction of this important medicinal and aesthetic plant is very important and we are doing our part.

Methods adopted for conservation adopted are as follows;

- Search of the Golden Butea plant.
- Confirmation of plant by morphological studies of the plants.
- Collection of Flowers, Fruits & Seeds in the fruiting season.
- Educating locals about importance and conservation of plant.

Progress so far:

After inquiring almost 150 peoples and searching almost 250 sq kilometer of area in forests, farms and cities Nagpur and Wardha Districts, we are able to find only one plant of Golden Butea. We are doing all we can to protect it and multiply it. We are educating the locals about its importance and importance of its conservation. We have collected seeds of the plants and we are trying to germinate those in by regular methods and *in vitro* seed germination. We are also started *in vitro* germination by plant tissue culture methods.

Acknowledgement:

This work is in association with Plant Tissue Culture & Molecular Biology Lab, Department of Botany, Nabira Mahavidyalaya, Katol. Author is thankful to Dr. Bipinchandra B. Kalbande, Head & Assistant Professor, Department of Botany, Nabira Mahavidyalaya, Katol, for his valuable assistance in this work.

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Mr. Rahul V. Zade

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METAGENOMICS: A COMPREHENSIVE REVIEW OF ITS APPLICATIONS IN ENVIRONMENTAL SCIENCE

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Abstract:

Metagenomics is a powerful tool that allows for the study of genetic material recovered directly from environmental samples, providing insight into the genetic diversity and metabolic potential of microbial communities. This book chapter provides a comprehensive review of the applications of metagenomics in environmental science. Metagenomics is a combination of cutting-edge sequencing techniques and biological research, enabling culture-independent research of environmental microbial communities. It has been used to study microbial diversity and function in a variety of contexts, including wastewater treatment systems, soil habitats, marine ecosystems, gut microbiomes, and novel viruses. Metagenomics has revolutionized our understanding of microbes, including their role in decomposing pollutants, generating new enzymes, and contributing to the global nutrient cycle. Furthermore, metagenomics can aid in the identification and monitoring of antibiotic resistance genes in both environmental and clinical settings, leading to the discovery of novel antibiotics and antimicrobials. It is a great tool for discovery of important new genes and enzymes. The future applications of metagenomics in biotechnology, environmental science, and medicine are promising, indicating the significance of this field of study.

Keywords: Metagenomics, Environmental Science, Sequencing, Microbial Communities, Antibiotic Resistance, Gene Discovery, Biotechnology.

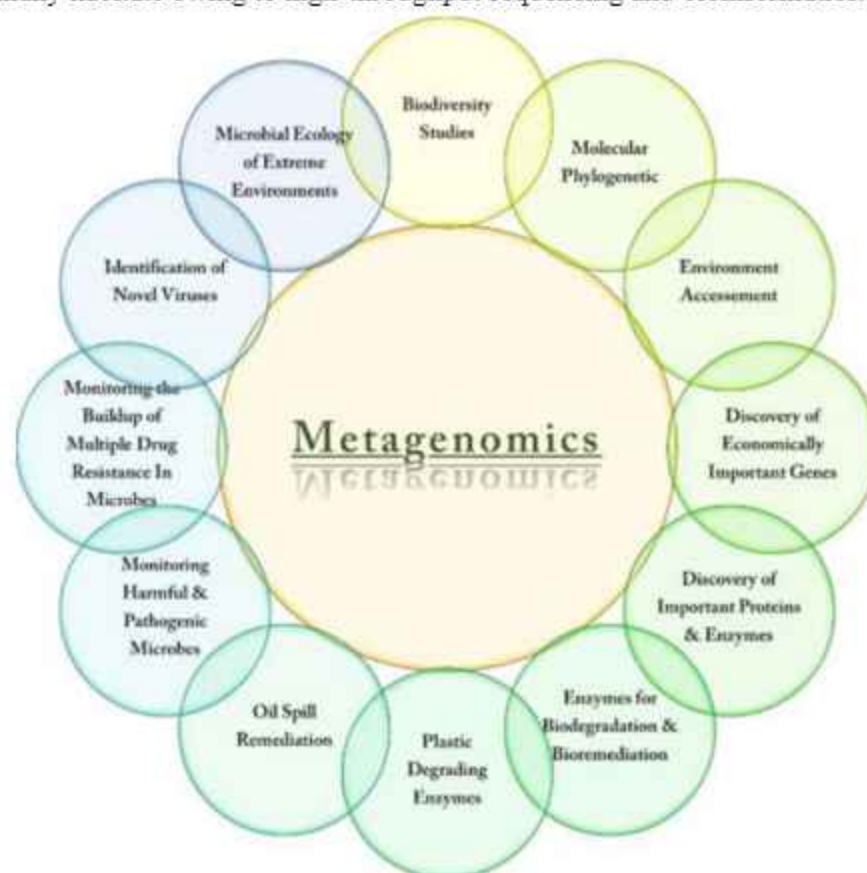
Introduction:

Metagenomics is a powerful approach that allows for the study of genetic material recovered directly from environmental samples (Handelsman *et al.*, 1998). This method involves the analysis of DNA isolated from microbial communities, providing insight into the genetic diversity and metabolic potential of these communities (Lorenz and Eck, 2005).

Metagenomics is the study of genetic material (DNA/Genome) derived directly from the environment from a diverse population of animals. Metagenomics is a combination of the words "meta" and "genomics." Genomic sequences are DNA sequences, whereas meta sequences are DNA sequences for several species. When we cannot separate all species from an environmental sample and need to examine them all, we do metagenomic research. Metagenomics blends biological research with cutting-edge sequencing techniques. Metagenomics enables culture-independent research of environmental microbial communities (Hu *et al.*, 2021c; Xiong & Yu, 2021; Zhu *et al.*, 2021a; Kalia & Kumar, 2022).

Pace and his colleagues suggested isolating and cloning DNA from natural sources for the first time in 1985 (Pace *et al.*, 1985). Schmidt and colleagues sequenced the 16S rRNA gene by cloning picoplankton DNA in a phage vector in 1991 (Schmidt *et al.*, 1991). Healy and colleagues developed "zoolibraries," the first function-driven metagenomic library, in 1995. (Healy *et al.*, 1995). Handelsman and colleagues described "metagenomics" in 1998 as "the genomic analyses of microorganisms by direct extraction and cloning of DNA from an assemblage of microorganisms" (Handelsman *et al.*, 1998).

Collecting environmental samples, total DNA extraction, eDNA (environmental DNA) library preparation, shotgun or amplicon sequencing, and sequence data analysis are all part of metagenomics. Modern metagenomics research has looked at microbial diversity and function in a variety of contexts. Microbial diversity in wastewater treatment systems, soil habitats, marine ecosystems, and gut microbiomes has been studied using metagenomic analysis (Yuan *et al.*, 2021). Metagenomics has also been used by researchers to uncover and describe environmental antimicrobial resistance genes (Wu *et al.*, 2022) and to investigate how climate change impacts microbial communities (Hou *et al.*, 2021). Metagenomics can now examine the microbial ecology of many habitats owing to high-throughput sequencing and bioinformatics.



Next-generation sequencing has transformed biological sciences and metagenomic research. These advancements have enabled a thorough analysis of huge microbial communities,

yielding fresh insights into their structure, function, and ecology (Mardis, 2008; Goodwin 2016; Singh *et al.*, 2021b; Kanika Vasudeva *et al.*, 2023).

Metagenomics has discovered novel species in soil, seas, and the human gut, transforming our knowledge of microbial diversity. It has also demonstrated how microbial communities decompose pollutants, generate new enzymes, and contribute to the global nutrient cycle. Metagenomics can aid in the identification and monitoring of antibiotic resistance genes in both environmental and clinical settings. It has aided in the discovery of novel antibiotics and antimicrobials, bringing up new paths for the treatment of antibiotic resistance. Metagenomics has also been used to explore microbial genome evolution, community dynamics, and host-microbiota interactions. Metagenomics has revolutionized our understanding of microbes, and its future applications in biotechnology, environmental science, and medicine are promising.

Biodiversity studies:

Metagenomics has changed our understanding of microbial diversity, discovering previously undiscovered taxa in different settings like soil, oceans, and the human gut. Only a small portion of known prokaryotes are amenable to cultivation in prokaryotic diversity. Metagenomics uses environmental DNA sequencing to study microbes without cultivation. The set of all individual genomes pertaining to each species present in one niche can be seen as one metagenome.

Woese and Fox (1977) classified prokaryotes using molecular phylogenetics. Comparative investigation of 16S rRNA sequences revealed three domains of life: one eukaryotic and two prokaryotic (Bacteria and Archaea). Only 11 bacterial phyla were cultivable. The "great plate-count anomaly" - the difference between plate counts and direct microscopic counts—shows that such easily isolated organisms make up less than 1% of environmental species diversity. Recent studies have shown that prokaryotes are varied and exhibit codon use bias (CUB) across genomes and genes. Highly expressed genes use codons that match the most abundant tRNAs to optimize RNA translation. Codon use bias in a metagenome can predict gene expression (Lima-Mendez *et al.*, 2015).

Pace *et al.* (1985) developed a microorganism-free approach for sequencing small subunit rRNA genes. Environmental samples can directly isolate nucleic acids and determine small subunit RNA sequences. The Ribosomal Database Project (RDP) has identified 34 bacterial and 4 archeal phyla using this method (Cole *et al.*, 2009). Six bacterial and one archeal phylums are uncultivable. Six bacterial phyla lack representatives with comprehensive whole genome sequencing initiatives. These poorly described species are mostly studied from environmental samples (Rinke *et al.*, 2013; Nayfach *et al.*, 2016).

Overall, metagenomic studies have provided a more comprehensive view of microbial diversity and their functional capabilities. They have also revealed the vast potential for discovery of new organisms and metabolic pathways, with implications for biotechnology and ecology (Trujillo *et al.*, 2020; Wang *et al.*, 2021a).

Recent metagenomic studies have contributed significantly to environmental assessment and gene discovery (Datta *et al.*, 2020; Pasolli *et al.*, 2019). By allowing culture-independent

analysis of microbial flora directly from environmental samples, metagenomics provides scientists with unprecedented access to the majority of uncultured microbial counterparts (Bao *et al.*, 2021; Zhao *et al.*, 2021a; Jiang *et al.*, 2022b).

Molecular phylogenetic:

Woese and Fox established molecular phylogenetic classification of prokaryotes in 1977 (Woese and Fox 1977). After this, molecular phylogenetics and microbe identification used 16s rRNA sequencing. Environmental metagenome sequencing yields great findings. The latest metagenomics technologies enable faster, more accurate sequencing, analysis, and interpretation of complex microbiomes (Datta *et al.*, 2020; Carr *et al.*, 2021). New computer tools allow researchers to extract more information from metagenomic datasets and improve taxonomic and functional annotations (Bowers *et al.*, 2020; Forster *et al.*, 2021).

Environmental samples have revealed several unimaginable organisms. So, this unique, fast, and cheap survey strategy may be beneficial for biodiversity monitoring. Recent research has shown that metagenomics may find novel bacterial and archaeal lineages and assess the phylogenetic diversity of microbial communities in soil, marine water, and gut microbiota (Fernández-Antúnez *et al.*, 2021; Prakash and Rinke 2021). Phylogenetic placement algorithms and reference databases have also increased the accuracy and resolution of microbial community profiling and taxonomy classification (Tang *et al.*, 2020; Yu *et al.*, 2020).

Environment accesement:

Metagenome sequencing is a powerful tool that can provide insights into various aspects of the Earth's environment. One important application is in the study of environmental impacts, such as the rapid detection of non-native species. Like Piombo *et al.*, in 2021 have detected the invasive freshwater snail *Potamopyrgus antipodarum* in New Zealand waterways. This technique can identify the presence of non-native species by analyzing their DNA in environmental samples, such as water or soil (Greay 2018).

Metagenomics can also be used to monitor the population size of rare and threatened aquatic taxa. For example, Thomsen and Willerslev (2015) used metagenomic sequencing to estimate the population size of the Greenland shark, a threatened species that is difficult to study due to its deep-sea habitat and low population density. Similarly, Bohmann *et al.*, (2014) used metagenomic analysis to estimate the population size of the Arctic charr, a rare fish species in the high Arctic. Goodwin *et al.*, (2017) used metagenomic sequencing to assess the population structure of the critically endangered vaquita porpoise, a small marine mammal found in the Gulf of California. These studies demonstrate the potential of metagenomics to provide valuable insights into the population size and genetic diversity of rare and threatened species, which can aid in their conservation and management.

Discovery of economically important genes:

Metagenomic analysis can find commercially relevant genes, such as those that produce industrial enzymes and proteins. Recently, metagenomic samples from various habitats have yielded novel cellulases and hemi-cellulases with industrial potential (Jiang *et al.*, 2021; Ramírez-Sarmiento *et al.*, 2021). For instance, Jiang *et al.*, (2021) identified novel cellulases and

hemi-cellulases with potential for industrial applications through metagenomic analysis of soil samples. In another study, Ramírez-Sarmiento *et al.*, (2021) identified new cellulose-degrading enzymes from metagenomic samples of soil and compost, with potential for use in biofuel production.

Metagenomics has also found novel biosynthetic gene clusters for natural product manufacturing with therapeutic uses (Luo *et al.*, 2021; Nguyen *et al.*, 2020). Like, metagenomic analysis has been used to identify biosynthetic gene clusters for the production of natural products with therapeutic uses, such as the discovery of a novel biosynthetic gene cluster for the production of anti-tuberculosis natural products by Luo *et al.*, (2021). Metagenomic analysis has also found economically relevant genes involved in biofuel and bioplastic manufacturing (Lau *et al.*, 2018; Gouda *et al.*, 2019). For ex. Gouda *et al.*, (2019) have done metagenomic analysis to discover genes involved in the production of biofuels and bioplastics, such as the identification of genes involved in the synthesis of bioplastic from metagenomic samples of wastewater by Gouda *et al.* (2019). Hence, metagenomics offers a viable method for discovering novel economically relevant genes that could impact multiple industries.

Discovery of important proteins & enzymes:

Metagenomic analysis has proven to be a powerful tool for the discovery of important proteins and enzymes with various applications. Studies have identified novel enzymes and proteins from metagenomic samples that have potential for various industrial and biotechnological applications, including bioremediation, biodegradation, and bioprocessing. For example, recent studies have reported the discovery of novel lignocellulolytic enzymes from metagenomic samples of various environments, including soil, marine sediments, and intestinal microbiota of herbivorous animals (Meng *et al.*, 2021; Hu *et al.*, 2021b). Metagenomic analysis has also been used to identify novel enzymes for the degradation of recalcitrant compounds, such as polycyclic aromatic hydrocarbons (PAHs) and plastics (Ma *et al.*, 2019; Wei *et al.*, 2021). In addition, metagenomic analysis has enabled the discovery of novel enzymes and proteins for medical applications, including the identification of novel antibiotic peptides and enzymes with antiviral properties (Lei *et al.*, 2020; Chen *et al.*, 2021b). Therefore, metagenomic analysis has the potential to lead to the discovery of important proteins and enzymes with diverse applications in various fields.

Enzymes for biodegradation & bioremediation:

Metagenomics has revolutionized the discovery of enzymes for biodegradation and bioremediation applications, offering a powerful approach to identify new pathways and enzymes for the efficient removal of pollutants from the environment. Recent studies have reported the discovery of novel enzymes with biodegradation and bioremediation potential from a range of environmental samples, including soil, water, and sediments (Kang *et al.*, 2021; Kim *et al.*, 2021; Song *et al.*, 2021). These enzymes can degrade a variety of contaminants, including polycyclic aromatic hydrocarbons (PAHs), pesticides, and heavy metals. Metagenomic analysis has also enabled the identification of novel genes and pathways involved in biodegradation and bioremediation, providing new insights into the mechanisms underlying the process (Chen *et al.*,

2020a; Li *et al.*, 2022). Furthermore, metagenomics has been used to optimize the enzymatic degradation of pollutants, through protein engineering and bioprocess optimization (Lee *et al.*, 2020; Singh *et al.*, 2021a). Therefore, metagenomic analysis provides a promising approach for the discovery and optimization of biodegradation and bioremediation enzymes, which could have significant implications for environmental remediation and pollution control.

Plastic degrading enzymes:

Metagenomic research has emerged as an effective approach for identifying enzymes capable of digesting plastics, which are important environmental contaminants. Recent studies have reported the discovery of novel plastic-degrading enzymes from various environmental samples, including soil, sediments, and marine ecosystems (Wei *et al.*, 2021; Wang *et al.*, 2021b; Wu *et al.*, 2021a). These enzymes have shown promising potential for the biodegradation of various types of plastics, including polyethylene terephthalate (PET), polystyrene (PS), and polyethylene (PE). Metagenomic analysis has also enabled the identification of novel genes and pathways involved in plastic degradation, providing new insights into the mechanisms underlying the process (Yan *et al.*, 2021; Li *et al.*, 2022). In addition, metagenomics has been used to optimize the enzymatic degradation of plastics through protein engineering and bioprocess optimization (Fujimoto *et al.*, 2020; Kawata *et al.*, 2020). Therefore, metagenomic analysis offers a promising approach for the discovery and optimization of plastic-degrading enzymes, which could have significant implications for environmental remediation and waste management.

Oil spill remediation:

Metagenomic analysis has proven to be a valuable tool in the discovery and characterization of microbial communities involved in oil spill remediation. The use of metagenomics in oil spill studies has enabled the identification of novel genes and pathways involved in the degradation of hydrocarbons, providing new insights into the mechanisms underlying the process (Liu *et al.*, 2020; Guo *et al.*, 2021). Metagenomics has also been used to assess the diversity and abundance of hydrocarbon-degrading microbes in contaminated environments, allowing for the selection of efficient bioremediation strategies (Chen *et al.*, 2021a; Zhao *et al.*, 2021b). In addition, metagenomics has been used to study the impact of various factors, such as temperature and nutrient availability, on the activity and composition of hydrocarbon-degrading microbial communities (Zhang *et al.*, 2019; Wu *et al.*, 2020). Therefore, metagenomic analysis provides a powerful approach for the discovery and characterization of microbial communities involved in oil spill remediation, which could have significant implications for environmental remediation and management.

Monitoring harmful & pathogenic microbes:

Another important application of metagenomics is the monitoring of harmful and pathogenic bacterial, viral, and microalgae species in aquatic environments, especially in farmed seafood, drinking water, and aquatic recreational areas to minimize public health risks. For example, a study by Yoo *et al.*, (2019) used metagenomics to identify pathogenic bacteria in Korean aquaculture farms, while Yen and Johnson (2021) employed metagenomics to detect

foodborne pathogenic bacteria in retail meats. These studies demonstrate the utility of metagenomics in monitoring and detecting harmful microorganisms in various settings to protect public health. In drinking water, metagenomics has been used to detect and identify bacterial pathogens, such as *Salmonella* and *Legionella*, to ensure safe water supplies (Wu and Lu 2021b).

Metagenomics has also found applications in the early detection of viral pathogens, such as norovirus and rotavirus, in drinking water sources. Edge *et al.*, (2020) used metagenomic sequencing to identify viral pathogens in drinking water samples from six water treatment plants in Australia. They detected a wide range of viruses, including norovirus and rotavirus, which are known to cause gastroenteritis in humans. Similarly, Rizal *et al.*, (2020) used metagenomic sequencing to detect viral pathogens in river water samples collected from the Kelantan River in Malaysia. They identified several viral families, including norovirus, astrovirus, and rotavirus, in the water samples. This study demonstrated the potential of metagenomics in detecting and identifying viral pathogens in drinking water sources.

Furthermore, metagenomics can provide rapid and accurate identification of bacterial pathogens in seafood, such as *Vibrio* species, and facilitate the development of effective control measures (Chopyk *et al.*, 2020; Romanis *et al.*, 2021). These examples demonstrate the significant role that metagenomics plays in ensuring public health and safety by monitoring and detecting harmful microorganisms in aquatic environments.

Monitoring the buildup of multiple drug resistance in microbes:

Metagenomics has also proven to be a valuable tool in monitoring the buildup of multiple drug resistance in microbes, a growing concern in the field of antimicrobial resistance. Metagenomic analysis can provide insights into the diversity and abundance of resistance genes in microbial communities, allowing for the identification of potential sources of antibiotic resistance and the monitoring of resistance gene spread over time and across different environments (Li *et al.*, 2019; Chen *et al.*, 2020b). Recent studies have utilized metagenomic analysis to identify novel resistance genes and characterize their prevalence and distribution in various environments, including soil, water, and animal gut microbiota. Recent studies have used metagenomic analysis to identify novel resistance genes and investigate their prevalence and distribution in various environments. For example, Zhu *et al.*, (2021b) used metagenomics to analyze the antibiotic resistance genes in soil and found that multiple resistance genes were present, including some that had not been previously identified. Similarly, Liu *et al.*, (2021a) used metagenomics to identify antibiotic resistance genes in water samples and found that these genes were widespread and diverse. Hu *et al.*, (2021a) used metagenomics to analyze the gut microbiota of pigs and identified a wide range of antibiotic resistance genes.

Furthermore, metagenomic analysis has been used to evaluate the impact of different anthropogenic activities on the development and spread of antibiotic resistance genes. For example, Cui *et al.*, (2019) studied the impact of antibiotic pollution from a pharmaceutical factory on the spread of antibiotic resistance genes in the surrounding environment. They found a high abundance of antibiotic resistance genes in the polluted soil and nearby river sediment, indicating that the pollution may have contributed to the dissemination of resistance genes.

Similarly, Sun *et al.*, (2021) used metagenomic analysis to study the antibiotic resistance genes present in soil samples from different regions with varying degrees of agricultural intensification. They found a higher abundance and diversity of resistance genes in samples from regions with higher levels of agricultural intensification, indicating a potential link between intensive agriculture and the spread of antibiotic resistance genes. Therefore, metagenomic analysis can serve as a useful tool for monitoring the spread and buildup of antibiotic resistance in microbial communities, providing valuable insights for the development of strategies to combat this growing problem.

Identification of novel viruses:

Recent studies have also highlighted the potential of metagenomic analysis in identifying novel viruses in different environments, such as the ocean (Gregory *et al.*, 2020), soils (Huang *et al.*, 2021), and wastewater (Kwon *et al.*, 2021). Gregory *et al.*, (2020) used metagenomics to uncover diverse and novel viral populations in marine sediments from different depths and locations, expanding our understanding of viral diversity in the ocean. Similarly, Huang *et al.*, (2021) employed metagenomic analysis to identify a wide range of novel viruses in soil samples, suggesting that soil may serve as a significant reservoir of unexplored viral diversity. Lastly, Kwon *et al.*, (2021) utilized metagenomic sequencing to identify a large number of previously unknown viral genomes in wastewater, providing insights into the diversity and abundance of viruses in human waste and their potential implications for public health.

Metagenomic analysis has indeed been utilized in the discovery and characterization of novel viruses in various environments. The approach involves sequencing of the viral metagenome, which consists of the entire collection of viral genomes in a particular environment. This enables the identification of new viral species and families, as well as the study of viral diversity and community structure.

Recent studies have utilized metagenomics to identify novel viruses in diverse environments, such as marine sediments, wastewater, and human gut microbiota. Metagenomic analysis has opened up new possibilities for the discovery of novel viruses that were previously unknown. For example, a recent study by Gregory *et al.*, (2020) identified a new group of viruses called "autolykiviruses" in marine sediments using metagenomic analysis. Another study by Kwon *et al.*, (2021) utilized metagenomics to identify and classify a novel virus in wastewater that has a unique genetic structure and characteristics. In addition, metagenomics has been used to study the viral diversity in the human gut microbiota, with studies like Moreno-Gallego *et al.*, (2021) discovering previously unknown viruses and gaining insight into their potential impact on human health.

Additionally, metagenomics has been used to study the interactions between viruses and their hosts, as well as the role of viruses in various ecological processes, such as nutrient cycling and carbon fixation. For example, metagenomics has been used to investigate the role of viruses in carbon cycling, such as identifying new virus-encoded enzymes that are involved in carbon fixation (Emerson *et al.*, 2018). Similarly, metagenomics has been used to explore the diversity

and evolutionary relationships of viruses infecting hosts in different environments, such as the ocean (Roux *et al.*, 2021).

Moreover, metagenomics has been applied to investigate the interactions between viruses and their hosts, such as the identification of novel viral genes involved in host manipulation and immune evasion strategies (Laffy *et al.*, 2019; Di Giallonardo *et al.*, 2021). Additionally, metagenomic analysis has facilitated the discovery of new viruses that could have applications in biotechnology, such as the identification of novel bacteriophages that can be used for bacterial biocontrol (Shao *et al.*, 2021).

Overall, metagenomic analysis has greatly expanded our knowledge of the diversity of viruses in different environments and their potential implications for human health and the environment.

Microbial ecology of extreme environments:

Metagenomics has emerged as a powerful tool for studying the microbial ecology of extreme environments. In recent years, metagenomic analysis has been utilized in various studies to understand the diversity, function, and adaptation of microbial communities in harsh environments. Studies have shown that metagenomics is a powerful tool to study the microbial communities in extreme environments, such as deep-sea hydrothermal vents and Antarctic ice shelves.

In the case of deep-sea hydrothermal vents, metagenomics has allowed researchers to identify previously unknown microbial species and understand their adaptations to high-temperature and high-pressure conditions. For example, a recent study used metagenomic analysis to characterize the microbial community of a hydrothermal vent field in the Okinawa Trough and identified several novel microbial lineages that are potentially involved in sulfur and nitrogen cycling (Zhang *et al.*, 2021). Another study conducted metagenomic analysis of microbial communities associated with hydrothermal vents in the Mariana Trench and identified potential novel pathways for the metabolism of carbon, nitrogen, and sulfur (Zhang *et al.*, 2022).

Similarly, metagenomic analysis has also been applied to study the microbial communities in Antarctic ice shelves. For instance, a study conducted metagenomic analysis of the microbial communities in the McMurdo Dry Valleys of Antarctica and found that the bacterial and fungal communities in the ice-free valleys were more diverse than those in the ice-covered regions (Aronson *et al.*, 2019). Another study used metagenomic analysis to identify the microbial communities in subglacial lake ecosystems beneath the West Antarctic Ice Sheet, revealing the presence of diverse microbial communities that play important roles in nutrient cycling and ecosystem functioning (Mendez *et al.*, 2021). These findings highlight the potential of metagenomics to provide insights into the microbial ecology of extreme environments and expand our understanding of the adaptations and functions of microorganisms in these environments.

Metagenomic analysis of Antarctic ice shelves has revealed the presence of unique microbial communities adapted to cold and nutrient-poor conditions (Cameron *et al.*, 2020). For

example, a recent study of the McMurdo Dry Valleys in Antarctica used metagenomics to identify bacteria, archaea, and fungi in the soil samples, revealing a high diversity of cold-adapted microorganisms and their potential roles in nutrient cycling (Michaud *et al.*, 2021).

In addition, metagenomics has been used to study the impact of climate change on microbial communities in extreme environments. For example, a study used metagenomic sequencing to investigate the impact of permafrost thaw on microbial communities in Arctic soils, revealing changes in community composition and functional potential (Xue *et al.*, 2021). Another study used metagenomic analysis to investigate the effects of altitude on soil microbial communities, revealing changes in community structure and metabolic pathways at different elevations (Li *et al.*, 2021).

Overall, metagenomics provides a valuable approach for the study of microbial ecology in extreme environments, which could have significant implications for the understanding of microbial evolution, biogeochemical cycles, and environmental management.

Conclusion:

Metagenomics has revolutionized our understanding of microorganisms and their functions in a diverse range of environments, including the human gut and extreme habitats. By enabling the discovery of previously unknown microorganisms and their potential biotechnological applications, this approach has transformed our knowledge of microbial diversity. Moreover, metagenomics has provided new insights into the contributions of microorganisms to biogeochemical cycles, ecological management, and human health. Despite challenges such as data analysis and interpretation, metagenomics remains an invaluable technique for studying the microbiome of different ecosystems.

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BOTANY

B. Sc. Semester-VI

Paper - I: Biochemistry, Biotechnology and Herbal Technology

Paper - II : Phytogeography, Utilization of Plants, Techniques and Pharmacognosy



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A Text Book of
BOTANY
B. Sc.
(Semester - VI)

Paper - I: Biochemistry, Biotechnology and Herbal Technology

Paper - II : Phytogeography, Utilization of Plants, Techniques and Pharmacognosy

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ADVANCES IN SCIENCE AND TECHNOLOGY VOLUME I

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PHYSICO-CHEMICAL AND MICROBIAL STATUS OF SOIL SAMPLES OF SOME PUBLIC GARDENS OF BHANDARA CITY- A CASE STUDY

Padmavathi S. Rao* and Shweta P. Udapure

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Abstract:

Bhandara city is situated on the banks of Wainganga River. Soil adjacent to bank of Wainganga River is of various Types mainly black Kachhar soil, reddish soil and Sandy Marhani soil. Most parts of the city is covered with Sandy Marhani soil. The city has good numbers of public and private gardens to add beauty and greenery to Bhandara city. In the present study, some public gardens located in prime location were selected to study physico-chemical and microbial analysis of soil samples. Soil is an important abiotic factor in the nature which provide natural habitat for plants and animals. Soil can hold water and acts as an important source of nutrients to the plants. The fertility of the soil in any ecosystem depends on weathering processes, vegetation cover, microbial activities, and other biotic & abiotic factors. In view of this, 16 soil samples from various locations of each garden were collected by random sampling. In each sample, organic matter, hygroscopic moisture, soil temperature, soil texture, pH, water holding capacity, electrical conductivity, Potassium, Phosphorus, Organic carbon and microbial analysis were determined to analyze the fertility status of the garden soil.

Keywords: Fertility status, Marhani soils, Microbial analysis, Public garden

Introduction:

Soil is a complex mixture of mineral nutrients, organic matter, water, air and living organisms determined by various environmental factors such as topography, climate, weathering processes, vegetation cover, microbial activities and other biotic & abiotic factors. It is an important system of terrestrial ecosystem. So, the degradation of soil quality has posed a threat to plant growth. The soil enzymes occupy a vital role in catalyzing reactions associated with decomposition of organic matter and nutrient cycling. The fertility of the soil in the natural ecosystem depends on the microbial processes such as mineralization of organic nitrogen (N), carbon (C), sulfur (S) and phosphorus (P). Soil is

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one of the most significant ecological factors, on which plants depend for their nutrients, water and mineral supply. Soil contents include living organisms and products of their decay which are intermingled to add to the fertility (Humus soil). The major inorganic constituents of soil are Calcium, Iron, Potassium, Phosphorous, Magnesium and Silicon. However, soil also contains major quantities of micronutrients essentially. The main organic constituents of soil are humus. Soil productivity depends basically on Physical, Chemical and Microbial properties of the soil for which our study included the gardens of Bhandara. Significance is being attached to this physico chemical and microbial study for soil fertility studies. This analytical study of soil is based on various parameters like Temperature, Soil Texture, Soil Consistency, Soil Moisture, Water Holding Capacity, Soil Organic carbon, Soil pH, Electrical conductivity (EC), available Phosphorus, Potassium and isolation of some micro-organisms such as fungi & bacteria. The study area include four well known public gardens of Bhandara city (Miskin Tank Garden (S1), Civil Lines Garden (S2), Nagar Parishad Garden (S3) and Shastri Nagar Garden (S4). Soil samples were collected randomly from different locations of each garden and studied physico-chemical and microbial analysis for analyzing fertility status.

PLATE-I



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Chapter - 4

Synthesis, Characterization, Crystal Structure and Biological activity of Transition Metal Complexes of N_2O_2 donor of Salophen Ligand

Dr. Samina Karimkha Tadavi, Dr. Rahul D. Patil and Dr. Ratnamala S. Bendre

Abstract

In the present study, the main objective of this chapter is to prepared the Salophen ligand (PH)6,6'-((1E,1'E)-(1,2-phenylenebis(azanylylidene))bis(methanylylidene))bis(5-isopropyl-2-methylphenol and its mononuclear Mn(III), Co(II), Ni(II) and Cu(II) complexes with suitable metal acetate/chloride salts. The various techniques were used to for structure determination of the complexes by Uv-visible, FT-IR, NMR, Mass spectroscopic, C, H and N (Elemental analysis) & SEM analysis, ESR spectroscopy, magnetic susceptibility measurement and molar conductance. X-ray crystallographic analysis reveals that the Salophen ligand acts as N_2O_2 donor tetradentate. PH ligand $C_{28}H_{32}N_2O_2$, Crystallizes from chloroform in monoclinic space group P21 with $a = 8.561(2) \text{ \AA}$, $b = 8.705(2) \text{ \AA}$, $c = 16.556(4) \text{ \AA}$, $\alpha = 90^\circ$, $\beta = 103.736(11)^\circ$, $\gamma = 90^\circ$, $Z = 2$, $R = 0.1275$ and $R_w = 0.2945$. For the biological application have performed the antibacterial antifungal and antioxidant activities.

Keywords: Salophen ligand, metal complexes, crystal structure, antibacterial, antifungal and antioxidant activities.

1. Introduction

Hugo Schiff, a German scientist, gave Schiff bases their name ^[1]. They are made by condensing ketones or aldehydes with primary amines under various circumstances and in various solvents after the water molecule is removed. A variety of natural compounds can be synthesized using the reactive intermediates provided by the azomethine nitrogen ($-C=N$) in Schiff base. Aliphatic aldehyde or ketone Schiff bases are usually unstable and highly polymerisable, but aromatic aldehyde Schiff bases are much more stable because an effective conjugation is present. Aldehydes frequently react more quickly in a condensation reaction than ketones, which leads to the formation of Schiff bases since an aldehyde's reaction centre is sterically less



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Women Roles in Environment Management

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Women constitute almost half of the world's population yet their social economic and political status is lower than that of men in all countries. In India there were distinct stages of rise and fall in the status of women. Role of women in modern India can be called as phenomenal. The transition of women from past to present is worth mentioning women who once considered being the masters in the art of home making are now considered to be the forces that shape a country. There is no arena which remained unconquered by Indian women. Indian women have mastered anything and everything which a women can dream of. Development of our country depends on the empowerment of women. A man and a women are like two wheels of a cart. The cart can move fast and safely too when both of them pull it in the same direction and with equal strength hence no developing country or society can afford to ignore the role of women if they are to progress. For centuries, Women have been making huge contribution to the field of Environmental management and as in many sectors their remarkable findings have been hidden. However in Science there is long been positive tradition that keeps their name in the record books. Women have always played a critical role in meeting household and community energy needs. Inadequate energy resources and a lack of access to efficient technologies of energy utilization force the people to depend on their own labour, animal power and bio-mass energy to meet their daily requirements. With adequate environmental education and awareness women can conserve energy resources far more efficiently as compared to men.

Role of women in Environmental management

Efforts to include women in environmental policy in more engaging ways need to be conceptualised in the Indian context, keeping in mind the levels of social stratification that exist in our society. Some major policies and programs on environment and their implications for women are briefly discussed here. Among them these Eight women environmentalists and activists are the ones, whose work in various environmental related fields has been invaluable.

1 Amrita Devi- (Chipko movment) One of the first environmentalist movement which was inspired by women was the Chipko movement (Women tree-huggers in India). Amrita Devi, the brave lady of Khejarli, sacrificed her life in the year 1730 to protect the Khejri trees in Khejarli village near Jodhpur in Rajasthan. She belonged to Bishnoi community. Bishnois strictly forbid the harming of trees and animals. Thus Bishnois movement laid the foundation of environment protection movement in India. This movement started by Amrita Bai in 1731 A D was revived by Bachni Devi and Gaura Devi of Uttar Pradesh in 1972. They snatched the axe from the wood cutters and warned contractors not to cut the trees. The government of India has introduced an "Amrita Devi Bishnoi National Award for Wildlife Conservation" within the memory of Amrita Devi Bishnoi.

2. Vandana shiva- (Navdanya) Dr Vandana Shiva is a physicist, environmental activist, and food sovereignty and anti-globalisation advocate. She

founded (RFSTE) The Research Foundation for Science, Technology and Ecology, and Navdanya, an organisation which promotes biodiversity conservation, organic farming, and the rights of farmers. She was perhaps best known, however, as a critic of Asia's Green Revolution, an international effort that began in the 1960s to increase food production in less-developed countries through higher-yielding seed stocks and the increased use of pesticides and fertilizers. The Green Revolution, she maintained, had led to pollution, a loss of indigenous seed diversity and traditional agricultural knowledge, and the troubling dependence of poor farmers on costly chemicals. In response, RFSTE scientists established seed banks throughout India to preserve the country's agricultural heritage while training farmers in sustainable agricultural practices. In 1991 Shiva launched Navdanya, meaning "Nine Seeds," or "New Gift" in Hindi. The project, part of RFSTE, strove to combat the growing tendency toward monoculture promoted by large corporations. Navdanya formed over 40 seed banks in India and attempted to educate farmers on the benefits of conserving their unique strains of seed crops.

3. Sugatha Kumari- (Silent valley) Sugatha kumari had been a leading light in the literary, cultural and social spheres of Kerala for the last 60 years. She had been at the forefront of environmental movements and those for marginalised groups including women, Adivasis and the mentally-ill. Silent Valley is one of the important biodiversity hotspot in Southern end of

साहित्य में राष्ट्रबोध के स्वर

सम्पादक

डॉ. एकादशी जैतवार-भैरम

प्रा. जागृति मनोज सिंह



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परिकल्पना

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डॉ. पद्मिनी दुरुगकर घोसेकर

डॉ. प्रविण घोसेकर

१९वें शतक स्वातंत्र्य चळवळीचे शतक म्हणून ओळखले जाते. या शतकातच टिळक युगानंतर गांधी युगाला सुरुवात झाली. १९२० ला लोकमान्य टिळकांनी देह ठेवला आणि गांधी, आंबेडकर युगाला सुरुवात झाली. एकोणिसाव्या शतकाला स्वातंत्र्य चळवळीचे शतक संबोधल्या जात असले तरीही त्याआधीही अनेक स्वातंत्र्यलढे इतिहासात झालेले आहे आणि त्याचे परिणाम साहित्यावर दूरगामी उमटलेले आपल्याला दिसून येतात.

इसवी सन १६०० मध्ये शिवाजी महाराजांनी केलेली हिंदवी स्वराज्य स्थापना ही या स्वातंत्र्यलढ्यातील एक महत्त्वपूर्ण घटना होती. भारतावर फक्त इंग्रजांचे राज्य नव्हते तर अनेक परकीय सत्तांचे सुद्धा राज्य भारतावर होते. या पारतंत्र्यात कालखंडात अनेक स्वातंत्र्य लढे झाले. त्यात शिवाजी महाराजांचा हिंदवी स्वराज्याचा स्थापनेच्या संकल्प महाराष्ट्र सह संपूर्ण देशाला स्फूर्ती देणारा ठरला. शिवरायांची विचार व प्रेरणा घेऊन अनेक लढे झालेले दिसून येतात.

शिवरायांचे कार्य आणि त्यांची युद्धनीती तसेच राजनीती बखर वाङ्मयाच्या स्वरूपात तसेच पोवाड्याच्या स्वरूपात आपल्याला मराठी साहित्यात दिसून येते. आज्ञापत्र यासारख्या पत्रांनी सुद्धा मराठी साहित्यात मोलाची भर घातलेली आहे. शिवरायांचा इतिहास, मराठ्यांचा इतिहास किंवा पेशव्यांचा इतिहास हा जसा घ्कीव इतिहासातून आपल्याला कळतो तसाच तो साहित्यावरूनही आपल्याला अवगत होतो. तसेच १८५७ च्या उठावाचे जसे दूरगामी परिणाम सर्वत्र झाले तसेच ते मराठी साहित्यावरील झालेले दिसून येते. राणी लक्ष्मीबाई, तात्या टोपे यांची माहिती साहित्यात कुठे ना कुठे आपल्याला दिसून येते. तसेच स्वातंत्र्यवीर सावरकरांच्या “१८५७ चे स्वातंत्र्यसमर” या ग्रंथात विस्तृत दिसून येते. यानंतरच्या कालखंडाचा जर विचार केला तर गांधी युगातील महत्त्वाच्या कालखंडात महात्मा फुले, राजर्षी

महाराज यांचेही कार्य महत्वाचे आहे आणि त्यांचा कार्याचा योग्यपणे साहित्यात झेनाकुटे दिगून येतो. महात्मा फुलेंनी तर सामाजिक क्रांती घडवतांना अनेक ग्रंथांचे लेखन केलेले दिगून येते. त्यात गुलामगिरी, शेतकऱ्यांचा आगूड, मार्कंडेयक मन्व्यधर्म, ब्रह्मणाचे कसब, तृतीय रत्न नाटक, इशाग, मन्साग, अमृश्यांची कैफियत, सैबाश शिवाजीराजे भोसले, अखंड रचना ही त्यांची प्रमुख साहित्य निर्मिती दिगून येते.

टिळकांचे साहित्य आणि स्वातंत्र्य चळवळ : त्या पत्रांनी लवकरच देशी पत्रकारितेच्या क्षेत्रात आपले विशेष स्थान निर्माण केले. विष्णूशास्त्री चिपळूणकर यांनीही या दोन वृत्तपत्रांसाठी दोन प्रेस स्थापन केल्या. ज्याईसाठी 'आर्यभूषण' आणि 'ललित कला'च्या जाहिरातीसाठी 'चित्रशाळा' देण्यात आली. काही काळ हे पाच जण या कामात पूर्णपणे गुंतले. ही कामे त्यांनी पुढे नेली. 'न्यू इंग्लिश स्कूल'ने लवकरच शाळांमध्ये प्रथम क्रमांक पटकावला. 'मराठा' आणि 'कंसरी' हीही देखूनची प्रमुख वृत्तपत्रे झाली.

भारतीय जनतेत 'स्व'राज्याची व राष्ट्रवादाची जाणीव निर्माण करण्यास नमूद ते स्वराज्य मिळवण्याची सिंहराजना करून समाजाला प्रेरित करणारे लोकमान्य बाळ गंगाधर टिळक हे स्वातंत्र्य चळवळीतील एक महत्वाचे नाव होते.

टिळकांनी इंग्रजांच्या अत्याचाराला विरोध केला, आणि इंग्रजांना टणकावून सांगितले स्वराज्य हा माझा जन्मसिद्ध हक्क आहे आणि तो मी मिळवणारच. लोकमान्य टिळकांसमोर पुढे इंग्रज सरकार सुद्धा नमले होते. त्यांनी फेसरी व मराठा या वर्तमानपत्राला सुरुवात केली आणि त्यामधून लोकांना जागृत केले. त्यांचे लेख म्हणजे प्रखर स्फूर्तिदायी आणि स्वाभिमान जागृत करणारे नमूद दिशादर्शक होते. कंसरीतल्या लेखामुळे अवघा महाराष्ट्र खळबळून जागा झाला. त्यांच्या जहाल लेखाचा परिणाम क्रांतिकारकांवरही पडला.

टिळकांचे अग्रलेख हाच 'कंसरी' चा आत्मा होता. 1881 ते 1920 या चाळीस वर्षांच्या काळात टिळकांनी अनेक अग्रलेख लिहिले. 'सरकारचे डोकं टिकाणावर आहे काय?', यासारख्या अनेक लेखांनी भारतीयांचे स्वातंत्र्यप्रेम जागृत केले.

लोकमान्यांच्या लेखनात बनावट, सजावट, अलंकाराची वेलवुट्टी नसायची, तर ते लेखन रोख-टोक आणि अभ्यासपूर्ण असायचे. लेखनाप्रमाणेच लोकमान्यांचे वक्तृत्वही धारदार होते. सामाजिक सहभागाचे महत्त्व जाणणारे ते विलक्षण प्रभावी संघटक होते. समाज एकजूट होण्यासाठी त्यांनी सार्वजनिक शिवजयंती आणि गणेशोत्सवाचा श्रीगणेशा महाराष्ट्रात केला. म्हणून त्यांच्या ह्या क्रांतिकारी विचारामुळेच त्यांना भारतीय अशांततेचे जनक असेही म्हटल्या जाते. त्यांनी मराठीतील कंसरी आणि इंग्रजीतील द मराठा या दोन साप्ताहिक वृत्तपत्रांच्या माध्यमातून लोकांचे

अथवा धार्मिक स्वातंत्र्य असो. गुरुजींना सर्व प्रकारचे स्वातंत्र्य अभिप्रेत होते. गुरुजींच्या देशभक्तीपर कवितातून सतत 'स्वातंत्र्य' व 'आत्मत्याग' याचा ऊहापोह दिसून येतो. त्यांच्या या स्वातंत्र्य गीतांमुळे अनेक युवकांना प्रेरणा मिळाली व त्यांनी स्वतःला स्वातंत्र्यसंग्रामात झोकून दिले.

1928 साली साने गुरुजींनी 'विद्यार्थी' नावाचे मासिक सुरु केले. गांधीजींच्या विचारांनी प्रेरित झालेल्या साने गुरुजी यांनी 1930 साली शिक्षकाची नोकरी सोडून सविनय कायदेभंगाच्या चळवळीत उडी घेतली.

1942 च्या चळवळीत भूमिगत राहून साने गुरुजी यांनी स्वातंत्र्याचा प्रचार केला. स्वातंत्र्य समारातील त्यांच्या सहभागामुळे त्यांना तुरुंगवास भोगावा लागला. नाशिकला कारागृहात त्यांनी 'श्यामची आई' या पुस्तकाचे लेखन पूर्ण केले. धुळे येथे कारागृहात असतांना साने गुरुजी यांनी विनोबा भावेंनी सांगितलेली ष्ठीताई लिहिली.

बलसागर भारत होवो... । विश्वात शोभूनी राहो ।।

राष्ट्रार्थ प्राण हे उरले । मी सिद्ध मराया हो... ।।

या साने गुरुजींनी लिहिलेल्या कवितेने त्यावेळी नागरिकांवर प्रभाव वाढला होता व त्यांनी स्वातंत्र्य संग्रामात स्वतःला झोकून दिले होते. त्यांच्या ह्या गीतामुळे ब्रिटीश सरकारने त्यांच्या काव्यपंक्ती देखील जप्त केल्या होत्या.

स्वातंत्र्यवीर विनायक दामोदर सावरकर व त्यांचे लेखन : भारतीय स्वातंत्र्य चळवळीतील एक महत्त्वाचे स्वातंत्र्यसैनिक म्हणजे स्वातंत्र्यवीर विनायक दामोदर सावरकर हे होत.

विनायक दामोदर सावरकर हे समाजसुधारक, मराठी कवी व लेखक होते. तसेच ते हिंदू तत्वज्ञ होते. सावरकर हे भाषा शुद्धी व लिपिशुद्धी या चळवळीचे प्रणेते होते. सावरकरांचा माझी जन्मठेप हा आत्मवृत्तांत पर ग्रंथ 1927 ला प्रकाशित झाला. 1911 ते 1920 या काळात अंदमानात भोगलेल्या करावासातील वृत्तांत या ग्रंथांमध्ये त्यांनी विशद केलेला आहे. तुरुंगातील त्यांच्यावर झालेले अन्वनिष्ठ छळ, शारीरिक वेदना, मानसिक यातना सोसत असताना सावरकरांची कविता व लेख लिहिण्याची उर्मी कायम राहिली. त्यांनी भिंतीवर स्तंभ आलेखून लेखन केले. मातृभूमी हा त्यांच्या लेखनाचा महत्त्वाचा विषय होय. स्वतंत्रतेचे स्त्रोत या कवितेत स्वातंत्र्याची अध्यय आकांक्षा व मातृभूमीवर उत्कट भक्ती व्यक्त झाल्याचे दिसून येते. त्यांच्या लिखाणां मुळे अनेक नागरिकांनी स्वातंत्र्यसंग्रामाची प्रेरणा घेऊन स्वातंत्र्यसंग्रामात उडी घेतल्याचे दिसून येते.

साहित्यिक या नात्याने सावरकरांनी अनेक प्रकार हाताळले. कवी, नाटककार,

शाहीर, कादंबरीकार, निबंधकार, पत्रलेखक, चरित्रकार, आत्मचरित्र लेखक, व्याकरणकार, इतिहासकार, पत्रकार अशा विविध भूमिकांतून त्यांनी आपली साहित्यसंपदा सृजन केली. मराठी भाषेत 1000 हून अधिक पाने व इंग्रजीत 15000 हून अधिक पाने भरेल इतके लिखाण केले. भाषाशुद्धीची चळवळ केली. मराठी भाषेला अनेक नवे शब्द दिले. मोडी लिपीला प्रोत्साहन दिले. उर्दू भाषेत गझला लिहिल्या. या कामगिरीबद्दल नागपूर व पुणे विद्यापीठांनी 'डी.लिट' देऊन सन्मान केला. साहित्य संमेलनाचे अध्यक्षपद भूषविले.

रत्नागिरी येथे स्थानबद्धतेत असताना सावरकरांनी ग्रंथाची निर्मिती केली. 'माझी जन्मठेप', 'माझ्या आठवणी', 'तेजस्वी तारे', 'छत्रपतींचा जयजयकार', 'शत्रूंच्या शिबिरांत' इत्यादी ग्रंथसंपदा त्यांनी निर्माण केली. 'कमला' हे अंदमानला रचलेले महाकाव्य लिहून काढले.

कादंबरीकार म्हणून 'काळे पाणी' व 'मला काय त्याचे?' या त्यांच्या कादंबऱ्या आत्मानुभव सांगणाऱ्या आहेत. 'मोपल्याचे बंड' ही कादंबरी केरळमधील मलबार जिल्ह्यातील घटनांचा समकालीन वेध घेणारी आहे.

सावरकरांचा 'धन्य शिवाजी तो रणगाजी धन्यचि तानाजी' हा सिंहगडाचा पोवाडा गाजला आहे. 'बाजीप्रभूचा पोवाडा', 'चाफेकर नि रानडे यांजवर फटका' हा प्रसिद्ध आहे.

'सत्तावनचे स्वातंत्र्यसमर' लिहून त्यांनी राष्ट्रवादी इतिहास लेखनात मोलाचे योगदान दिले. हिंदुत्व (हा शब्दही त्यांनीच प्रचलित केला) या तात्त्विक सिद्धांताची प्रस्थापना केल्यानंतर सावरकर त्याच्या राजकीय अंमलबजावणीकडे वळले. त्यासाठी त्यांना मराठ्यांच्या इतिहासाचे पुनर्लेखन करावे लागले. तेच त्यांचे 'हिंदुपदपातशाही' हे पुस्तक. 'सहा सोनेरी पाने' हा ग्रंथ त्यांनी डॉ. आंबेडकरांच्या 'हिंदूंचा इतिहास हा पराभवाचा इतिहास आहे' या वाक्याचा प्रतिवाद करण्यासाठी लिहिला.

पत्ररूपाने अभिव्यक्त झालेले सावरकर, वाचकांच्या भेटीला येतात ते 'अंदमानच्या अंधेरीतून' लिहिलेल्या व कालांतराने प्रसिद्ध झालेल्या ग्रंथाच्या रूपाने. त्यांची 'लंडनची बातमीपत्रे' युरोपातील घडामोडींची माहिती पुरवतात. 'सावरकरांच्या गोष्टी' व 'समाजचित्रे' हे त्यांचे कथासंग्रह वाचनीय आहेत.

ने मजसी ने।

परत मातृभूमीला।

सागरा प्राण तळमळला।

तळमळला सागरा।।

ह्या कवितेतून त्यांच्या उत्कट देशप्रेमाची तळमळ दिसून येते.

महात्मा गांधी व त्यांचे साहित्य : भारतीय स्वातंत्र्य संग्रामात महात्मा गांधी ह्यांचे फार मोलाचे कार्य होते. महात्मा गांधी हे एक राजकीय नेतेच नव्हते तर ते एक चांगले लेखकही होते. त्यांनी अनेक पुस्तके लिहिली. महात्मा गांधींनी विपुल लेखन केले आहे. अनेक दशके त्यांनी बऱ्याच वर्तमानपत्रांचे संपादन केले.

महात्मा गांधी यांचे आत्मचरित्र प्माझे सत्याचे प्रयोग या नावाने प्रकाशित झाले आहे. त्यांच्या दक्षिण आफ्रिकेतील संघर्षावर त्यांनी "Satyagraha in South Africa (दक्षिण आफ्रिकेतील सत्याग्रह)" हे पुस्तक लिहिले आहे. तसेच त्यांनी 'हिंद स्वराज' किंवा "Indian Home" ही राजकीय पुस्तिका लिहिली आहे आणि जॉन रस्किनच्या "Unto This Last" चे गुजराती भाषांतर केले आहे. हा शेवटचा लेख त्यांच्या अर्थशास्त्रावरील विचारसरणीचे वर्णन करतो. त्यांचे काही साहित्य मराठी भाषेत अनुवादित झाले आहे. त्यांच्या साहित्यामुळे अनेक लोकांना स्वातंत्र्य चळवळीची प्रेरणा मिळाली होती.

साहित्यिकांचे आणि संघर्षाचे नाते : महाराष्ट्र भूमी ही विविध राजकीय आणि सामाजिक क्रांतीची भूमी आहे. स्वातंत्र्यपूर्व तसेच स्वातंत्र्योत्तर महाराष्ट्रामध्ये विविध रंगी राजकीय जीवन नांदत आलेले आपण बघितलेले आहे. या राजकीय जीवनाला अनेक पैलू आहेत. स्वातंत्र्यपूर्व काळात परकीयांबरोबर तसेच स्वातंत्र्योत्तर काळात स्वकीयांबरोबर क्रांतीकारी विचारधारा महाराष्ट्रात होत्या. आणि ह्या बदलत्या काळातही अशा विचारधारा कायम आपला प्रभाव पाडत होत्या. संघर्षाचे कारण, संघर्षाचे स्वरूप, आणि संघर्षाच्या पद्धती सतत बदलत होत्या पण विचारांचा संघर्ष हा महाराष्ट्राच्या जीवनपद्धतीचे एक अविभाज्य अंग होते. विचार प्रवण व कार्यप्रवण करणारी माणसे सतत महाराष्ट्राच्या भूमीने बघितलेली आहेत. महाराष्ट्राने अनेक चळवळी बघितलेल्या आहेत.

देशाच्या स्वातंत्र्य चळवळीमध्ये अनेक क्रांतिकारक हे थोर साहित्यिकही होते त्यांनी भारतीय स्वातंत्र्य चळवळीमध्ये सक्रिय सहभाग घेतलेला दिसून येतो. लोकमान्य टिळक, स्वातंत्र्यवीर सावरकर, साने गुरुजी, महात्मा फुले, महात्मा गांधी, पंडित नेहरू, यशवंतराव चव्हाण, पंजाबराव देशमुख, आचार्य अत्रे, डॉक्टर बाबासाहेब आंबेडकर, प्रा.ग.प्र. प्रधान, मुकुंदराव किर्लोस्कर असे अनेक साहित्यिक स्वातंत्र्य समरांमध्ये विविध लेख, कादंबरी, वृत्तपत्रांमधील लेख याद्वारे आपल्या लेखणीने स्वातंत्र्य चळवळीत प्राण फुंकत होते. त्यांच्या वैचारिक आणि ललित वाङ्मयाच्या निर्मितीने स्वातंत्र्य चळवळीमध्ये अमिट असा ठसा उमटलेला दिसून येतो.

भारतामध्ये स्वातंत्र्यलढा हा फार पूर्वीपासून चालत आलेला दिसून येतो यवनांपासून आपण स्वतंत्र असावं असे अनेक नागरिकांना वाटत होते. देशावर

गजनीचा, मोहम्मद घोरी यासारख्या अनेकांचे आक्रमण होत होते. छत्रपती शिवाजी महाराजांपासून खऱ्या अर्थाने आपली अस्मिता जागृत झाल्याचे दिसून येते. तो इतिहास बखर वाङ्मयातून लिहून ठेवलेला असून तो एक मोलाचा ऐतिहासिक वारसा आहे. शिवचरित्रात्मक अनेक बखरी मराठी वाङ्मयाच्या इतिहासात एक अभिमत ठेवा असल्याचे आपल्याला जाणवते. तसेच पेशव्यांच्या पराक्रमाच्याही बखरी अनेक बखरकारांनी लिहून ठेवलेल्या आहेत. इतिहासकालीन अनेक घराणी, वाडे, मुलुखे हे त्यांच्या पराक्रमासह मराठी साहित्यातून चित्रित झाल्याचे दिसून येते. या साहित्यामुळे अनेक चळवळींमध्ये अतिशय मोलाची कामगिरी केलेली दिसून येते.

मराठी साहित्याची पहाट मुक्तेश्वरांपासून उगवली असली तरी गुलामगिरीची जाणीव करून देणारी प्रेरणा महात्मा फुल्यांच्या 'शेतकऱ्यांच्या आसूड' पासून मिळाली. गुलामगिरीची खरी जाणीव त्यांच्या 'गुलामगिरी', 'तृतीय रत्न', 'ब्राह्मणांचे कसब' या विविध ग्रंथातून झाल्याचे दिसून येते.

टिळक युगाच्या अस्तानंतर म्हणजे 1920 नंतर भारतात राजकीय स्थित्यंतर घडले. त्यात भारतीय राजकारणात आणि स्वातंत्र्यसंग्रामात महात्मा गांधींच्या उदय ही देशासाठी एक महत्त्वाची आणि जमेची बाजू होती. गांधीवादी विचाराचे आणि तत्त्वज्ञानाने संपूर्ण भारतच नव्हे तर संपूर्ण विश्वाला भुरळ घातल्याचे दिसून येते. भारतीय लढ्यात गांधीवादी विचारसरणीने अनेक स्वातंत्र्यवीर भारावून गेले आणि त्यांनी भारतीय स्वातंत्र्य लढ्यामध्ये प्राणाची आहुती दिल्याचे दिसून येते.

भारतीय स्वातंत्र्यलढ्यामध्ये 'वंदे मातरम' हे गीत स्वातंत्र्य वीरांचे स्फूर्ती पर गीत ठरले. हे गीत म्हणजे भारतीय संस्कृतीचा एक अनमोल ठेवाच आहे. बांकिमचंद्र चॅटर्जी यांनी दिलेले वंदे मातरम हे गीत प्रत्येक भारतीयाला वेदमंत्राहूनही अधिक वंदनीय वाटणारा एक समर मंत्र होय. या सहा अक्षरी मंत्राने स्वातंत्र्य चळवळीमध्ये अनेक क्रांतिकारक भारावून गेले तसेच सावरकरांच्या 'स्वतंत्रतेचे स्त्रोत्र' या कवितेत स्वातंत्र्याची अदम्य आकांक्षा तसेच मातृभूमीवरील उत्कट भक्ती व्यक्त झालेली आहे. या कविता व काव्यांमुळे भारतीय स्वातंत्र्यसंग्रामात अनेकांनी आपल्या प्राणाची आहुती दिली व क्रांतिकार्यात स्वतःला शोकून दिले.

स्वातंत्र्य चळवळी दरम्यान लेखन व चित्रण करणारे अनेक साहित्यिक हे स्वातंत्र्ययोद्धेच होते. त्यांनी आपापल्या परीने साहित्य तीच्या द्वारे स्वातंत्र्यलढ्यात सहभाग नोंदविलेला दिसून येतो. त्यांच्या साहित्य प्रेरणेने अनेक नागरिकांचे मन परिवर्तन होऊन त्यांनी स्वतःचे आयुष्य स्वातंत्र्यसंग्रामात शोकून दिलेले दिसून येते.

भारतीय स्वातंत्र्य समरामध्ये मराठी साहित्य क्षेत्रातील विविध मान्यवर यांनी विविध लेखन कृतींमधून स्वातंत्र्यसैनिकांना प्रेरणा देण्याचे कार्य केलेले आहे.

साहित्यिकांनी त्यांच्या साहित्य तीमधून स्वातंत्र्यसमोर आला एक स्फूर्ती आणि उभारी दिल्याचे दिसून येते. टिळक, आगरकर, महात्मा गांधी, स्वातंत्र्यवीर सावरकर, साने गुरुजी, संत तुकडोजी महाराज आधी थोर मान्यवरांनी आपल्या विविध साहित्यकृती जसे कादंबरी, लेख, स्पुटलेखन, कविता, गाणे यांद्वारे नागरिकांना प्रेरणा देऊन त्यांच्यात राष्ट्रभक्तीची जाणीव निर्माण केल्याची दिसून येते. स्वातंत्र्याची जाणीव छत्रपती शिवाजी महाराजांच्या काळातील बखर आणि पोवाडे यांच्याद्वारे सुद्धा झाल्याचे दिसून येते. बखर आणि पोवाड्यांद्वारे तसेच विविध कवितां द्वारे आणि अनेक साहित्य कृतीद्वारे स्वातंत्र्यसंग्रामात एक भरीव योगदान दिलेले आहे. याद्वारे असे लक्षात येते की मराठी साहित्याचे स्वातंत्र्यसंग्रामात अतिशय मोलाचे योगदान होते.

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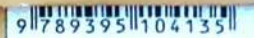
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Quantitative Analysis on Cloud computing service in distributed & business models

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Abstract: The field of cloud computing has reached to the new heights of technical Development and also speeding up the growth of the computational services in organization. Even after transferring to the cloud becoming an alluring trend from a financial approach, there are several other aspects that must be taken into consideration by all organization before they decide to implement cloud services. The cloud services are used as and when required for the users. With the tremendous growth in the cloud environment there are major issues that everyone should take into consideration like data security and protection against access control! Risk is estimated based on statistical assumptions, and those are changing over time. Each party needs to manage their risk towards an acceptable level (multi-party security). The residual risk is never zero, there is no absolute security. In this paper we present security analysis in context of the data security provided in different types of cloud services and domains. The aim of this paper is to provide a better understanding of the design challenges of cloud computing and identify important research directions in this increasingly important area. In this paper, we present security analysis in the context of data security of using a cloud environment.

Keyword: Access control, Virtualization, Cloud Computing, Multi-party Security.

Introduction:

Cloud computing environment is used as and when required for the users and different services. For example, in order to process a user request, a service provider can draw the necessary resources on-demand, perform a specific job and then hand over the unneeded resources and often dispose them after the job is done. Contrary to the traditional computing environment, data and the application is controlled by the service provider [1,2,3,4]. With the growth and development in cloud computing there is major concern about the data security and protection against external and internal access and threats. Despite of this cloud services give many advantages such as On-demand Infrastructure, pay as you go, reduced cost of maintenance, elastic scaling etc. are fascinating reason for enterprises to use cloud computing environments. In a cloud computing data storage and computation are performed in a single data center. Since cloud is responsible for providing various services according to the user requirements there are more chances for vulnerability and hacking attacks. Single reason may not be allocated for any data loss or attack. As shown in Fig.1 the data may be located at several geographically distributed nodes in the cloud. There may be multiple points where

security breach can occur. It is very much difficult to track the security breach in clouds as compared to traditional computing environments. This technological trend has enabled the realization of a new computing model called cloud computing, in which resources (e.g., CPU and storage) are provided as general utilities that can be leased and released by users through the Internet in an on-demand fashion. In a cloud computing environment, the traditional role of service provider is divided into two: the *infrastructure-true providers* who manage cloud platforms and lease resources according to a usage-based pricing model, and *service providers*, who rent resources from one or many infrastructure providers to serve the end users. The emergence of cloud computing has made a tremendous impact on the Information Technology (IT) industry over the past few years, where large companies such as Google, Amazon and Microsoft strive to provide more powerful, reliable and cost-efficient cloud platforms, and business enterprises seek to reshape their business models to gain benefit from this new paradigm. The term "cloud" has also been used in various contexts such as describing large ATM networks in the 1990s. However, it was after Google's CEO Eric Schmidt used the

word to describe the business model of providing services across the Internet in 2006, that the term really started to gain popularity. Since then, the term cloud computing has been used mainly as a marketing term in a variety of contexts to represent many different ideas.

NIST definition of cloud computing

Cloud computing is a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction.

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2. State-of-the-art in Cloud Computing

In this section, we present the state-of-the-art implementations of cloud. We first describe the key technologies currently used for cloud computing. Then, we survey the popular cloud computing products.

2.1 Cloud computing technologies

This section provides a review of technologies used in cloud computing environments.

2.1.1 Architectural design of data centers

A data center, which is home to the computation power and storage, is central to cloud computing and contains thousands of devices like servers, switches and routers. Proper planning of this network architecture is critical, as it will heavily influence applications performance and throughput in such a distributed computing environment. Further, scalability and resiliency features need to be carefully considered.

Currently, a layered approach is the basic foundation of the network architecture

design, which has been tested in some of the largest deployed data centers. The basic layers of a data center consist of the core, aggregation, and access layers, as shown in Fig. 1.

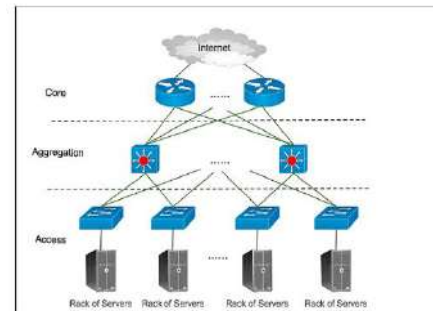


Fig.1 Basic layered design of data center network infrastructure

The access layer is where the servers in racks physically connect to the network. There are typically 20 to 40 servers per rack, each connected to an access switch with a 1 Gbps link. Access switches usually connect to two aggregation switches for redundancy with 10 Gbps links. The aggregation layer usually provides important functions, such as domain service, location service, server load balancing, and more. The core layer provides connectivity to multiple aggregation switches and provides a resilient routed fabric with no single point of failure. The core routers manage traffic into and out of the data center.

A popular practice is to leverage commodity Ethernet switches and routers to build the network infrastructure. In different business solutions, the layered network infrastructure can be elaborated to meet specific business challenges. Basically, the design of data center network architecture should meet the following objectives [1, 21–23, 35]:

Uniform high capacity: The maximum rate of a server- to-server traffic flow should be limited only by the available capacity on the network-interface cards of the sending and receiving servers, and assigning servers to a service should be independent of the network topology. It should be possible for an arbitrary host in the data center to communicate with any other host in the network at the full bandwidth of its local network interface.

Free VM migration: Virtualization allows the entire VM state to be transmitted across the network to migrate a VM from one physical machine to another. A cloud computing hosting service may migrate VMs for statistical multiplexing or dynamically changing communication patterns to achieve high bandwidth for tightly coupled hosts or to achieve variable heat distribution and power availability in the data center. The communication topology should be designed so as to support rapid virtual machine migration.

Resiliency: Failures will be common at scale. The network infrastructure must be fault-tolerant against various types of server failures, link outages, or server-rack failures. Existing unicast and multicast communications should not be affected to the extent allowed by the underlying physical connectivity.

Scalability: The network infrastructure must be able to scale to a large number of servers and allow for incremental expansion.

Recessive compatibility: The network infrastructure should be backward compatible with switches and routers running Ethernet and IP. Because existing data centers have commonly leveraged commodity Ethernet and IP based devices, they should also be used in the new architecture without major modifications.

Another area of rapid innovation in the industry is the design and deployment of shipping-container based, modular data center (MDC). In an MDC, normally up to a few thousands of servers, are interconnected via switches to form the network infrastructure. Highly interactive applications, which are sensitive to response time, are suitable for geo-diverse MDC placed close to major population areas. The MDC also helps with redundancy because not all areas are likely to lose power, experience an earthquake, or suffer riots at the same time. Rather than the three-layered approach discussed above, Guo et al. [22, 23] proposed server-centric, recursively

defined network structures of MDC.

2.1.2 Distributed file system over clouds:

Google File System (GFS) [19] is a proprietary distributed file system developed by Google and specially designed to provide efficient, reliable access to data using large clusters of commodity servers. Files are divided into chunks of 64 megabytes, and are usually appended to or read and only extremely rarely overwritten or shrunk. Compared with traditional file systems, GFS is designed and optimized to run on data centers to provide extremely high data throughputs, low latency and survive individual server failures.

Inspired by GFS, the open source Hadoop Distributed File System (HDFS) [24] stores large files across multiple machines. It achieves reliability by replicating the data across multiple servers. Similarly to GFS, data is stored on multiple geo-diverse nodes.

The file system is built from a cluster of data nodes, each of which serves blocks of data over the network using a block protocol specific to HDFS. Data is also provided over HTTP, allowing access to all content from a web browser or other types of clients.

Data nodes can talk to each other to rebalance data distribution, to move copies around, and to keep the replication of data high.

2.1.3 Distributed application framework over clouds

HTTP-based applications usually conform to some web application framework such as Java EE. In modern data center environments, clusters of servers are also used for computation and data-intensive jobs such as financial trend analysis, or film animation. MapReduce [16] is a software framework introduced by Google to support distributed computing on large data sets on clusters of computers. MapReduce consists of one Master, to which client applications submit MapReduce jobs. The Master pushes work out to available task nodes in the data center, striving to keep the tasks as close to the data as possible. The Master

knows which node contains the data, and which other hosts are nearby. If the task cannot be hosted on the node where the data is stored, priority is given to nodes in the same rack. In this way, network traffic on the main backbone is reduced, which also helps to improve throughput, as the backbone is usually the bottleneck. If a task fails or times out, it is rescheduled. If the Master fails, all ongoing tasks are lost. The Master records what it is up to in the file system. When it starts up, it looks for any such data, so that it can restart work from where it left off.

The open source Hadoop MapReduce project [25] is inspired by Google's work. Currently, many organizations are using Hadoop Map Reduce to run large data intensive computations.

3. OBJECTIVE

Considering various approaches present in the literature till date it is found that there exists no suitable service and cost model for providing distributed cloud computing service. Hence, it is the intention to develop an approach to build a versatile and effective service and cost model for providing cloud computing service for compiling source code remotely from any hand held device (having limited resources) using the distributed service model. According to this model, for providing a service, the service provider may subsequently use the services of other service providers in the cloud without the awareness of the client. The cost model effectively evaluates the cost which each client pays to each of its service providers for receiving the services. The approach will provide services to the end user having limited configuration in their hand held devices. The Cloud service provider will provide its services through web and the consumer will pay for using the services. In it, one service provider may subsequently use the services of other service providers without the awareness of consumers. The model is expected to be mutually beneficial to the client and its service provider.

4. PROPOSED APPROACH:

The approach is to develop a suitable Cloud Computing service and cost model for

providing cloud computing service (like Compilation service, file service etc.)

SERVICE MODEL

The steps of this model are summarized as follows:-

Step 1:

In accordance with the service model the client (CL) requests for a service from a suitable service provider (SP).

Step 2:

The service provider on receiving the request ensures whether it is possessing sufficient resource to provide the service requested by its client.

Step 3:

If the service provider finds that it possesses sufficient resource to provide the service then it provides the service to its client directly

else

{

if the service provider finds that it does not possess all the necessary resource then it finds suitable service providers and requests those service providers to provide it with the required resource.

Again the steps from Step 2 onwards are repeated for each service provider requested (for providing service).

}

Considering an implementation of the service model (as shown in Fig.2) where client will request to provide a Platform for writing and compiling their programs/source code. The service provider will provide the user friendly platform for writing and compiling programs on the fly using any hand held device having internet access facility.



Fig. 2 Diagrammatic representation of an implementation of the service model.

In accordance with this implementation the following activities takes place:

1. Client (CL) will write his/her program or source codes using the user friendly interface provided in the web page and request for compilation to the service provider (SP).

2. The service provider (SP) on receiving the request will check whether all the necessary packages required for compilation are available or not.

3. If the service provider finds that it possesses all the necessary packages which are required for compilation then it provides the service to its client directly.

```

else
else
{
    it finds suitable service providers
    and requests the service
    providers (SP1,SP2,...) to provide
    it with the required resource.
    3.1 The new service providers
    (SP1,SP2,...) on receiving the
    request may again check whether
    it has all the packages which is
    requested by its client.
    3.2 If the new service provider
    finds that it possess all the
    necessary packages which
    are requested it provides the
    service to its client directly
    by providing the packages
    requested.
    else
    {
        if it finds that it does
        not possess all the
        packages requested
        then it finds
        appropriate service
        providers and makes
        requests to provide it
        with the required
        (missing) package.
        Step 3.1 is repeated
        again.
    }
}

```

4. Once the service provider (SP) receives

all the packages necessary for compiling the program it compiles the program and provides the results/output of the compilation to the client (CL).

5. COST MODEL

The cost model is based on the following steps which are enumerated as follows.

Let the cost which A pays for receiving services be $C(A)$ Let the service charge for A providing a service be SA .

When the client (M) receives the service which requested from the service provider (N) then the cost that client (M) pays to its service provider (N) is

$$C(M) = C(N) + SA$$

Where $C(N)$ is the cost which N pays for receiving services from other service providers.

SA is the service charge (based on companies policies) of N for providing the service to its client (M).

$C(N)=0$, when N does not make any request for providing any service to it.
if N requests services from k number of service providers (labeled as $Q1, Q2, \dots, Qk$)
)
then

$$C(N) = SQ1 + C(Q1) + S(Q2) + \dots + SQk + C(Qk)$$

$$\begin{aligned}
 & (k) \\
 & = \sum S(Qi) \\
 & + C(Qi) \quad \text{where } i = 1
 \end{aligned}$$

In accordance with the implementation in Fig. 2 the cost is evaluated in the following manner.

Step1. Client (CL) writes his/her program or source code using the user friendly interface provided in the web page and sends a request for compilation to the service provider (SP).

Step2. On receiving the request service provider (SP) checks whether all the

necessary packages are available to it for compilation of source code.

Step3. If the service provider (SP) finds that it possess all the packages necessary to compile the source code then it provides its service (i.e. the result of the compilation) to its client (CL) by deducting the service charge s(SP) from client (CL)'s account.

Step4. If the service provider (SP) finds that it does not possess all the packages necessary to compile the source code then it requests for providing the necessary packages from other service providers.

Consider a scenario where the service provider (SP) requests for packages from service providers SP1 and SP2. SP2 may not have all the packages requested by SP. Hence, SP2 sends a request to SP3 to provide the required (missing) package. Once, SP3 provides the packages requested to SP2. SP2 provides the packages requested to SP. SP1 also provides the packages requested to it by SP. When the service provider (SP) receives all the packages necessary for compilation, it does compilation of the source code and provides its service (i.e., the result of the compilation) to its client (CL).

In this case the service provider –

SP2 pays a charge:

Represents as follows-

SP2 pays a charge

$$\begin{aligned} C(SP2) &= S(SP3) \quad \dots (1) \\ &\text{since } C(SP3) \\ &= 0 \end{aligned}$$

SP pays a charge

$$\begin{aligned} C(SP) &= S(SP1) + S(SP2) \\ &\quad + C(SP2) \quad \dots (2) \\ &\text{since } C(SP1) \\ &= 0 \\ &= S(SP1) + S(SP2) + \\ &S(SP3) \quad \dots (3) \end{aligned}$$

*(Substituting eqtn (1) in eqtn (2))
for receiving the packages, hence the client (CL)
pays a charge C(CL) then we have the eqtn*

$$\begin{aligned} C(CL) &= S(SP1) + C(SP) \quad \dots \dots (4) \\ &= S(SP1) + S(SP2) + S(SP3) \end{aligned}$$

(Substituting eqtn (3) in eqtn (4))

6. IMPLEMENTATION

The proposed approach has been implemented by developing a Web application using Java servlets and Oracle. In accordance with the implementation a new client first creates an account by filling up a registration form (by submitting the required information) online and paying a charge (as fixed by the service provider). Once the client is registered, he/she can log into the service provider's website using his/her user- id and password. If the client successfully logs in then he will be provided with the options to edit his profile, compile a source code, view balance, make payment etc. Using the user name and password the service provider authenticates the clients. After authentication the service provider will provide a user friendly interface where the authorized user writes the program (Java or C source code), specifies a filename for saving it, submits it for compilation (as shown in Fig.3). The service provider compiles the source code and displays the results of compilation. If the compilation is successful then the files generated after compilation (Java class files/byte codes or binary executable or binary object files) are provided to the client. If the compilation is not successful then the error messages generated are displayed to the client.

Every time a request is made by the client for compilation a charge (based on the proposed cost model) is deducted from clients account. If a service provider finds that it does not possess all the necessary packages required for compilation then it finds appropriate service providers and requests it to provide the missing (necessary) package in accordance with the proposed service model. The implementation has been made in such a way that the packages provided by the service providers can be used only once. This aspect has been incorporated to prevent reusability (thereby preventing software piracy to a considerable extent) of the packages once provided by any service provider. It implies that every time you require a package, you need to make a

request to the vendor specific service provider thereby paying the requisite amount to the provider of the package. This would provide the service providers a great impetus and would help in boosting up their business.

6.1 Comparison of traditional and proposed method

In Fig.3 C_0 is the cost which one pays in the traditional approach to purchase the entire product (containing n_0 number of components where each component belongs to a specific vendor) irrespective of the number of components used. In the proposed approach the best case shows that initially (when few components are used) the consumer pays a very low cost and the cost increases gradually as more and more components are being used (shown in Fig.3). Hence, the consumer pays very less as compared to the traditional approach for getting a service (component) from various service providers (corresponding to various vendors). In the worst case initially (when few components are used) consumer pays very high cost and the cost increases gradually as more components are being used. In accordance with Fig. 5, it is found that when the number of components used is n_0 then the consumer in all the cases (i.e. traditional, proposed approach: best case and worst case) pays the cost C_0 . Otherwise, in the proposed approach both under best and worst cases it is found that the cost which a consumer pays is always less than the actual price of the product (C_0) when the number of components used is less than n_0 .

Looking from the perspective of the service provider it is found that in traditional approach the service provider earns the revenue (profit) from a customer only once (after selling the product to the customer). But in the proposed approach the revenue (profit) earned goes on increasing depending upon the number of times a service is requested and provided.

This aspect is best explained in the following example. Considering that a service provider earns a profit of p for providing a particular service once.

If n number of times a service provider is

requested for the same service then the service provider earns a profit np , by providing the service n number of times. Therefore, it is found that the profit or the revenue goes on increasing linearly with the number of times a service is provided (as shown in Fig.4).

According to Fig.4, it is found that in the proposed approach initially (when less than n_c number of times a service is requested) the revenue (profit) earned is low as compared to traditional approach.

But, when more than n_c number of times a service is requested the revenue (profit) becomes more than the revenue (profit) earned in the traditional approach.

The planned approach including services and cost model for providing Cloud computing service for writing and compiling source code remotely from any hand held device using the distributed service model is expected to be mutually beneficial to the client and its service provider.

The cost model evaluates the cost which client pays to each of its service providers for receiving the services. The model is probable to be beneficial to the client and also for service provider. The clients are paying for the service they receive.

Depending on the services provided by the service provider the cost is evaluated and the different features are being amalgamated for providing better data security and PaaS support for various other tasks.

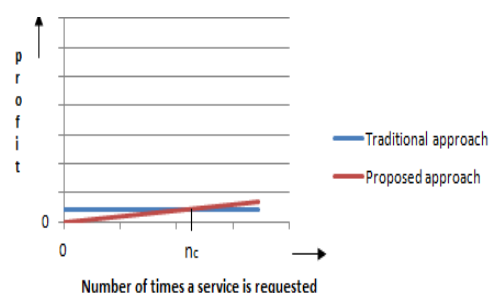


Figure 4. Plots showing the profit gained by the provider based on the number times a service are provided

7. Conclusion

The proposed approach comprising of service and cost model for providing Cloud computing service for writing and compiling source code remotely from any

hand held device using the distributed service model is expected to be mutually beneficial to the client and its service provider. According to this model, for providing a service, the service provider may subsequently use the services of other service providers (which may in turn use the services of other service providers to provide their service) in the cloud without the awareness of the client. The cost model effectively evaluates the cost which each client pays to each of its service providers for receiving the services. The model is expected to be mutually beneficial to the client and its service provider. The client is paying only for the service it receives and the service provider only provides the service that is requested by the client. The cost is evaluated based on the kind of service provided. Features are being incorporated for providing better data security and PaaS support for various other tasks. Since, the packages provided by the service providers can be used only once, reusability of the packages once provided by any service provider can be prevented (thereby preventing software piracy to a considerable extent). It implies that every time you require a package, you need to make a request to the vendor specific service provider thereby paying the requisite amount to the provider of the package. Hence this model is also expected to reduce software piracy to a considerable extent thereby helping the vendors in boosting up their business.

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Study of integration of Cloud Computing and Data Mining

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Abstract: This paper describes how data mining is used in cloud computing. Data mining is a process of extracting potentially useful information from raw data and cloud computing is a general term for anything that involves delivering hosted services over the internet. Data mining techniques and applications are very much needed in the cloud computing paradigm. In data mining with cloud computing we retrieve meaningful information from virtually integrated data warehouse.

Keyword: Cloud Computing, Data Mining, Cloud Deploying model, Cloud Services.

Introduction:

In recent year internet has become important factor in our day to day life. On the daily basis very large amount of data stored on internet. These data stored in cloud infrastructure and from these large amounts of data extract sorted data which is very useful is the process of data mining. Cloud computing allows the integration of data mining techniques and methods, which deals with the massive amounts of data. Cloud data mining extracts "structured" information from different Web-based data sources. Web data may be semi-structured data or unstructured data.

Data mining is the process of sorting data from large amount of data sets with the help of identifies patterns and relationships between related data. Data mining, also known as knowledge discovery in data (KDD), is the process of uncovering patterns and other valuable information from large data sets. Data mining techniques and tools enable enterprises to predict future trends and make more-informed business decisions. Data mining is used to explore increasingly large databases and to improve market segmentation.

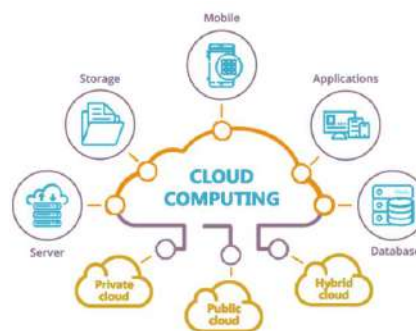
Cloud computing is the delivery of different services through the Internet. These resources include tools and applications like data storage, servers, databases, networking and software. Cloud computing is named as such because the information being accessed is found remotely in the cloud or a virtual space. Cloud computing addresses these issues by offering computing resources as scalable, on-demand

services. Cloud computing is the on-demand availability of computing resources as services over the internet. It eliminates the need for enterprises to procure, configure, or manage resources themselves, and they only pay for what they use.

Data mining techniques and applications are very much needed in the cloud computing paradigm. The implementation of data mining techniques through Cloud computing will allow the users to retrieve meaningful information from virtually integrated data warehouse that reduces the costs of infrastructure and storage. Cloud computing allows the integration of data mining techniques and methods, which deals with the massive amounts of data. Cloud data mining extracts "structured" information from different Web-based data sources. Web data may be semi-structured data or unstructured data.

Cloud Deployment Models:

Cloud deployment model works as your virtual computing environment with a choice of deployment model depending on how much data you want to store and who has access to the Infrastructure.



1. Public Cloud: A public cloud is an IT model where public cloud service providers make computing services. Public cloud is accessible to the public. In public cloud, "Cloud provider data centre" are available which provide the services like application services, platform services, scalable services, computing services, and storage service to public.

2. Private Cloud: A Private Cloud is a model of cloud computing where the infrastructure is dedicated to a single user organization. The accessibility of infrastructure is provide to specific company. Companies that look for cost efficiency and greater control over data & resources will find the private cloud a more suitable choice.

3. Community Cloud: When we talk about shared cloud services then we consider community cloud services. Community cloud allows access to only a specific set of users who share common objectives and use cases. This type of deployment model of cloud computing is managed and hosted internally or by a third-party vendor.

4. Hybrid Cloud: Hybrid cloud is the combination of two or more cloud services from cloud deployment models. Hybrid cloud combines and unifies public cloud, private cloud and on-premises infrastructure to create a single, flexible, cost-optimal IT infrastructure.

Cloud services:

Cloud services are infrastructure, platforms, or software that are hosted by third-party providers and made available to users through the internet.

1. Software as a Service (SaaS) - Delivers a single application through the web browser to thousands of customers using a multitenant architecture. On the customer side, it means no upfront investment in servers or software licensing; on the provider side, with just one application to maintain, cost is low compared to conventional hosting. Under SaaS, the software publisher (seller) runs and maintains all necessary hardware and software. The customer of SaaS accesses the applications through Internet. Google docs is also a very nice example of SaaS where the users can create, edit, delete and share their documents, spreadsheets or presentations whereas Google have the responsibility to maintain the software

and hardware. • E.g. - Google Apps, Zoho Office

2. Platform as a Service (PaaS)-Delivers development environment as a service. One can build his/her own applications that run on the provider's infrastructure that support transactions, uniform authentication, robust scalability and availability. The applications built using PaaS are offered as SaaS and consumed directly from the end users' web browsers. This gives the ability to integrate or consume third-party webservices from other service platforms. E.g. - Google App Engine

3. Infrastructure as a Service (IaaS) - Consumers control and manage the systems in terms of the operating systems, applications, storage, and network connectivity, but do not themselves control the cloud infrastructure. IaaS service provides the users of the cloud greater flexibility to lower level than other services. It gives even CPU clocks with OS level control to the developers. E.g. - Amazon EC2 and S3.

Conclusion:

The data mining in cloud computing allows organizations to centralize the management of software and data storage. Cloud computing denotes new trend in Internet services and with the help of data mining we cover broad area of cloud services. Data mining integrated in cloud computing is very important characteristic in business to make effective decisions to predict the future trends and behaviour. Computing is the serving side, and Data Mining is the side being served. It's not that Data Mining can't be done without Cloud Computing or Cloud Computing only application is Data Mining.

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Application of Convergence of Big Data and Machine Learning

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Abstract: Industries in the current era are using both Big Data and Machine Learning and they are using this combination very successfully. Majority of professionals and data scientist are using this combination and it is being popular day by day. Big data is a term that is used to designate large, hard-to-manage, structured and unstructured voluminous data. Whereas, Machine learning is a subfield of Artificial Intelligence that enables machines to automatically acquire and improve from experience from the past data.

Keywords: machine learning, big data, artificial intelligence

1. Introduction:

Companies are collecting a huge amount of data at different pace, volume, and format. The volume of data is not that much important, but what really matters is the use of this data. In today's digital world, big data has a very significant role when it comes to customer data. But this data can be of no use if it is not paired with machine learning systems having high computational capability. Machine learning systems can give a real insight into the customer data and can be used in more efficient way according Companies are collecting a huge amount of data at different pace, volume, and format.

The volume of data is not that much important, but what really matters is the use of this data. In today's digital world, big data has a very significant role when it comes to customer data. But this data can be of no use if it is not paired with machine learning systems having high computational capability. Machine learning systems can give a real insight into the customer data and can be used in more efficient way according Companies are collecting a huge amount of data at different pace, volume, and format.

The big data is ever growing field in the computer science. Many organisations are collecting a huge amount of data of different format, volume and pace. The use of data is much important than its volume of data. Big data plays a very significant role in the current digital era and offers varied services when we are dealing with customer data. When these data will paired

with the machine learning system which has high computational capability; then only it is of use. Machine learning system offers a real insight into the customer's data and can be used very effectively according to the needs of the organisation.

Convergence of Big data with machine learning can indeed boost the organisation business and can gear up long-time business importance. The distinctive features of big data including huge volume, high speed, different varieties, complex, unstructured and inaccurate have proved to be better than the traditional data mining and statistical techniques. Most of the data scientist support machine learning techniques to explore the pattern and structures hidden as categorized into supervised and unsupervised learning.

Machine learning is extensively used in different real-world applications of varied disciplines. The machine learning is popularly used where there is a high volume of structured and unstructured data. Machine learning is useful with big data in healthcare industry for improving patient care and monitoring, early disease detection and assisting doctor to suggest patient health issues. Machine learning is very useful in many industries including financial services, intelligent transportation systems, national security, automotive, computer vision, etc. to extract required data.

In the current digital era, huge amount of data is generated which has a different varieties and veracity. So it's organisational top priority to handle it efficiently. Thus, majority of the organisations are

restructuring their infrastructures and shifting towards big data to increase automation level and the use of smart devices to enhance the productivity and to deliver efficient and effective services to the customer. Machine learning systems with high computational and storage capacity along with intelligence can offer such services and big organisations have already integrated machine learning and big data.

Both Machine learning and big data technologies are being used together by most companies because it becomes difficult for the companies to manage, store, and process the collected data efficiently; hence in such a case, Machine learning helps them.

2. Big Data

Big Data is a broad term which is used to refer to the huge volume of digital information generated by different businesses. This big data is generated by traditional information exchange and software, along with from sensors of various types embedded in varied environments; markets, hospitals, metro stations, schools and virtually every electrical or electronic device that produces data.

Big Data puts an excessive focus on the issue of voluminous information. It exceeds the capacity of traditional data management technologies generating the need for new tools and technologies to handle the extremely large volume. It not only presents a challenge in storing huge volumes of data but also the new competences of analyzing this huge volume of data. Another way of defining Big Data is datasets whose size or type is beyond the ability of traditional relational databases to capture, manage, and process the data with low latency. Big Data comes from sensors, databases, devices, audio/video, computers, networks, log files, transactional applications, web, and social media typically generated real-time and at a very large scale

Characteristics of this Big Data

- **Volume:** The volume defines the size of the data which is collected and stored. The apprehension is not only in terms of the storage required to store this but also the resources needed for processing this huge amount of data irrespective of the source of the data and generate a real-time result from it.
- **Velocity:** Data generation has changed drastically from the traditional applications like invoicing or production where the data is generated only during production hours and is restricted to how many invoices a day or amount of production a day. New applications like event-based alerting or flow-of-control monitoring need quick data processing. Enterprises now want to look at the results in a blink of an eye and see the influence of every new transaction. This has given rise to a new dimension in data analysis known as "streaming analysis".
- **Variety:** The huge volume of data is not coming from the structured data or database-based applications only. Datasets have a many new formats. Social media is one of the most important new source of data. Enterprises want to capture how users are feeling about their products on social media and plan their upcoming strategies accordingly. Other social media achievements include learning about spread of viruses and the vaccination frequency. Bluetooth and RFID applications, large quantities of PDFs, emails, recorded voice messages and videos, etc. add to the variety of data.

Challenges in Big Data

Big data has fabulous growth and collection of structured as well as unstructured data. Majority of companies are using this technology for running their business and to store, process, and extract value from a bulk amount of data. Hence, it is becoming a challenge for them to use the collected data in effective way. Following are the challenges while using Big data are, which are as follows:

- Storing
- Capturing
- distribution

- Searching
- Sharing
- Transferring
- Analyzing
- Visualization

5V's in Big Data

Big data is defined by 5V's, which denotes to the **volume, Variety, value, velocity, and veracity**. These 5Vs are discussed hereunder:



1. Volume (Huge volume of data)

Data is the core of any technology, and the huge volume of data flow in the system makes it essential to employ a dynamic storage system. Nowadays, data is coming from countless sources such as social media sites, e-commerce platforms, new sites, financial transactions, etc., and it is becoming directed to store data in the most efficient manner. Although, with the passing of time, storage cost is slowly decreasing, thus permitting storage of collected data. The seriousness that the term big data owns is because of its volume.

2. Variety (Different formats of data from many sources)

Data can be structured as well as unstructured and comes from numerous sources. It can be audio, video, text, emails, transactions, and many more. Due to different formats of data, storing, managing, and organizing the data becomes a big challenge for any organizations. Though storing raw data is not tough but converting unstructured data into a structured format and making them available for business uses is practically complex for IT expertise.

3. Velocity (velocity at which data is processed)

Classification and sorting of data is very necessary to control data flows. Further, the superiority of processing data with great accuracy and speed is also necessary for storing, managing, and organizing data in an effective manner. Smart sensors, smart metering, and RFID tags make it essential to deal with huge data invasion in almost real-time. Sorting, assessing, and storing such deluges of data in a timely fashion become essential for majority of organizations.

4. Veracity (Accuracy)

In general, Veracity is the accuracy of data sets. But when it comes to Big data, it is not only limited to the accuracy of big data but also inform us how trustworthy is the data source. It also determines the reliability of data and how expressive it is for analysis. In one line, we can say Veracity is defined as the quality and consistency of data.

5. Value (Meaningful data)

Value in Big Data refers to the meaningful or helpfulness of stored data for your business. In big data, data is stored in structured as well as an unstructured format, but irrespective of its volume, usually, it is not meaningful. Hence, we need to transform it into a useful format for the business requirements of organizations. For e.g., data having missing or corrupt values, missing key structured elements, etc., are not useful for companies to offer better customer service, create marketing campaigns, etc. Hence, it leads to minimizing the revenue and profit in their businesses.

Sources of data in Big Data

Big data can be of numerous formats of data either in structured as well as unstructured form, and comes from different different sources. The main sources of big data are given hereunder:

• Social Media

Data is collected from different social media platforms such as Instagram, Facebook, Twitter, WhatsApp, etc. Although data collected from these platforms can be anything like text, audio, video, etc., the biggest challenge is to store,

manage and organize these data in an efficient way.

- **Online cloud platforms:**

There are different online cloud platforms, such as **Amazon AWS, Microsoft Azure, Google Cloud, IBM cloud**, etc., that are also used as a source of big data for machine learning.

- **Internet of things:**

The Internet of Things (IoT) is a platform that offers cloud facilities, alongwith data storage and processing through IoT. Currently, cloud-based ML models are becoming popular. It starts with raising input data from the client end and processing machine learning algorithms using an artificial neural network (ANN) over cloud servers and then returning with output to the client again.

- **Online Web pages:**

Currently, every second, thousands of web pages are created and uploaded over the internet. These web pages can be in the form of text, videos, images, pdf etc. Hence, these web pages are also a main source of big data.

Machine Learning

Difference between Big Data and Machine Learning

With the increasing use of big data, the use of machine learning has also

Machine Learning is one of the utmost crucial subsets of Artificial Intelligence in the computer science field. Machine learning means the study of automated data processing or decision-making algorithms that improve themselves automatically based on experience or past experience.

It makes systems proficient of learning automatically and improves from experience without being explicitly programmed. The primary aim of a machine learning model is to progress computer programs that can access data and use it for learning purposes.

With the rise in Big Data, Machine Learning has become a kingpin in solving problems in various areas such as:

- Automation
- Image recognition
- Healthcare
- Speech Recognition
- Finance and Banking industry
- Computational Biology
- Energy production
- Personal virtual assistance
- Self-driven vehicle
- Natural Language Processing (NLP)
- Marketing and Trading
- The education sector, etc.

amplified in all industries. Differences between machine learning and big data is given hereunder:

Machine Learning	Big Data
Machine Learning is used to predict the data for the future based on applied input and past experience.	Big Data is defined as large or voluminous data that is difficult to store and also cannot be handled manually with traditional database systems.
Machine Learning can be categorized mainly as supervised learning, unsupervised learning, semi-supervised learning, and reinforcement learning.	Big Data can be categorized as structured, unstructured, and semi-structured data.
It helps to analyze input datasets with the use of various algorithms.	It helps in analyzing, storing, managing, and organizing a huge volume of unstructured data sets.

It uses tools such as Numpy, Pandas, Scikit Learn, TensorFlow, Keras.	It uses tools such as Apache Hadoop, MongoDB.
In machine learning, machines or systems learn from training data and are used to predict future results using various algorithms.	Big data mainly deals in extracting raw data and looks for a pattern that helps to build strong decision-making ability.
It works with limited dimensional data; hence it is relatively easier to recognize features.	It works with high-dimensional data; hence it shows complexity in recognizing features.
An ideal machine learning model does not require human intervention.	It requires human intervention because it mainly deals with a huge amount of high-dimensional data.
It is useful for providing better customer service, product recommendations, personal virtual assistance, email spam filtering, automation, speech/text recognition, etc.	It is also helpful in areas as diverse as stock marketing analysis, medicine & healthcare, agriculture, gambling, environmental protection, etc.
The scope of machine learning is to make automated learning machines with improved quality of predictive analysis, faster decision making, cognitive analysis, more robust, etc.	The scope of big data is very vast as it will not be just limited to handling voluminous data; instead, it will be used for optimizing the data stored in a structured format for enabling easy analysis.

Convergence of Big data Machine Learning

Big Data and Machine Learning are the growing technologies. The both technologies have their own advantages and aren't competing for concepts or mutually exclusive. Though, both are very crucial individually, when united, they provide the opportunity to achieve some incredible results. By considering 5V's in big data, machine learning models helps to deal with them and predict precise results. Similarly, while developing machine learning models, big data helps to extract high-quality data as well as quality learning methods by means of providing analytics teams.

Many organizations, including Google, Amazon, IBM, Netflix, etc., have already discovered the power of big data analytics improved by machine learning.

Machine Learning is a very crucial technology, and with big data, it has

become more authoritative for data collection, data analysis, and data integration. All big organizations use machine learning algorithms for running their business efficiently.

We can apply machine learning algorithms to all element of Big data operation, including:

- Data Labelling and Segmentation
- Data Analytics
- Scenario Simulation

In machine learning algorithms, we need numerous varieties of data for training a machine and predicting precise results. However, sometimes it becomes tough to manage these bulkified data. So, it becomes a challenge to manage and analyze Big Data. Also, this unstructured data is useless until it is well interpreted. Thus, to use information, there is a need for talent, algorithms, and computing infrastructure. Machine Learning enables machines or systems to learn from previous experience and use data received from big data, and

predict accurate results. Hence, this leads to generating better quality business operations and building improved customer relationship management. Big Data helps machine learning by offering a variety of data so machines can learn more or numerous samples or training data.

In this way, businesses can attain their dreams and get the benefit of big data using machine learning algorithms. Though, for using the combination of machine learning and big data, companies need skilled data scientists.

Process of application of Machine Learning in Big data

Machine Learning offers efficient and automated tools for data gathering, analysis, and integration. In collaboration with cloud computing dominance, machine learning ingests agility into processing and integrates big amounts of data regardless of its source.

Machine learning algorithms can be applied to all element of Big Data operation, including:

- Data Segmentation
- Data Analytics
- Simulation

All these phases are integrated to create the big picture out of Big Data with insights, patterns, which later get categorized and packaged into an understandable format.

Conclusion

Big data creates many challenges for traditional machine learning in terms of their scalability, adaptability, and usability, and presents novel prospects for inspiring transformative and unique machine learning solutions to cope up with many technical challenges and create real-world impacts. These opportunities and challenges serve as promising guidelines for future research in this area too. Machine learning and big data can be used together to learn machine learning models using the high quality of data from the enormous amount of unstructured as well as structured data. Big data and machine

learning and provide amazing results so that organisations can achieve big results.

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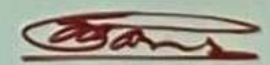
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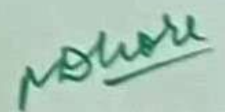
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"A Review of Machine Learning Algorithms for
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Prof. M. P. Dhore
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A Review of Machine Learning Algorithms for Video Processing

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Abstract: The amount of data generated by the videos is growing at a large scale. It is quite a difficult task to handle and process such a huge amount of data. The traditional video processing techniques counters this problem with great accuracy but got its own limitations. Machine learning is the need of the hour. Deep learning is the sub domain of Machine Learning which is specifically used for large sets of data. The algorithms available fit perfectly to solve this problem. There are lots of algorithms available which can be used for the task of video processing. It sometimes creates a great confusion which algorithm to be used to get better results. This paper aims to review some Deep Learning techniques which can be proven very effective for the task of video processing.

Keywords: Video Processing, Machine Learning, Deep Learning.

Descriptors such as Histogram of Oriented Gradient (HOG), Histogram of optic Flow

1. Introduction:

Twenty first century is a fast-growing world. It is the era of ICT. With the fast advancement in technology, we are more surrounded by gadgets. A lot of ways have come into existence which can be used to capture videos. The video can be captured with the help of cameras, mobile phones, surveillance cameras, etc. So a huge amount of video data is generated. This caught the attention of the researchers and the major work has been concentrated on video processing. The previous decade can be called a decade of image processing. But this decade is moreover a decade of video processing.

A lot of work is going on in the field of video processing. The majority of the work has been focused on the task of action recognition, face recognition, emotion recognition, video summarization, etc. The list of the applications is never ending.

The video data is nothing but the continuous stream of frames. It majorly comprises two features that are spatial and temporal. This is often referred to as spatio-temporal features. Then traditional ways of extracting this feature was based on the handcrafted methods for feature extraction. Space time interest point (STIP), Scale Invariant Feature Transformation (SIFT), Motion Scale Invariant Feature Transform(MoSIFT) are some of the approaches to extract handcrafted features.

(HOF) were used for the Human Activity Recognition (HAR).

Modern techniques for video processing make use of Machine Learning algorithms. Convolution Neural Network CNN is found out to be very promising when it comes to image and video data. A lot of pre-trained models of CNN are available. This paper aims to review a few pre-trained models of CNN which can help to make a wise decision for further research in the field. Out of the available models this paper will review the VGG16 and Inception (GoogLeNet). These three are the widely and most commonly used pre-trained model of CNN when it comes to the task of video processing.

2. Literature Review:

Peipei Zhou et al. [1] A new input modality, image acceleration field is proposed to better extract the motion attributes. Firstly, each video is framed as RGB images. Secondly, the optical flow field is computed using the consecutive frames and acceleration field is obtained according to the optical flow field. Thirdly, the FightNet is trained with three kinds of input modalities, i.e., RGB images for spatial networks, optical flow images and acceleration images for temporal networks. By fusing results from different inputs, they conclude whether a video tells a violent event or not. To provide researchers a

common ground for comparison, they have collected a violent interaction dataset (VID), containing 2314 videos with 1077 fight ones and 1237 no-fight ones. By comparison with other algorithms, experimental results demonstrate that the proposed model for violent interaction detection shows higher accuracy and better robustness.

Heyam M. Bin Jahlan et al. [2] work proposed a novel method to detect violence using a fusion technique of two significantly different convolutional neural networks (CNNs) which are AlexNet and SqueezeNet networks. Each network followed by separate Convolution Long Short Term memory (ConvLSTM) to extract robust and richer features from a video in the final hidden state. Then, making a fusion of these two obtained states and fed to the max-pooling layer. Finally, features were classified using a series of fully connected layers and softmax classifier. The performance of the proposed method is evaluated using three standard benchmark datasets in terms of detection accuracy: Hockey Fight dataset, Movie dataset and Violent Flow dataset. The results show an accuracy of 97%, 100%, and 96% respectively. A comparison of the results with the state of the art techniques revealed the promising capability of the proposed method in recognizing violent videos.

Ifanullah et al.[3] In their research, multiple key challenges have been incorporated with the existing work and the proposed work contrast. Firstly, violent objects can't be defined manually and then the system needs to deal with the uncertainty. The second step is the availability of label dataset because manually annotation video is an expensive and laborintensive task. There is no such approach for violence detection with low computation and high accuracy in surveillance environments so far. The Convolutional Neural Network's (CNN) models have been evaluated with the proposed MobileNet model. The MobileNet model has been contrasted with AlexNet, VGG-16, and GoogleNet models.

The simulations have been executed using Python from which the accuracy of AlexNet is 88.99 and the loss is 2.480 (%). The accuracy of VGG-16 is 96.49 and loss is 0.1669, the accuracy of GoogleNet is 94.99 and loss is 2.92416 (%). The proposed MobileNet model accuracy is 96.66 and loss is 0.1329 (%). The proposed MobileNet model has shown outstanding performance in the perspective of accuracy, loss, and computation time on the hockey fight dataset. Shakil Ahmed Sumon et al. [4] have explored different strategies to find out the saliency of the features from different pretrained models in detecting violence in videos. A dataset is created which consist of violent and non-violent videos of different settings. Three ImageNet models; VGG16, VGG19, ResNet50 are being used to extract features from the frames of the videos. In one of the experiments, the extracted features have been feed into a fully connected network which detect violence in frame level. In another experiment, they had fed the extracted features of 30 frames to a long short-term memory (LSTM) network at a time. Furthermore, they applied attention to the features extracted from the frames through spatial transformer network which also enables transformations like rotation, translation and scale. Along with these models, they designed a custom convolutional neural network (CNN) as a feature extractor and a pretrained model which is initially trained on a movie violence dataset. In the end, the features extracted from the ResNet50 pretrained model proved to be more salient towards detecting violence. These ResNet50 features, in combination with LSTM provide an accuracy of 97.06% which is better than the other models we have experimented with.

Narges Honarjoo et al. [5] employed pre-trained deep neural networks in order to present a low-complexity method for violence detection. The extracted features from pre-trained models have been pooled and fed into a fully connected network in order to detect whether a violent action has occurred. As

pre-trained models, the results of both ResNet-50 and VGG16 are explored in the proposed approach. They evaluate the effectiveness of the method on four public datasets. The experimental results depict the efficiency of the low-complexity proposed approach in comparison with other approaches using time-consuming networks like recurrent ones.

3. Algorithms:

3.1 VGG 16:

It is a pre-trained model with 3×3 filter for convolution layer and 1 stride. It uses 2×2 filters and 2 stride for max pooling layer. Same configuration is used for padding also. It does not use any hyper parameter but consists of this simple arrangement. In VGG 16 this arrangement is consistent throughout the architecture. At the end of the architecture there are two fully connected layers which are followed by the softmax function for output. There are all 16 layers in this Deep learning model hence it is called VGG 16. This layer can be extended up to 19 layers which builds the architecture of VGG19. It takes the input from three RGB channels with the size of 224×224 . The total no of filters in Convolution layer 1 is 64, layer 2 is 128, layer 3 is 256, and layer 4 and 5 have 512 filters.

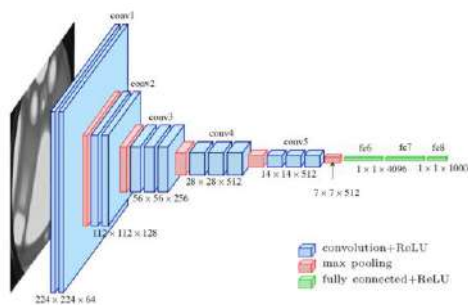


Fig.1. The standard VGG-16 network architecture as proposed in [6].

The fully connected layers have 4096 and 4096 nodes respectively. The softmax consists of 1000 nodes.

This model is best suited when less training time is required. As it has very few parameters it takes very less time for training while giving quite impressive results.

3.2 Inception (GoogLeNet):

Another Deep Learning model of CNN is Inception which is proposed by Google. This architecture is total 27 layers deep. It is based on the idea of a sparsely connected network. This architecture consists of convolution layer, followed by a max pooling layer, inception, avg pool, dropout, linear and lastly a softmax function. There are 2 convolution layers, 4 max pool layers, and 9 inception layers which is followed by a dropout, avg pool, linear and a softmax layer. Which makes this architecture huge. The Inception layer is the combination of 1×1 convolution layer, 3×3 convolution layer, 5×5 convolution layer with the output filter to create an image which in turns acts as an input to the next layer of the architecture.

The Inception requires a lot of space as it has this huge architecture. The variable type features need to be extracted by different sizes of kernel. This is rightly done by Inception. It got a small to large kernel implemented in one layer which are perfectly suited for this task.

type	patch size/ stride	output size	depth	#1×1	#3×3 reduce	#3×3	#5×5 reduce	#5×5	pool proj	params	ops
convolution	7×7/2	112×112×64	1							2.7K	34M
max pool	3×3/2	56×56×64	0								
convolution	3×3/1	56×56×192	2		64	192				112K	360M
max pool	3×3/2	28×28×192	0								
inception (3a)		28×28×256	2	64	96	128	16	32	32	159K	128M
inception (3b)		28×28×480	2	128	128	192	32	96	64	380K	304M
max pool	3×3/2	14×14×480	0								
inception (4a)		14×14×512	2	192	96	208	16	48	64	364K	73M
inception (4b)		14×14×512	2	160	112	224	24	64	64	437K	88M
inception (4c)		14×14×512	2	128	128	256	24	64	64	463K	100M
inception (4d)		14×14×528	2	112	144	288	32	64	64	580K	119M
inception (4e)		14×14×832	2	256	160	320	32	128	128	840K	170M
max pool	3×3/2	7×7×832	0								
inception (5a)		7×7×832	2	256	160	320	32	128	128	1072K	54M
inception (5b)		7×7×1024	2	384	192	384	48	128	128	1388K	71M
avg pool	7×7/1	1×1×1024	0								
dropout (40%)		1×1×1024	0								
linear		1×1×1000	1							1000K	1M
softmax		1×1×1000	0								

Table 1: GoogLeNet incarnation of the Inception architecture.[7]

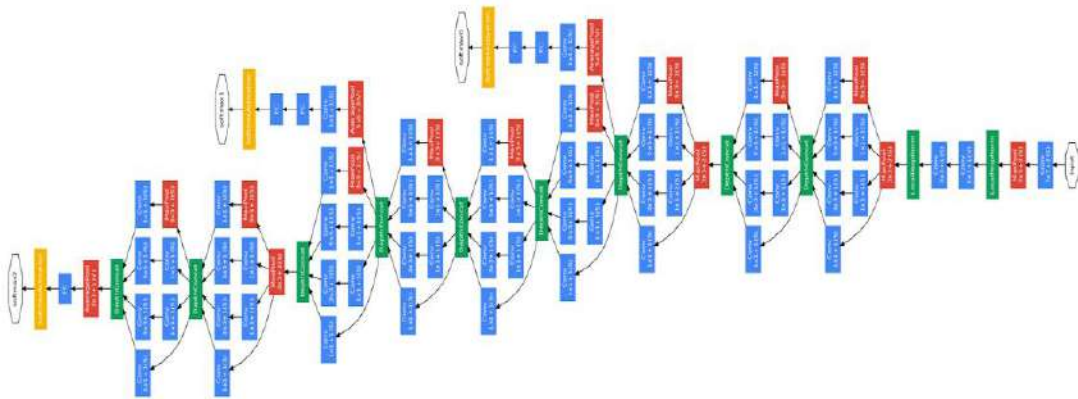


Fig.2. GoogLeNet network with all the bells and whistles.[7]

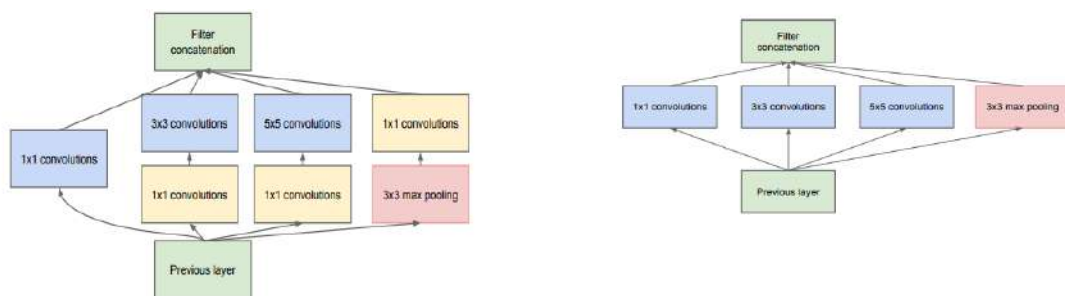


Fig. 3. Inception module with dimensionality reduction and Inception module, naive version[7]

Conclusion:

In this paper we have reviewed two greatly used pre-trained models of CNN which are used in deep learning. It has been

observed that the VGG 16 or VGG 19 (the architecture with 19 layers) requires comparatively less parameters to train and as a result it takes less time to get trained.

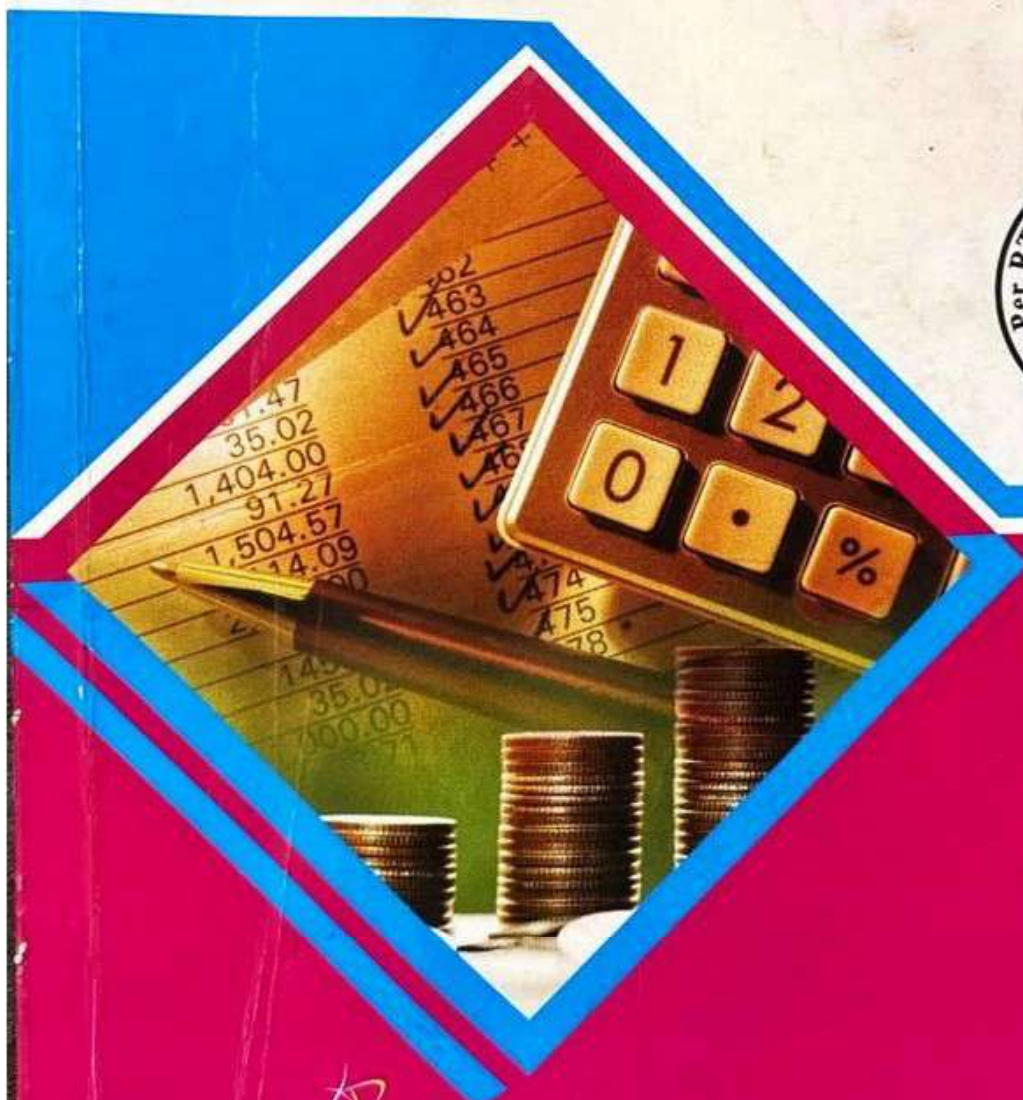
The Inception pre-trained CNN is a deep architecture of 27 layers. When it comes to the extraction of variable type features the Inceptions is the best choice as it got multiple kernels of different size built in a single layer. But it requires a good amount of space and takes time to get trained.

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“**Cost and Management Accounting**” book is prepared keeping in view the new syllabus of **RTM Nagpur University**, for **BBA Second Semester** Students. The objectives of this book is to make students understand the role of cost and management accounting for decision making with managerial perspective and provide the means of improving one's skill and knowledge in the field of accounting world as it helps in dealing with all modern method of preparation and presentation of accounts.

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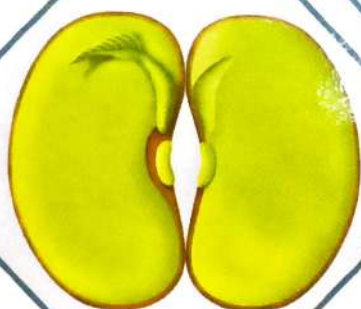
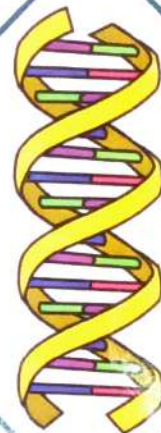
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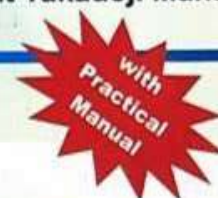


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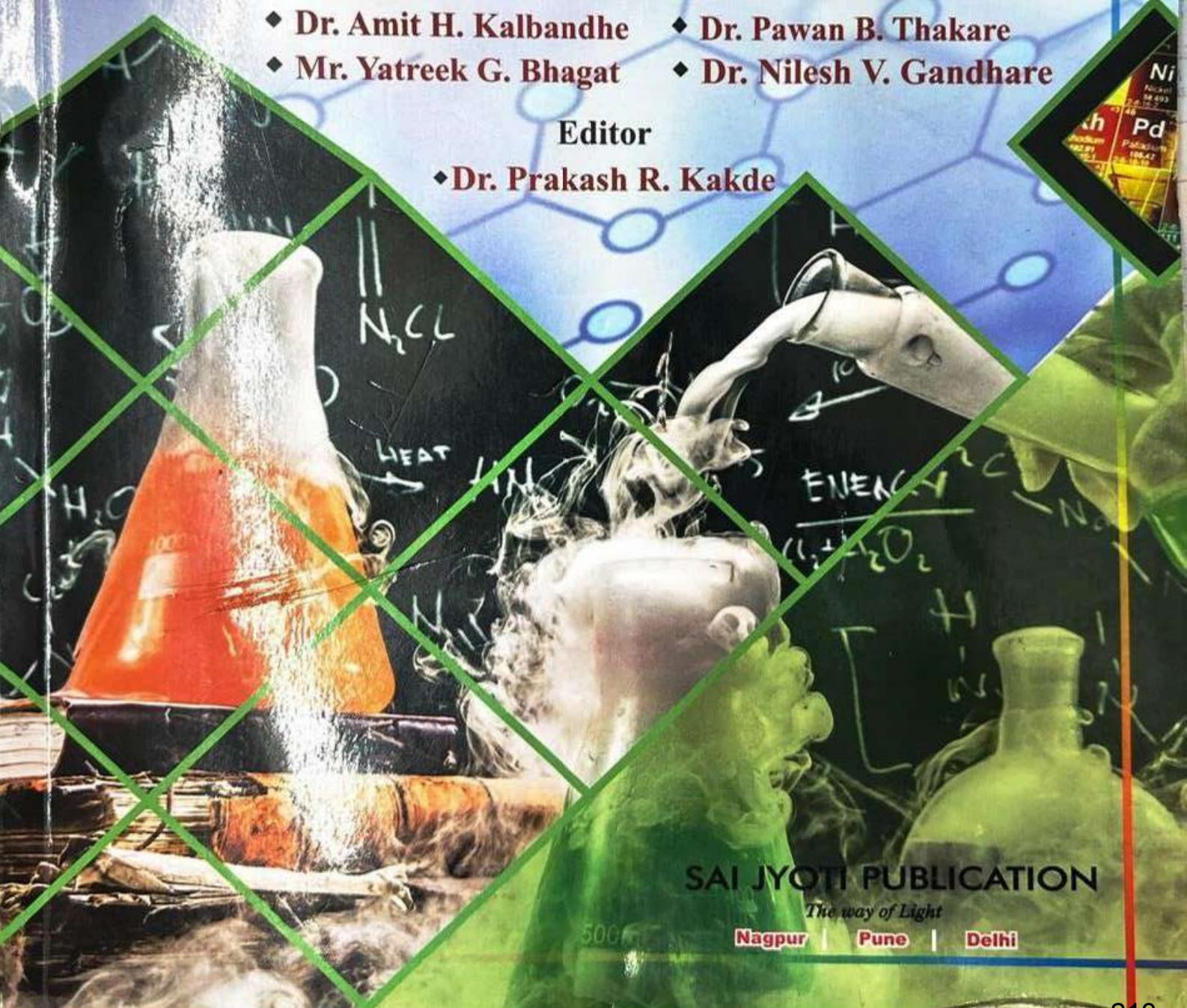
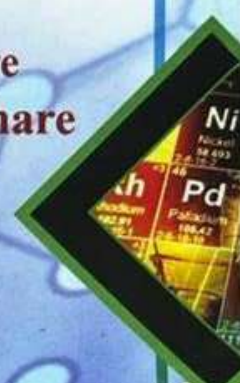
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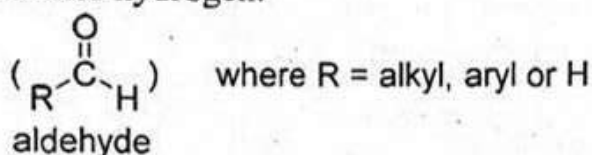
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UNIT - III

ALDEHYDES AND KETONES

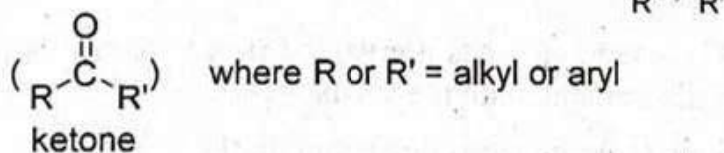
3.1 NOMENCLATURE

Aldehydes and ketones contain $\left(\begin{array}{c} \text{O} \\ \parallel \\ \text{R}-\text{C}-\end{array} \right)$ the carbonyl group in their structure and hence, both of these belong to the class of carbonyl compounds. In aldehydes, at least one hydrogen is bonded to the carbonyl carbon and the other group bonded may be either alkyl or aryl or a second hydrogen.



In a ketone, the groups bonded to the carbonyl carbon are either alkyl or aryl groups. If the groups (alkyl or aryl) bonded to the carbonyl carbon atom are same, the ketone is called as symmetrical ketone and if the alkyl or aryl groups bonded to the carbonyl carbon are different, the ketone is known as unsymmetrical ketone.

The functional group of aldehydes is $-\text{CHO}$ and called as an aldehydic group, while the functional group of ketones is $-\text{C}(=\text{O})-$ and is called ketonic group.



Nomenclature

a) Aldehydes - In common name system, the names of most aldehydes are derived from the common names of the corresponding carboxylic acids by replacing the terminal '-ic acid' with the suffix 'aldehyde'.

In the IUPAC system, open chain aliphatic aldehydes are named by replacing the ending '-e' of the corresponding alkane with '-al'. The longest carbon chain (parent chain) must contain the $-\text{CHO}$ group, and the numbering starts from the carbon of the $-\text{CHO}$ group.

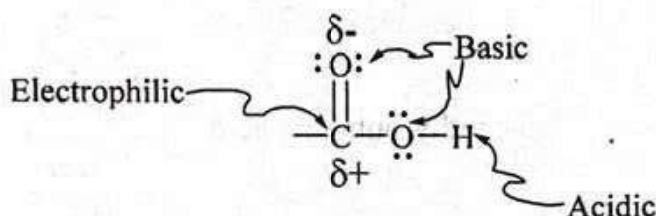
Formula	Name of the corresponding acid	Common name	IUPAC name
HCHO	HCOOH Formic acid	Formaldehyde	Methanal
CH ₃ CHO	CH ₃ COOH Acetic acid	Acetaldehyde	Ethanal

UNIT- IV

CARBOXYLIC ACIDS AND AGROCHEMICALS

The organic compounds containing carboxy group, a functional group with a hydroxy unit bonded to a carbonyl carbon (-COOH or $\text{-CO}_2\text{H}$) are known as carboxylic acids.

These compounds are widely distributed in nature. By viewing these carboxylic acids structurally as hydroxy carbonyl derivatives, the functional aspect of these can be understood well. The hydrogen atom of hydroxy group is acidic, the oxygen atoms are basic and nucleophilic, and the carbonyl carbon is electron deficient and hence electrophilic.



4.1 NOMENCLATURE

The common names of carboxylic acid end with the suffix -ic acid and are derived from Latin or Greek words that often indicate their origin to the natural source.

Common name of methanoic acid is formic acid (formica, Latin: ant), ethanoic acid is commonly known as acetic acid (acetum, Latin: vinegar). Propionic acid is the smallest acid that shows some of the characteristics of the larger fatty acids (pro, Greek: the first) & (pion, Greek: fat). Butanoic acid is the compound responsible for the foul-odour of rancid butter and hence, its common name is butyric acid (butyrum, Latin: butter). Pentanoic acid occurs in root of valerian (a perennial herb) and hence, it is commonly named as valeric acid.

Systematic or IUPAC names for monocarboxylic acids are obtained by replacing the terminal "e" in the name of the alkane with the suffix "oic acid". Parent chain is selected such that it is the longest chain containing the carboxyl carbon atom. The carboxyl carbon atom is always assigned number 1 and any substituents attached to the longest chain containing the -COOH group are labelled accordingly.

Carboxylic acids in which a carboxyl group is attached to a cyclic hydrocarbon, are named by adding "carboxylic acid" to the name of the hydrocarbon. Only exception being benzoic acid, whose IUPAC name is recognized by the common name.



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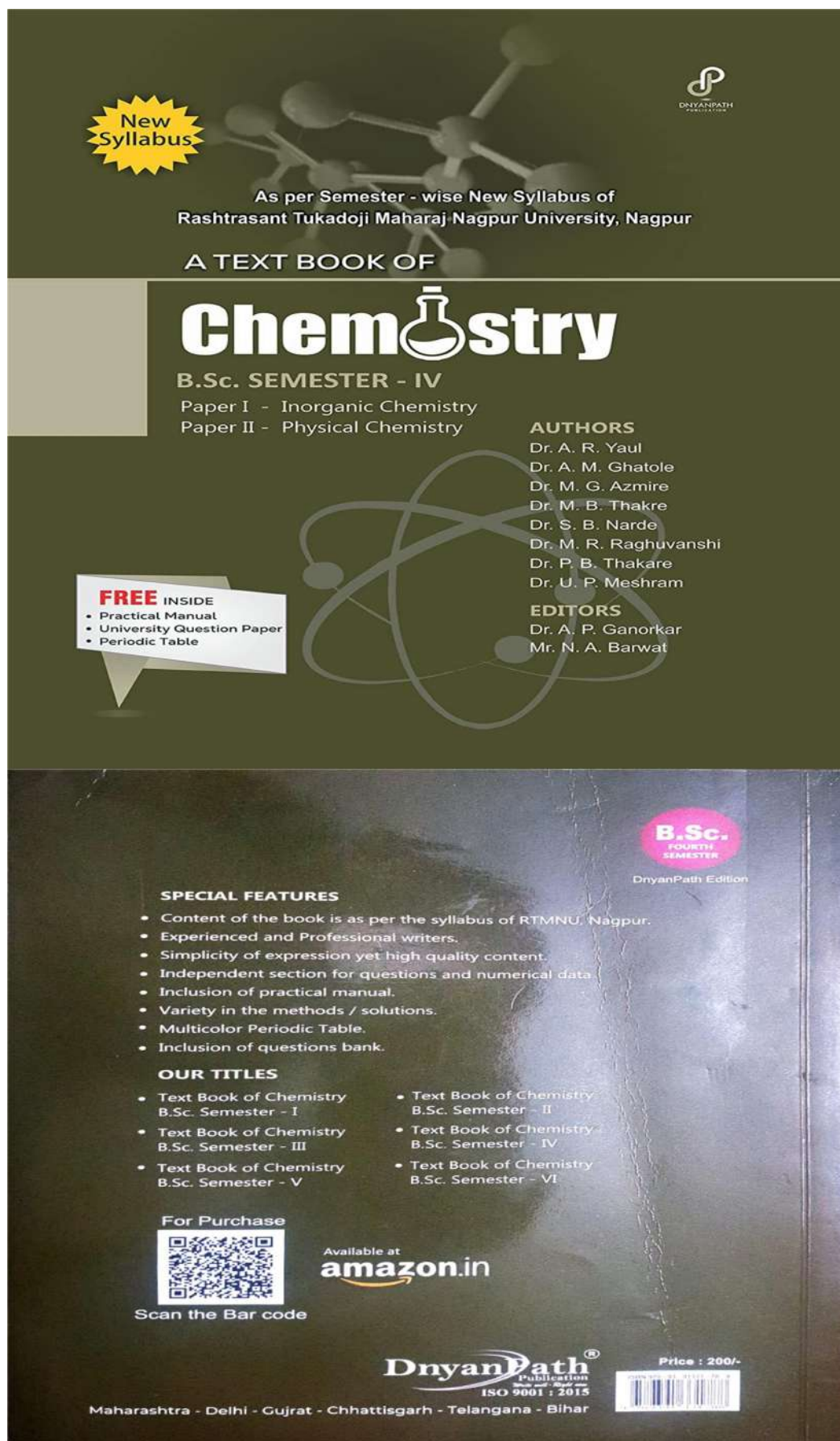
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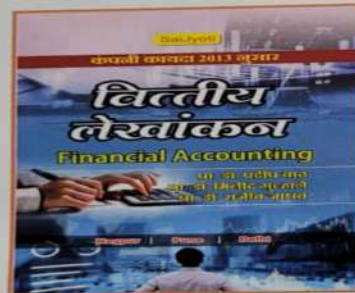
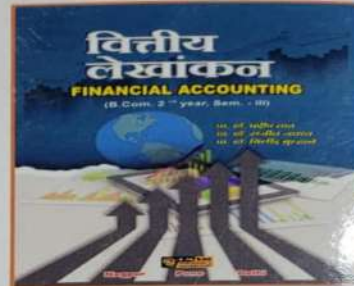
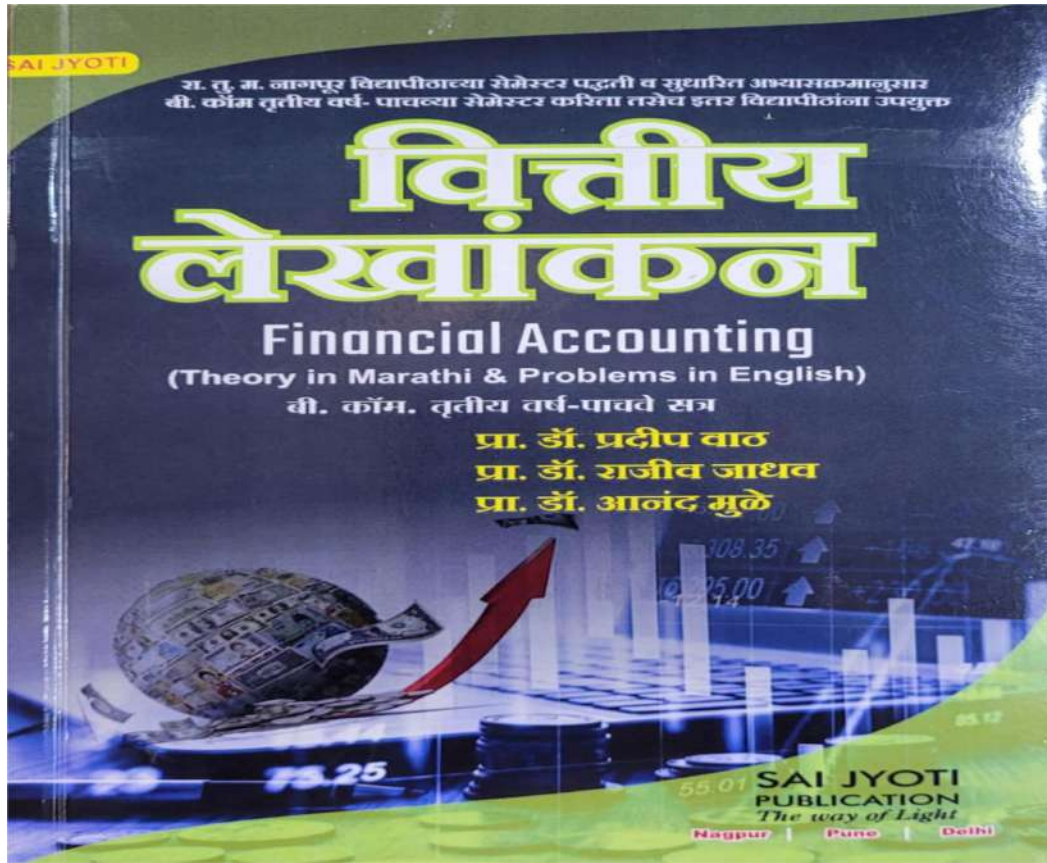


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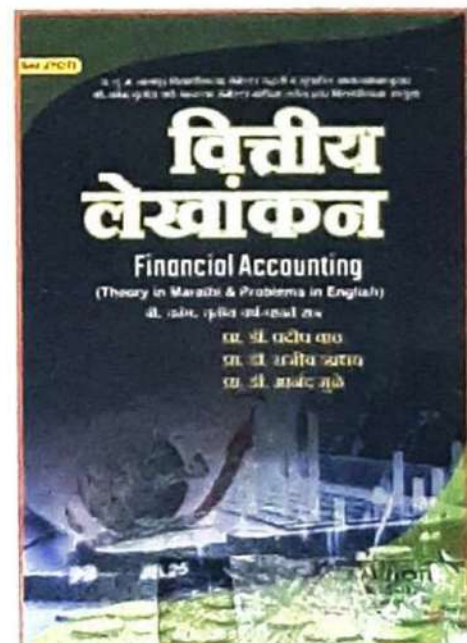
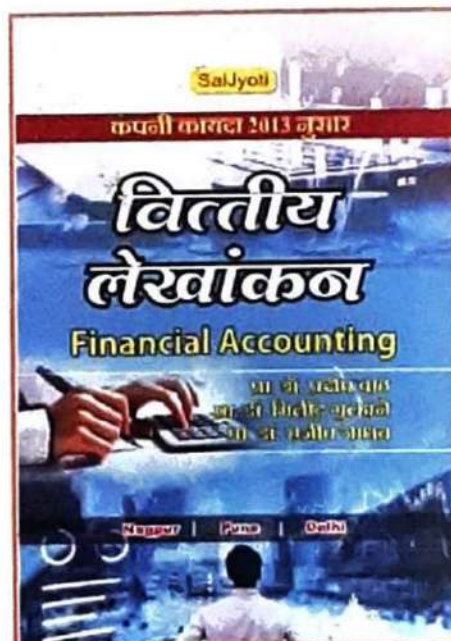
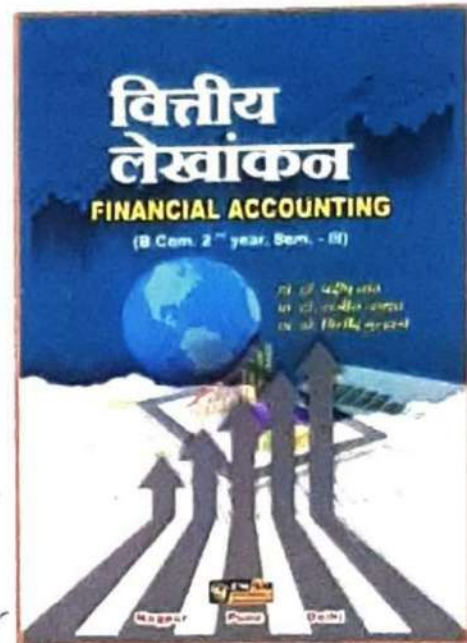
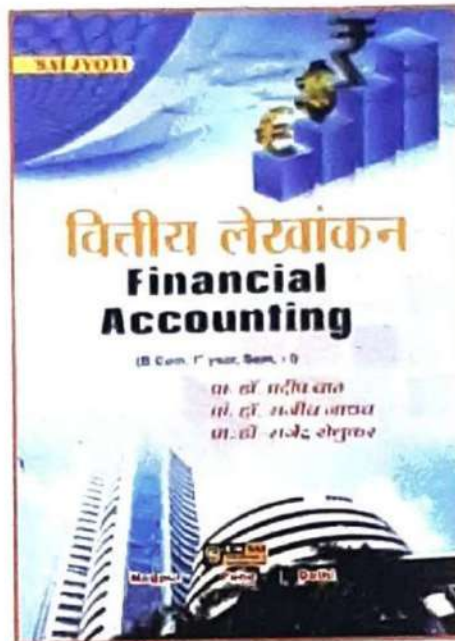
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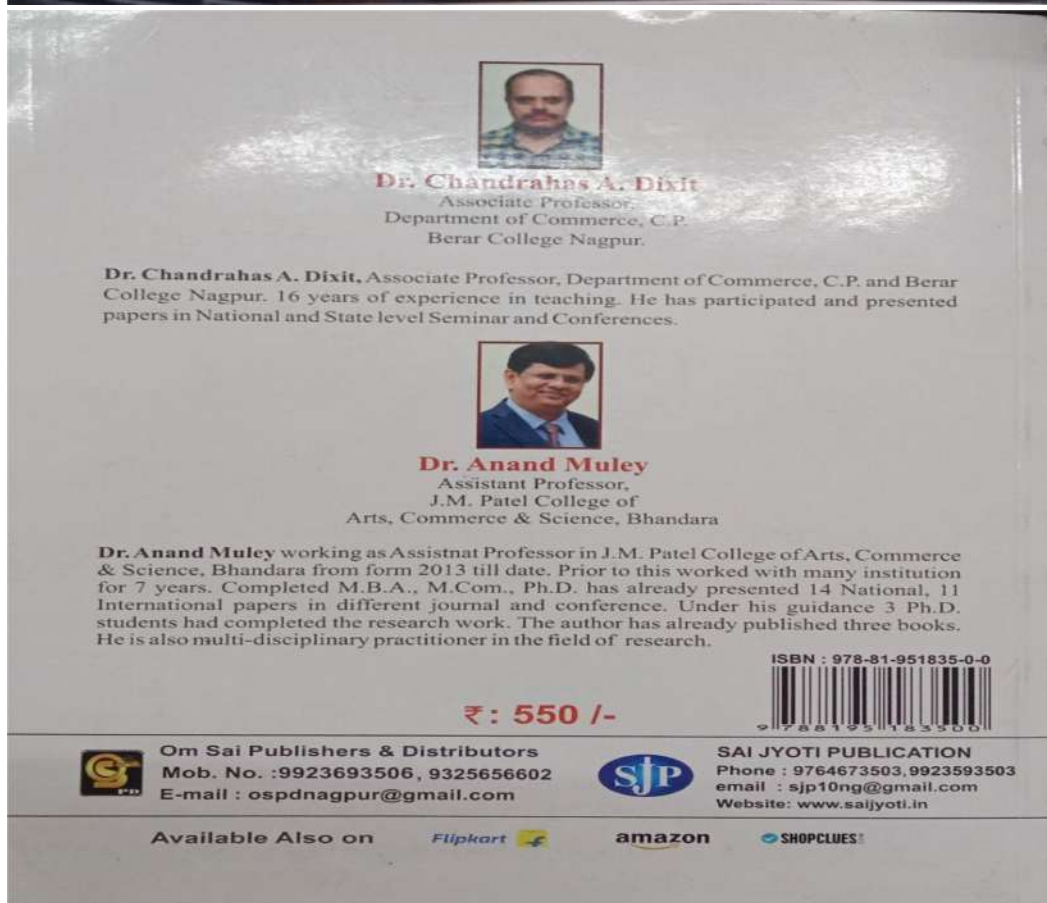
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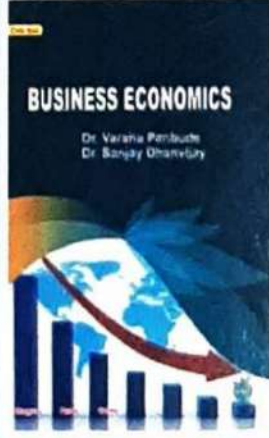
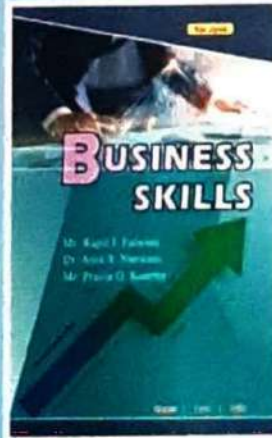
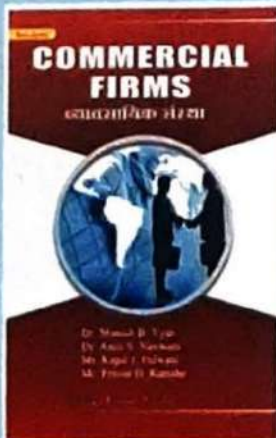
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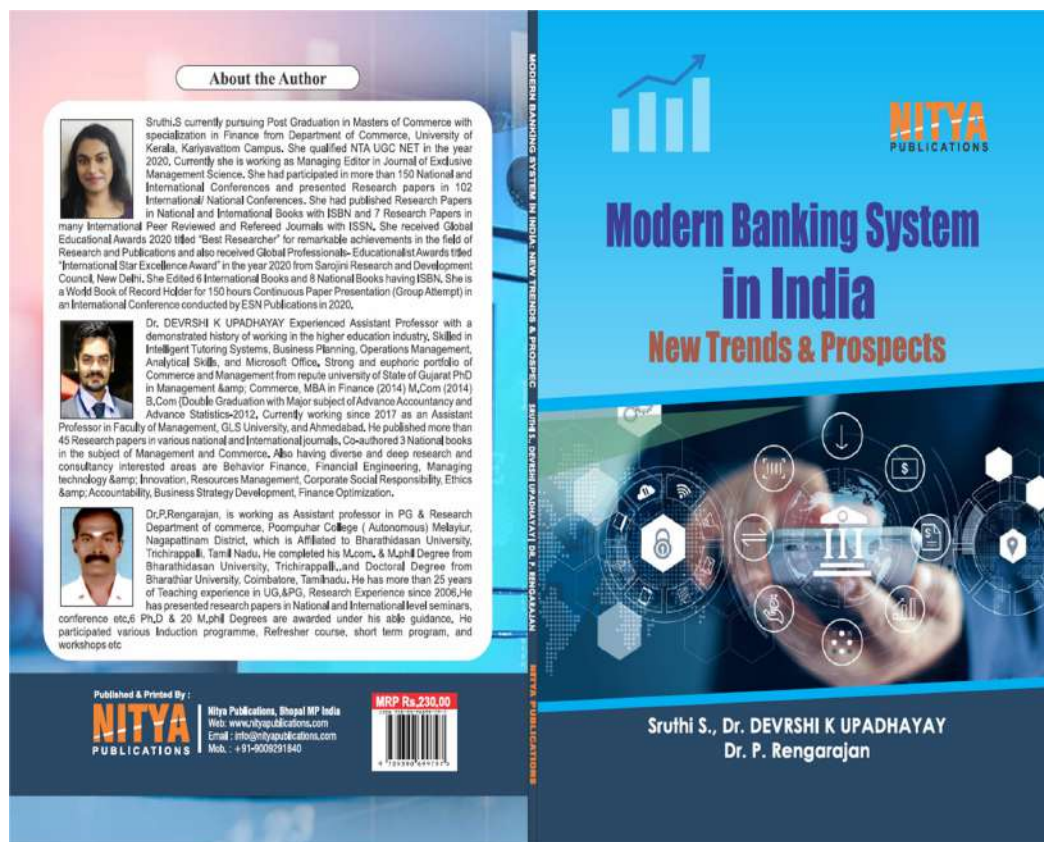
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DR. ANAND MULEY

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A STUDY ON HUMAN RESOURCE DEVELOPMENT IN CO-OPERATIVES

DR. ANAND A. MULEY

Department Of Commerce, J. M. Patel Commerce,
Art and Science College, Bhandara-441904 (M.S)

PROF. RUPALI PETKAR

Department Of Commerce, J. M. Patel Commerce,
Art and Science College, Bhandara-441904 (M.S)

ABSTRACT : Human Resource Management (HRM) basically deals with finding the right people, placing them in the right job, at the right time, training and developing them for better performance. The human resource planning is assuming increasing importance for the cooperative sector due to the growth and expansion of business, the need for adopting modern technology calling for exercise of new skills, the changing concept of cooperative management involving the introduction of professionalism at work place and need to ensure viability to cooperatives by keeping the man-power costs etc. Human resource development is an important component for the success of any organization. It plays a crucial role in the implementation of strategic management in co-operatives. In this paper we cover the present scenario of HRD's in co-operatives and the purpose of this paper is to development of Human resource in co-operative sectors.

KEYWORDS: Human Resource Development, Cooperatives, Management, Training, Education.

INTRDUCTION

Human resource is not only unique and valuable, but it is also an organization's most important resource. It seems logical that an organization would expend a great deal of effort to acquire and make full use of such a resource. This effort is known as human resource

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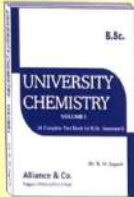
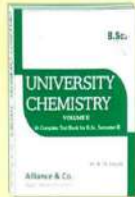
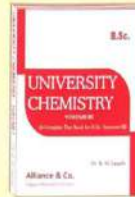
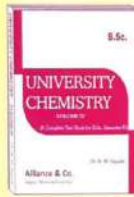
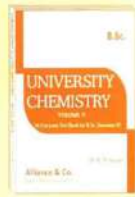
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LETTER FROM PUBLISHER

Dear Teachers and Students

As all of you know that new topics have been added to B.Sc chemistry of the Fourth semester (Implementation from session 2021-22) **Water Analysis (Paper-I)** and **operator, algebra of operators, Laplacian operator, Hermitian operator and Dielectric and Magnetic properties of molecules (Paper-II)** by Rashtrasant Tukadoji Maharaj Nagpur University. Except this the remaining syllabus is the same.

We have added the supplementary of these new topics at the end of this Textbook. For this **We sincerely give thanks to.**

Dr. S.W. Dafare
 Head & Assistant Professor,
 Department of Chemistry,
 J. M. Patel College, Bhandara.

Prof. Y.U. Rathod
 Assistant Professor,
 Department of Chemistry,
 J. M. Patel College, Bhandara.

Due to this, The Text book of University Chemistry Volume IV will be beneficial for all types of students (Present and Past).

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Thanks to all the teachers and senior students who gave us this suggestion.

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LETTER FROM PUBLISHER

Dear Teachers and Students

Rashtrasant Tukadoji Maharaj Nagpur University has been modified the syllabus of B.Sc chemistry of the Second semester (Implementation from session 2020-21) .

We have added the supplementary of this new modification at the end of this Textbook.
For this **We sincerely give thanks to.**

Dr. Sunil B. Zanje

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Dr. Shyam W. Dafare

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Head of the department of Chemistry,

J. M. Patel College, Bhandara.

Due to this, The Text book of University Chemistry Volume II will be beneficial for all types of students (Present and Past).

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Paper – II : Angiosperm Anatomy and Horticulture

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- Dr. Kalpana P. Ghoshal
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Paper – II : Angiosperm Anatomy and Horticulture

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Semester Pattern-wise Syllabus

B. Sc. Botany (Semester – III)

PAPER – I : ANGIOSPERM SYSTEMATICS, EMBRYOLOGY AND INDOOR GARDENING

- Unit – I :** **Systematic Botany :** 1. Origin of Angiosperms: (Benettitalean Theory) 2. Fossil angiosperms: Flower (*Sahiananthus*); Fruit (*Enigmocarpon*) 3. Angiosperm Taxonomy: Floras, Herbarium, Keys (Intended and Bracketed) 4. Botanical Nomenclature: Principles (Rank and taxon, Principle of priority) 5. Modern trends in taxonomy: Cytotaxonomy (Karyotype), Phytochemistry (Proteins and Flavenoids)
- Unit-II :** **Angiosperm: Classification and Families:** 1. Systems of Classification: Bentham and Hooker; Engler and Prantl (along with Demerits) 2. Study of families: Dicot: Malvaceae, Brassicaceae, Papilionaceae, Asclepiadaceae; Monocot: Poaceae.
- Unit-III:** **Embryology:** 1. Pollination: Types and Significance. 2. Anther: T. S. Anther, Microsporogenesis; Structure of pollen grain, Development of male gametophyte. 3. Ovule: Types of ovule, Structure of anatropous ovule, Megasporogenesis, Development of Female gametophyte (Polygonum type) 4. Fertilization: Double fertilization and triple fusion, Endosperm and its types, structure of Dicot embryo (*Onagrad*) and Monocot embryo.
- Unit-IV:** **Skill Development : Landscaping and Indoor gardening - 1. Landscaping:** Definition, scope of landscaping (Landscaping at offices, industrial premises, educational institutes and parks) 2. Indoor gardening: Brief account of places of house plants, pots and containers; Factors required for growing house plants (Temperature, light, humidity, ventilation, Watering Soil, feeding, potting) 3. Popular house plants: Foliage Plants: *Coleus blumei*, *Begonia sp.*, Ferns: *Adiantum sp.*, *Nephrolepis sp.*, Palms: *Chrysalidocarpus lutescens*-Areca palm, *Howea forsteriana*- Kentia palm, Flowering plant: *Anthurium sp.*, *Begonia sp.*, Orchids: *Vanda sp* *Dendrobium sp.*

PAPER – II : ANGIOSPERM ANATOMY AND HORTICULTURE

- Unit-1:** **Anatomy:** 1. Tissue: Definition, Characteristics of Meristematic tissue, Classification (based on origin and position). 2. Simple Permanent Tissue and their functions: Parenchyma, Collenchyma, and Sclerenchyma 3. Complex Permanent Tissue and their functions: Xylem and Phloem 4. Apical meristem of root and shoot: Apical cell theory, Histogen theory, Tunica-Corpus theory, Newman's theory 5. Cambium: Structure, Types and functions.
- Unit-II:** **Primary and Secondary Growth in stem and root:** 1. Types of vascular bundles: Radial, Conjoint, Concentric. 2. Normal Primary structure of root: Dicot (Sunflower) and Monocot (Maize) 3. Normal Primary structure of stem: Dicot (Sunflower) Monocot (Maize) 4. Normal secondary growth in dicot stem: Sunflower 5. Anomalous Secondary growth in: Dicot stem (*Bignonia*) and Monocot stem (*Dracaena*)
- Unit – III :** **Periderm, growth rings, Sap-heartwood, leaf anatomy:** 1. Growth rings: Spring wood and Winter wood 2. Sap wood, Heart wood, Tyloses 3. Periderm: Composition, functions and Structures associated with periderm (Lenticel, Bark, Commercial cork) 4. Anatomy of leaf: Dicot (*Nerium*) and Monocot (*Maize*) 5. Senescence and Abscission.
- Unit-IV:** **Skill Development: Horticulture** 1. Horticulture: Definition and scope, importance of horticulture, water requirement and irrigation, nutrient management. 2. Methods of propagation of following horticultural crops (propagation by seeds, vegetative propagation, propagation through specialized organs): *Rose*, *Chrysanthemum*, *Crotons*, *Mango*, *Citrus*, *Guava*, *Lilium*. 3. Technique of Bonsai preparation.

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- ❖ Variation in chromosome number: Aneuploidy (Nullisomics, Monosomics, Trisomics and Tetrasomics), Euploidy (Autopolyploidy, Allopolyploidy); Significance.
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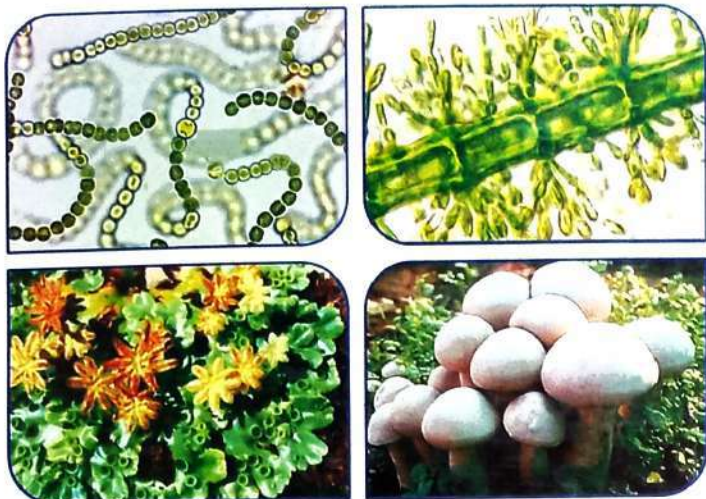


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PREFACE

The present Book "University Botany B.Sc. I Semester" has been written strictly as per the New Syllabus of RTM Nagpur University, Nagpur. The Syllabus of B.Sc. I Semester have been divided into Paper I and Paper II. Paper I contain Viruses, Prokaryotes, Algae and Biofertilizers were subject matter divided into four units while paper II contains Fungi, Plant Pathology, Lichens, Bryophyta and Mushrooms cultivation having four units.

The whole subjects matter has been written in simple understandable language that can easily be grossped by students. For easy understand self- explanatory labeled diagrams have been added each units can be followed by question bank such as very short, short and long answers questions. In the present book practical according to syllabus also added.

We take this opportunity to express our sincere gratitude to the principals, for encouragements and provided necessary library facilities.

The authors are grateful to shri. Harsh Nicholas the advisor of Alliance & Co. Nagpur. Who has inspired us for this task and managed to bring out the book in the present form.

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Authors

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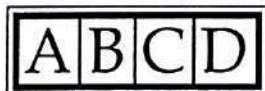
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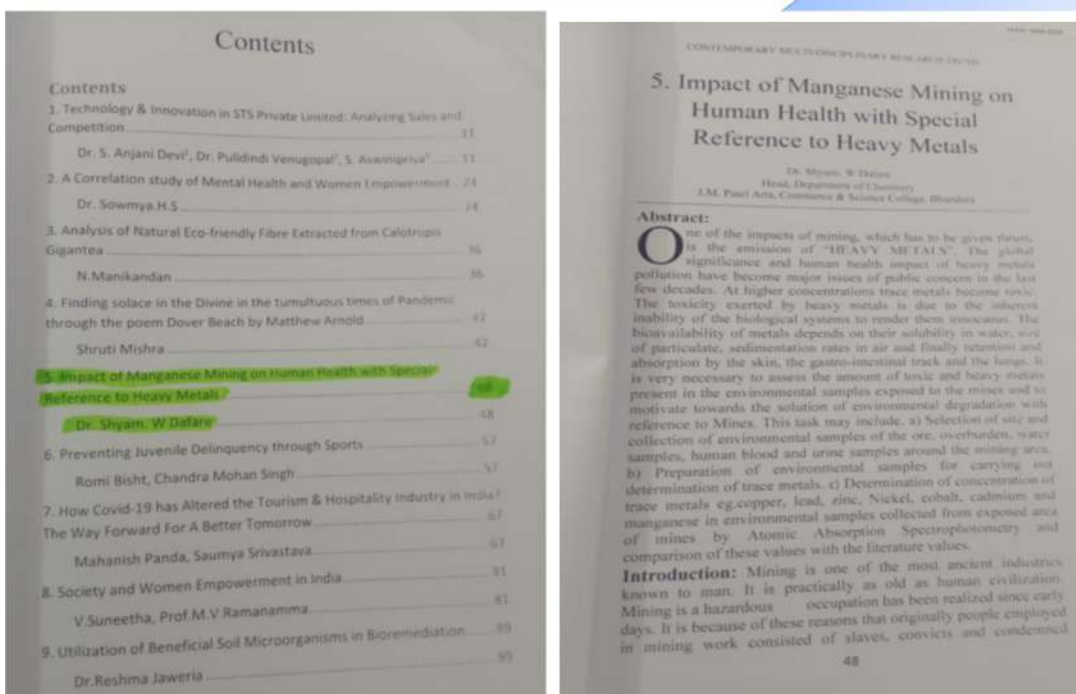
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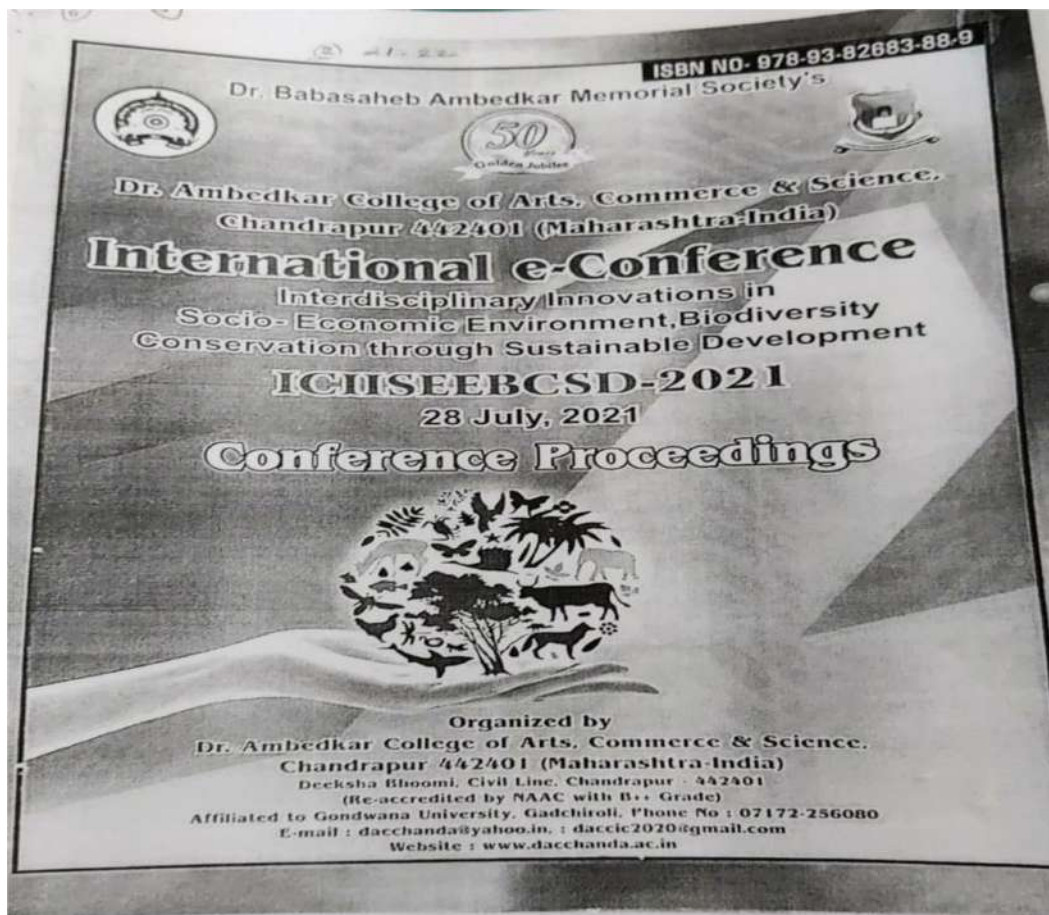
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न्हास आणि नियोजन शून्य विकास यामुळे निसर्गावर भार वाढतच गेला आहे. आणि दिवसेंदिवस त्यात वाढ होत जाणार आहे. मानसाच्या राहणीमानाने वेगाने होणाऱ्या बदलाचा निसर्गावर अधिक तान पडत आहे. या सर्व प्रक्रियामुळे वातावरणात कार्बनडाय ऑक्साईडची मात्रा प्रमाणाच्या अधिक वाढली आहे. सोबतच मिथेन नायट्रोजन ऑक्साईड, सल्फर ऑक्साईड आणि पूर्णपणे मानव निर्मित वायू (ग्रीन हाउस गॅस) यांचेही प्रमाण वाढत आहे. यामुळे मोठ्या प्रमाणात जागतिक तापमानात वाढ होत आहे. हे मानवनिर्मित वायू कृषि आणि औद्योगिक प्रक्रिये पासून वातावरणात उत्सर्जित केले जातात. हे वायू निसर्ग तयार करित नाही. यामुळे जागतिक तापमान प्रचंड प्रमाणात वाढत आहे. आणि ओझोन वायूवर २५ ते ३० कि.मी व्यासाचा मोठा खडा (भ्वसम) पडला आहे. त्यामुळे जागतिक तापमानाचा धोका पृथ्वीवरील सर्व लहान मोठ्या जिवसृष्टीवर निर्माण झाला आहे. दुःखाची गोष्ट ही आहे की, अजूनही मनुष्य आपल्या मान — सन्मानात गुंतला आहे. प्रत्येक देश आपली लष्करी व आणवीक शक्ती वाढवित आहे. यासाठी अमेरिका, इंग्लंड, रशिया, भारत, चिन, जपान, आफ्रेलिया इत्यादी मोठ्या देशांनी या गांभीर संकटाच्या समाधानासाठी उपाययोजना करणे अत्यंत आवश्यक आहे. मानव जातीच्या रक्षणसाठी त्वरित उपाययोजना करणे अत्यंत आवश्यक आहे. प्रभावी उपाययोजना करणे आणि जागतिक तापमानाच्या संकटापासून दुर करणे आवश्यक आहे. सर्व पृथ्वीवरील जीव सृष्टी समोरील या गांभीर समस्येपासून मुक्ती मिळविणे आणि सर्व एकजुट होऊन या संकटाचा सामना करणे, हे प्रत्येकाचे नैतिक कर्तव्य आहे.

बीज शब्द: नैसर्गिक हरितगृह वायुपरिमाण संतुलन, हरितगृह वायुचे उत्सर्जन, जैवविविधतेचा होणारा न्हास, मानव निर्मित वायू, वातावरणात उत्सर्जित, जागतिक तापमान खडा, पृथ्वीवरील जीवसृष्टी

MPP-014

बदलत्या वातावरणाचा आरोग्यावर होणारा परीणाम

व्ही.एन. कन्नाके

जे.एम. पटेल कॉलेज, भंडारा.

मोबा. ९७६५३३०१५३

सारांश :

आपल्या सभोवतालचा नैसर्गिक परिसर हा प्राचीन काळात घनदाट जंगल, नद्या, डोंगर, वाळवंट या सर्व भूभागांपैकी एक किंवा सर्व घटकांच्या एकत्रीकरणातून निर्माण झाला आहे. पृथ्वीवरील मर्यादित साधनसंपत्ती टिकाऊ दृष्टिकोनातून कशी योग्यप्रकारे वापरावी याचा विचार होणे गरजेचे आहे. आधीच्या पृथ्वीचा नैसर्गिक परिसर व आत्ताचा परिसर यात फार मोठ्या प्रमाणात बदल झालेला अनुभवास मिळतो आहे. सभोवतालच्या पर्यावरणातूनच व्यवहारासाठी लागणाऱ्या हवा, पाणी, जमीन, खनिज, वातावरण, सौरशक्ती इ. गरजा नैसर्गिक रित्या उपलब्ध होतात. परिसंस्थेच्या अस्तित्वासाठी अजैविक व जैविक घटकांची आवश्यकता असते. त्यांच्या परस्पर अभिक्रियांमुळे विविध परिसंस्था निर्मित होतात. वातावरण, जमीन, पाणी व सजीव हे प्रमुख घटक एकमेकांवर अवलंबून असतात. यातील एखादया घटकाची कमतरता झाल्यास संपूर्ण परिसंस्थेवर परीणाम व्हायला लागतो. मानवाने आपल्या सोयीनुसार नैसर्गिक परिसंस्थेत बदल घडवून आणला. आधीच्या काळात शेती ही पंरापंरागत पद्धतीने केली जात होती परंतु आधुनिक शेती रासायनिक खतांच्या उपयोगाने केल्याने वातावरणासोबतच मानवी आरोग्यावर देखिल गंभीर स्वरूपाचा वाईट परीणाम झालेला आढळतो. रासायनिकांच्या वापरामुळे जमिनीचा कस कमी होतो त्याच बरोबर कितकनाशकांच्या वापरामुळे भयंकर आजारांनी थैमान घातल्याचे आपल्या निदर्शनास येत आहे. गेल्या शंभर वर्षात झालेल्या आरोग्याच्या विकासांमुळे लोकसंख्यांचे प्रमाणात वाढ झाली. त्याप्रमाणात गरजा भागविण्याकरीता नैसर्गिक संसाधनांवर अश्लीकचा ताण पडायला लागला व विसंगती निर्माण व्हायला लागली. औद्योगीकरणांमुळे टाकाऊ पदार्थांच्या विल्हेवाटीची समस्या निर्माण झाली आहे. नैसर्गिक परीस्थितीत एकमेकांवर अवलंबित अन्नसाखळी अस्तित्वात असतात परंतु एखादया प्रजातीच्या नष्ट होण्यामुळे साखळी विस्कळीत होवून जीवनचक्रावर वाईट परीणाम होतो. उष्णतेच्या वाढत्या प्रमाणामुळे उष्माघात तसेच हृदयविकार, श्वसनविकार, अतिसार, मलेरिया,

कॉलरा, क्षयरोग, डेंगू, पीतज्वर, मेंदूज्वर, प्लेग, एड्स व कॅन्सर या सारखे अनेक आजारांचे प्रमाण वाढलेले आढळते. पर्यावरणाच्या संरक्षणाकरीता उत्तम पर्यावरण व योग्य जीवनशैलीच्या निर्मितीच्या दृष्टिकोनातून नियम, कायदे असणे गरजेचे आहे. नैसर्गिक पर्यावरणातील संसाधनांचा जाणिवपूर्वक वापर करणे गरजेचे आहे. तसेच मानवी मुल्याची विचारसरणी लोकांमध्ये रुजवणे अतिशय गरजेचे आहे.

MPP-015

सुरेश द्वादशीवारांच्या 'वर्तमान' कादंबरीतील राजकीय दर्शन

भारती दि. रत्नपारखी

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सारांश:

सुरेश द्वादशीवारांची ही कादंबरी राजकीय कादंबरी म्हणूनच लक्षात घ्यावी लागते. कादंबरीचे शीर्षकही हे बोलकेच आहे. 'वर्तमान' म्हणजे चालू परिस्थितीत घडलेल्या राजकारणाचा घेतलेला धांडोळा असेच लेखकाला सुचवायचे आहे. विशेषतः ह्या कादंबरीतील मलपृष्ठावरील अवतरणात ह्या कादंबरीचा हेतू आणि पट सांगितला आहे. इ.स. २००० ते २००२ या कालखंडातील राजकारणावर आणि त्यातील राजकारण्यांच्या निर्णयावर प्रकाशझोत टाकलेला आहे. लेखकाने ह्या कादंबरीत संपूर्ण देशाचे राजकारण लक्षात घेतले आहे. केंद्र सरकार, राज्यातील सरकार, पक्ष संघटना, प्रसारमाध्यमे, लोकमानस यांचा आढावा घेत वर्तमानातील राजकारणाचा पट उलगडणारी राजकीय कादंबरी म्हणून ह्या कादंबरीकडे पाहिले जाते. माणूस त्याचा धर्म, जात, वंश यापेक्षा मानवी जीवनाच्या स्वातंत्र्य, समता, बंधुता, न्याय या तत्त्वाने मानवी जीवन कसे समृद्ध करता येईल या विचाराने प्रभावित झालेली मांडणी ह्या कादंबरीत लेखकाने केलेली आहे. द्वादशीवार आपल्या 'वर्तमान' कादंबरीतून आंतरराष्ट्रीय राजकारणाचा देशाच्या राजकारणावर काय माणूस त्याचा धर्म, जात, वंश यापेक्षा मानवी जीवनाच्या स्वातंत्र्य, समता, बंधुता, न्याय या तत्त्वाने मानवी जीवन कसे समृद्ध करता येईल या विचाराने प्रभावित झालेली मांडणी ह्या कादंबरीत लेखकाने केलेली आहे. द्वादशीवार आपल्या 'वर्तमान' कादंबरीतून आंतरराष्ट्रीय राजकारणाचा देशाच्या राजकारणावर काय परिणाम होतो. त्याचाही सूक्ष्मपणे शोध घेताना दिसतात.

बिजसंज्ञा: राजकीय, मानवी जीवन, वर्तमान

MPP-016

पर्यावरण आणि लोकसंख्या

सचिन भा. बोधाने

संशोधक विद्यार्थी

मोबाई नं. ९७६६५८०३९३

सारांश:

लोकसंख्या नियंत्रण कायदा पास व्हावा ही अलीकडे सुरू झालेली ओरड कदाचित पर्यावरणाच्या दुपटीनेही असू शकेल. एकीकडे पर्यावरणाचा बिघडलेला समतोल आणि भ्रमसाठ वाढलेली लोकसंख्या आणि त्यातून निर्माण होणाऱ्या अगणित अश्या समस्या त्याचा शोध घेणे आज गरजेचे आहे.

प्राचीन काळापासून मानव निसर्गाला आपला मित्र मानत आलेला आहे. परंतु, पुढे मात्र त्याने स्वतःच्या स्वार्थासाठी या निसर्गाचीही लंगडेतोड करतांना दिसत आहे. निसर्गावर मात करण्याच्या सुरू केलेला प्रयत्न हा मानवासाठीच जीवघेणा ठरत आहे. सद्यस्थितीत कोरोना वायरस, त्सुनामीची आलेली लाट या सगळ्या गोष्टी मानवाने निसर्गाशी केलेल्या छेडछाडीचे परिणाम होत.



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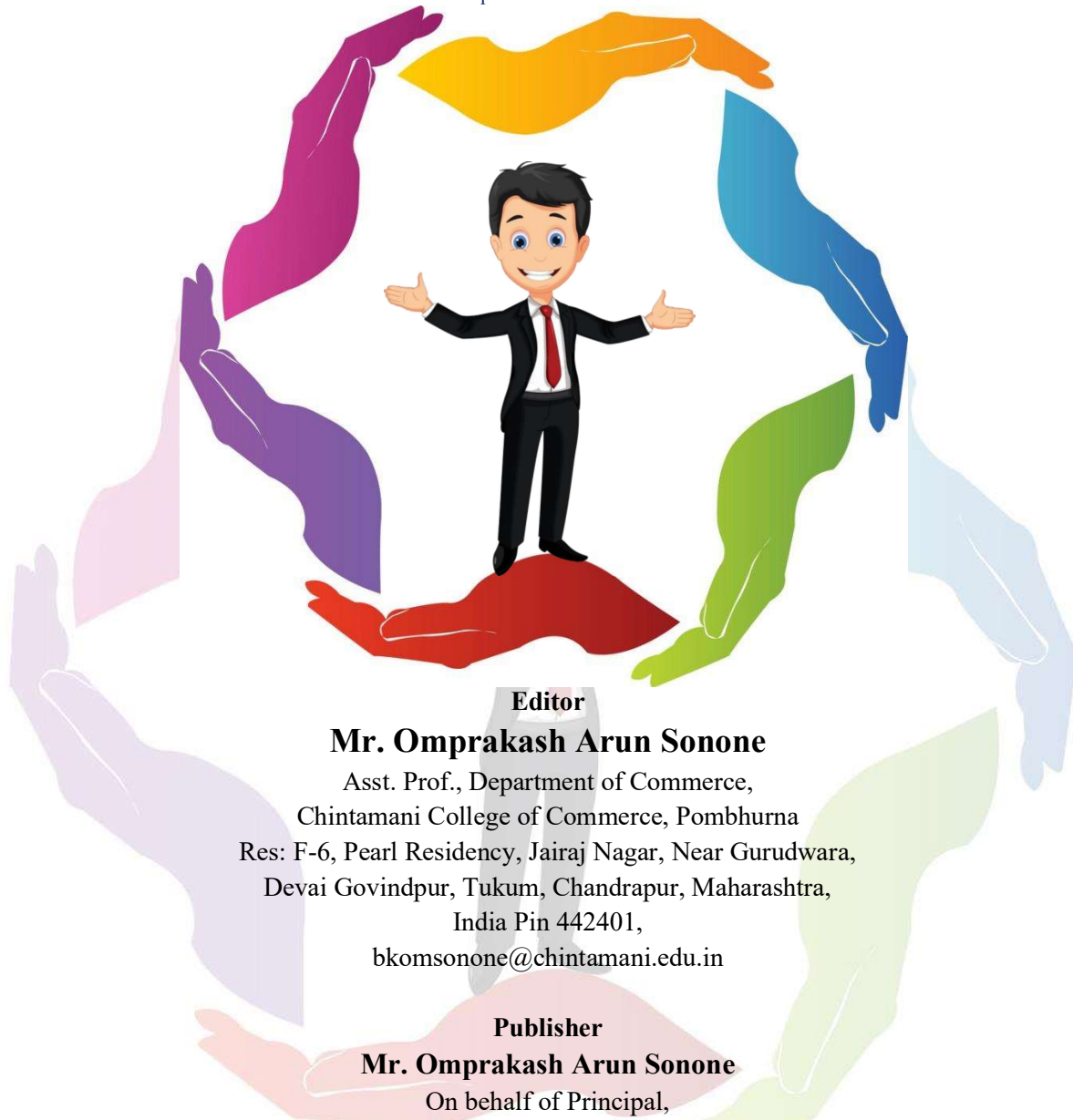


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डॉ. विजया एन. कन्नोके

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सारांश:

शिक्षणाचे प्राथमिक, माध्यमिक, उच्च माध्यमिक व उच्च शिक्षण असे वर्गीकरण करण करण्यात आले. भारतात उच्च शिक्षणाला सुरुवात ब्रिटीश काळात झाली. त्या काळात जिल्ह्याच्या ठिकाणीच उच्चशिक्षणाची सोय उपलब्ध होती स्वातंत्र्यानंतरच खऱ्या अर्थाने उच्च शिक्षणाचा प्रसार व विस्तार झाल्याचे आढळते. त्यामुळे साक्षरतेचे प्रमाण वाढण्यास मदत झाली. तळागाळातील लोकांना शिक्षण घेता येणे सहज शक्य झाले. प्राचीन काळातील शिक्षण प्रणाली ही व्यक्तिगुणांवर भर देणारी होती. ग्रामीण समुदाय मात्र उच्चशिक्षणाची सोय उपलब्ध नसल्याने जास्त उच्च शिक्षणाकरीता संघर्ष करावा लागलेला आढळून आला. तालुका स्तरावरील महाविद्यालयात उपयोगी साधनसुविधा योग्य त्या प्रमाणात उपलब्ध करणे सोयीचे होत नसल्याने पाहिजे तसा विद्यार्थ्यांचा विकास होवू शकत नाही. परंतू आताच्या शिक्षणप्रणालीत पुस्तकी ज्ञानावर जास्त भर दिला जात असल्याने प्रत्यक्ष जीवन जगतांना त्या ज्ञानाची पाहिजे तशी उपयोगिता होत नसल्याचे लक्षात येत आहे. बेरोजगारीची गंभीर समस्या देशात निर्माण झाली आहे. त्यामुळे तरुण युवावर्ग निराशा, वाईट मार्गाने भरकटत असल्याचे चित्र दिसत आहे. ही देशाच्या विकासाला घातक ठरणारी बाब आहे. आधीच्या काळात शिक्षण घेणारे विद्यार्थी हे उत्तम दर्जाचे घडत असत. परंतू आताचे चित्र आपल्याला वेगळे दिसत आहे. स्वावलंबी जीवन जगण्याच्या दृष्टिकोणातून ज्ञान प्राप्त होणारे शिक्षण आज गरजेचे आहे. त्यामुळे बेरोजगारी सारख्या समस्या सुटण्यास मदत होवू शकेल.

हेतुकथन: शिक्षण पद्धती, शिक्षणाचे धोरण व संस्थेच्या समस्या

प्रस्तावना:

भारतावर इंग्रजांचे राज्य असल्याने त्यांचा राज्यकारभार चालविण्याच्या उद्देशाने इंग्रजी विषय उच्च शिक्षण प्रणालीत भारतीयांवर लादल्या गेला. स्वातंत्र्यानंतर मात्र भाषावार प्रांतरचना निर्माण झाल्याने देशी भाषेतून शिक्षणाचा आग्रह धरण्यात आला. '1962 साली पंडित जवाहरलाल नेहरू यांनी प्रादेशिक भाषा आज ना उद्या माध्यम बनतील याबद्दल संशय नाही, विद्यार्थ्यांच्या दृष्टीने ते योग्यही आहे असे मत मांडले. 'कारणप्राध्यापक व विद्यार्थी यांच्यात संपर्क साधण्यास अडचणी येण्याची शक्यता असल्याने संपर्क हिंदी किंवा इंग्रजी भाषेतून साधता येवू शकतो. हिंदी भाषा ही समजण्यास सोपी आहे. माध्यम म्हणून इंग्रजीचा स्वीकार न करता प्रथम क्रमांक प्रादेशिक भाषेला व नंतर हिंदी राष्ट्रभाषा व शिक्षणातील अभ्यासाचा एक विषय म्हणून स्थान देण्यात यावे असे विचार मांडण्यात आले. उच्च शिक्षणाबाबत सर्व तळागाळातील गरजा पूर्ण करण्यास व संस्कृती व परंपरांचे जतन व संवर्धन करण्यास

उच्च शिक्षणाची म्हणजे विद्यापीठीय शिक्षणाची पुनर्रचना करणे गरजेचे असल्याचे सरकारचे मत असल्याने 1948 डॉ. राधाकृष्णन आयोग स्थापीत करून 25 ऑगस्ट 1950 मध्ये या आयोगाने अहवाल सादर केला. 1950 नंतर विद्यापीठीय अनुदान आयोगाची स्थापना करण्यात आली. या आयोगावर महाविद्यालयातील विविध शैक्षणिक सोयी सुविधा निर्माण करण्याची आणि उच्च शिक्षणाची गुणवत्ता वाढविण्याची जबाबदारी देण्यात आली. तालुका स्तरापर्यंत अनुदानतत्वावर शासनाने महाविद्यालये सुरू करण्याची परवानगी दिली. ग्रामिण भागात नवनिर्मित महाविद्यालयातील वाचनालयाच्या, महाविद्यालयाच्या, वस्तीगृहाच्या इमारती सुसज्ज करण्यास, ग्रंथखरेदी, प्रयोगशाळेतील उपकरण खरेदीकरीता विद्यापीठीय अनुदान आयोगाने भरपुर अनुदान देवून सोयींची पूर्तता केली. तसेच पंचवार्षिक योजनाद्वारे केंद्र सरकारने नियोजनबद्ध पद्धतीने आर्थिक तरदूत केली होती. त्या कारणाने तालुकास्तरापर्यंत महाविद्यालयांची संख्या मोठ्या प्रमाणात वाढण्यात आलेली आढळते. विद्यापीठावर वाढण्यात येणाऱ्या अतिरिक्त कार्यभारामुळे नवीन विद्यापीठाची निर्मिती करण्यात आली. सरकारने ग्रामीण भागात विद्यापीठांची स्थापना केल्याने उच्च शिक्षणाचा विस्तार फार झपाट्याने झालेला आढळतो. निरक्षरता दूर करण्या करीता शासनाने शालेय आहार योजना, मुलींना उच्च माध्यमिक शिक्षण मोफत उपलब्ध केले. प्रौढ शिक्षण, अनौपचारिक शिक्षण, रात्रशाळा, मुक्त विद्यापीठ या माध्यमातून शिक्षणाचा प्रचार करण्यात आला. प्रत्येक व्यक्तीला आपल्या क्षमतेनुसार प्रगती करण्याची संधी प्राप्त झाल्याने कुवतीनुसार, आवडीनुसार व्यवसाय निवडून स्वतःचा विकास साधण्याची संधी प्राप्त झाली आहे.

समस्येचा उद्देश: वर्तमान समस्येला कार्यान्वित करण्याकरीता खालील उद्देश निर्धारित केले आहे.

1. प्राचीन शिक्षण प्रणाली व आधुनिक शिक्षण प्रणाली यांची माहिती प्राप्त करणे.
2. तालुका स्तरावरील उच्च शिक्षणाबाबत संस्थेची माहिती प्राप्त करणे व त्यांच्या समस्या बाबत अभ्यास करणे.

संशोधन पद्धती: यादृच्छिक पद्धतीने नमुना निवड करण्यात आली. भंडारा जिल्ह्यातील ग्रामिण भागातील महाविद्यालयांची निवड करण्यात आली. परसोडी, करडी, सडक अर्जुनी, नवेगाव बांध, झालीया, दिघोरी, अडयाळ अश्या विविध महाविद्यालयाला भेटी देण्यात आल्या व त्यांच्या समस्या जाणुन घेण्याचा प्रयत्न करण्यात आला.

शिक्षणाचा अर्थ:

बोर्गाडर्स यांच्या मते “सांस्कृतिक परंपरा व जीवनाला अर्थ प्रदान करणे म्हणजे शिक्षण होय. “²

प्रा. हाॅर्ने यांच्या मते शारीरिक व मानसिकदृष्ट्या विकसित झालेल्या जाणीव असलेल्या मानवाचे त्याच्या बौद्धिक, भावनिक व संकल्पात्मक परीसराशी घडून येणारे वरच्या पातळीवरील समायोजन. “³

हर्बर्ट: वैज्ञानिक पद्धतीचा पुरस्कार केला उदार शिक्षणाची सुधारित कल्पना, संस्कृतीची नविन व्याख्या षालेय जीवनात आणि प्रत्यक्ष जीवनात विज्ञान विषयाची आवश्यकता या बाबींना महत्त्व दिले. ⁴

विलीयम जेम्स : ज्या व्यक्तीला त्याच्या प्राकृतिक व सामाजिक परीसरात योग्य स्थान मिळविण्यास समर्थ करतात. अशा अर्जित सवयी, आचार व वर्तन प्रेरणा यांचे व्यवस्थापन म्हणजे शिक्षण होय. ⁵

साहित्याचे पुर्नविकोलन:

2001 मधे 64. 8 टक्के साक्षरतेचे प्रमाण असून त्यात 75. 3टक्के पुरूष 53. 7टक्के स्त्रियांचे प्रमाण आढळते. ⁶

जागतिकरणामुळे निर्यातीच्या उत्पादनात वाढझाली असली तरी, बेरोजगारीचे प्रमाण वाढतच आहे. सुशिक्षिताचे प्रमाण वाढलेले असूनही कामाच्या अभावाने हात मात्र रिकामेच असल्याचे चित्र पाहायला मिळत आहे. रोजगार मिळू शकेल असे उपयोगी म्हणावे तसे शिक्षण नाही. भारतात शिक्षणावर करण्यात येणारा खर्च अत्यंत कमी म्हणजे 4टक्के आहे. तर परदेशात मात्र 35 टक्के खर्च केला जातो. ⁷

जागतिकरणाच्या प्रक्रियेत भारताची झालेली बचत

वर्ष	परदेशी गुंतवणूक
1990 ते 1991	103
1999 ते 2000	5181
2001 ते 2002	5925

Source : R.B. I. Bulletin September 2002
Economic & Political Weekly Page No. 1678, April 27, 2002

उच्च शिक्षण बाबत शासनाची भूमिका: 1950 ते 1990 पर्यंत समाजवादी, संमिश्र अर्थव्यवस्था होती. या धोरणांमुळे शासनाकडे आर्थिक सत्तेचे केंद्रीकरण झाले होते. तसेच व्यावसायिक व उच्च शिक्षणावरही शासनाची मक्तेदारी असल्याने खाजगी संस्थावर नियंत्रण होते. 1990 नंतर शालेय स्तरावर शिक्षणाचे खाजगीकरण करण्यात आले. पूर्वप्राथमिक, माध्यमिक व उच्च माध्यमिक स्तरावर इंग्रजी माध्यम असणाऱ्या शाळा, स्कॉलरशाळा, निवासी शाळा, सैनिकी शाळा केंद्रीय शाळा अश्या स्वरूपात खाजगीकरणास सुरुवात झालेली आढळते. एकीकडे शाळांचे मदगतीने खाजगीकरण व दुसरीकडे सार्वजनिक शाळांचा शिक्षणाचा दर्जा खालावल्याचे दिसत होते. उच्च शिक्षणाच्या लोकांच्या अपेक्षा वाढल्याने उच्चशिक्षणाचे देखिल खाजगीकरण करण्यात आले. विणाअनुदान तत्वावर व्यावसायिक शिक्षणसंस्था सुरू काण्याची शासनाची अनुमती आणण्यास सत्तारूढ राजकीय पक्षातील नेते सहज करू शकल्याने 1090 ते 2000 मधे खाजगीकरण झपाट्याने वाढलेले आढळते. उच्च शिक्षण क्षेत्रात संशोधन कार्यात सातत्य, व्यावसायिक अभ्यासक्रमाची गुणवत्ता वाढविण्याचे कार्य बोटावर मोजता येईल अश्या

संस्थांना जमले. अनेक संस्था शिक्षणातून समता प्रस्थापित करण्याचा आदर्श ऐवजी आर्थिक लाभ प्राप्त करण्याच्या नादात प्रारंभापासूनच गुणवत्तेचा दर्जा ढासळलेला आढळला.

सामाजिक आर्थिक विकासाच्या गतिमान प्रक्रियेतून निर्माण झालेले विशेषीकरण:

विभिन्न भागात वस्तूंचे व यंत्रसामुग्रीच्या उत्पादनाला सुरूवात झाल्याने विशेषीकरणास सुरूवात झाली. सरकारी क्षेत्रातील शिक्षणसंस्थांपेक्षा खाजगी शिक्षण देण्याची व्यवस्था अधिक वेगाने करत असल्याने दबाव निर्माण झाला व विशेषीकरणाचे प्रमाण वाढले.

ज्ञानाच्या स्फोटाचे युग: संगणक व इंटरनेट यांच्या ज्ञानामुळे आर्थिक विकासाचा वेग वाढण्यास मदत झाली. त्यामुळे विकसीत राष्ट्र बाजारपेठा काबीज करीत होत्या. विभिन्न विषयातील संशोधनाला उत्तेजन देवून तांत्रिक क्षेत्रात सुधारणा करणे देशाची गरज बनली. चौथी औद्योगिक क्रांतीमुळे कुशल कामगाराची गरज निर्माण झाली. 1090 नंतर नरसिंहराव यांच्या कालकिर्दीत आर्थिक धोरणात बदल करण्यात आला. त्यामुळे खाजगी उद्योगधंद्यावरील सरकारी नियंत्रणे रद्द करण्यात आल्याने खाजगीकरण, उदारीकरण, जागतीकरणात विकास झाला. खाजगी शिक्षणसंस्था शिक्षणाचे व्यापारीकरण करण्याच्या मार्गावर लागल्याने शिक्षणाचा दर्जा ढासळलेला आढळतो आहे. अश्या संस्थांमधे लोकशाही पेक्षा हुकुमशाही प्रवृत्तीने कारभार चालत असल्याचे निदर्शनात आले.

जागतिकरणामुळे निर्माण झालेले प्रश्न: औद्योगिकरणामुळे जुन्या प्रथा, मूल्य व परंपरांना स्थान राहीले नाही. तर व्यक्तित अद्यावतता, मुल्य प्रमाणक, विश्वास व्यवस्था यात बदल झाल्याचे आढळते. व्यक्तीच्या व्यक्तिमत्वामध्ये औपचारिक व अनौपचारिक शिक्षणाला अतिशय महत्व आहे. त्यांच्यावर विविध संस्कार केल्याने समाजमान्य उत्तम नागरिकाची निर्मिती होते. शिक्षणाला पूर्वीचे पवित्र आणि महत्वाचे क्षेत्र न समजता एक व्यावसायिक रूपात उदयास आले. पैश्यांवर पदवी ही अवलंबून असल्याचे चित्र दिसते आहे. जागतिकीकरणामुळे जगाला वैश्विक खेड्याचे स्वरूप प्राप्त झाले असून मोठ मोठ्या संस्था, संघटनांचा हस्तक्षेप वाढला असून विश्व बँक, आय. एम. एफ, विश्व व्यापार संघटना महासत्तांचे हितचिंतक असल्याचे आढळले. शिक्षण, व्यवसाय, रोजगार यांचे आंतरराष्ट्रीयकरण झाले आहे. विद्यार्थ्यांकडे व्यावसायिक दृष्टिने बघण्याचा कल आढळतो. शिक्षणामुळे उच्च पद भुषविता येईल, परदेशात जामा येईल, पैसा भरपूर कमवता येईल, शानशौकीन पुर्ण करता येईल परंतु माणुसकी मात्र मिळविता येणार नाही हे सत्य आहे. ज्यांच्याकडे गुण, कौशल्य आहे त्यांनाच पुढे विकसीत होता येईल. त्यामुळे समाजात फार मोठी विषमतेची दरी निर्माण होईल. व मूलभूत हक्क, अधिकारापासून वंचित राहावे लागण्याची शक्यता नाकारता येत नाही. जीवन उपयोगी शिक्षण, रोजगार निर्मिती साठी प्रयत्न करणे गरजेचे आहे.

निष्कर्ष:

1. ग्रामिण भागातील उच्च शिक्षण संस्था या विना अनुदान तत्वावर चालत असणाऱ्या संस्थांचे प्रमाण जास्त असल्याचे आढळले.

2. या संस्थांना अनुदान सरकार देत नसल्याकारणाने त्यांना स्वतःकडील पैसा वापरून कॉलेजचा पुर्ण आर्थिक भार सहन करावा लागतो.
3. अफिलेशन करीता येणाऱ्या कमिटीची मर्जी सांभाळावी लागते. त्यांचा खर्च सहन करावा लागतो.
4. कर्मचाऱ्यांचा पगार करावा लागत असल्याने त्यांचा पगाराच्या समस्या येवू नये याकरीता घरातील सर्व सदस्यांना कार्यकारीणी मध्ये सहभागी करून घेतल्या जाते.
5. या संस्थांमध्ये विद्यार्थ्यांना आवश्यक असणाऱ्या सुविधांचा अभाव आढळतो.
6. सुविधांच्या अभावामुळे विद्यार्थ्यांचा शैक्षणिक विकास पाहिजे त्या प्रमाणात होत नाही.
7. शहराच्या तुलनेत ग्रामिण भागातील विद्यार्थ्यांचा विकास निकृष्ट प्रतीचा आढळतो.
8. अश्या संस्थेचे संस्थापक अनुदानाची शासनाकडून मदत मिळत नसल्याने त्यांना योग्य शिक्षकांची भरती करू शकत नाही. त्यामुळे देखिल गुणवत्ता ढासळलेली आढळते.
9. कमी कालावधीत विद्यार्थ्यांना शिकवावे लागत असल्याने शिक्षणाचा दर्जा खालावलेला आढळला.
10. अश्या संस्थेत भ्रष्टाचाराची शक्यता नाकारता येत नाही.
11. कर्मचारी वर्गाचा पगार करणे, इतर कामे करण्यास आर्थिक बाबतीत खुप समस्या येतात.
12. इतर सोई सुविधा उपलब्ध करण्यास विद्यार्थ्यांच्या प्रवेश फी वर अवलंबून राहावे लागत असल्याने ग्रामिण हालाखीची परीस्थितीमुळे ॲडमिशनच्या वेळी सुट द्यावी लागते. त्यामुळे संस्थापकांना कॉलेज चालविण्यास अनेक समस्यांना तोंड देण्यास तारेवरची कसरत करावी लागते.

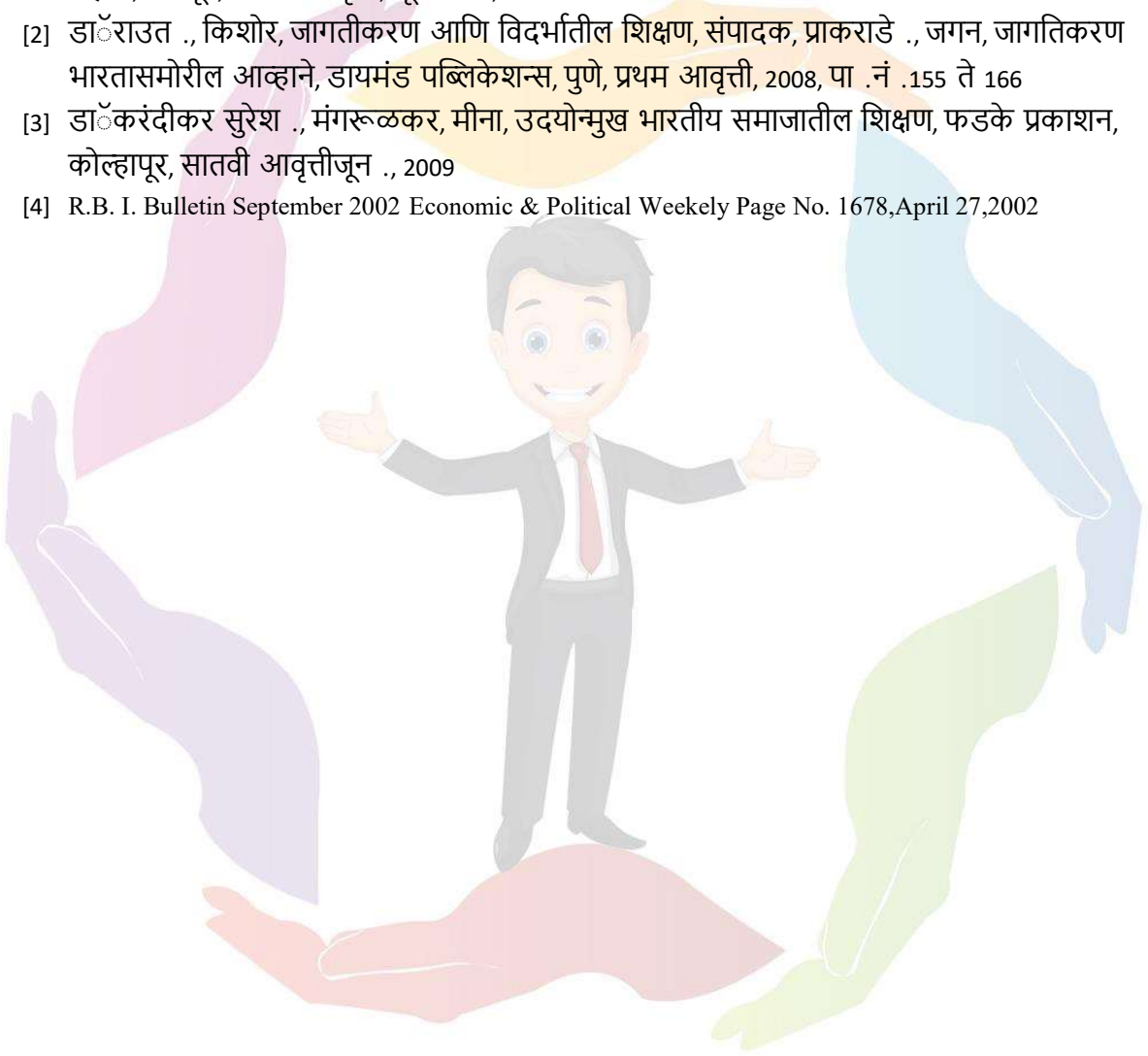
संगणक, इंटरनेट, माहिती तंत्रज्ञान याद्वारे जग अतिशय जवळ आलेत. चिंतन, मुक्तविचारांना, सर्जनशीलतेला विशेष महत्व प्राप्त झाल्याने शिक्षणासंबंधी भविष्याभ्यासात रचनात्मक विचारांमुळे विद्यार्थ्यांना प्रेरणा मिळण्यास मदत झाली. व विध्वंसक वृत्ती देखील नाहीशी झाली. या पध्दतीने विधायक दृष्टिकोण विद्यार्थ्याला भविष्याभ्यासाने जीवनाचे तत्वज्ञान विकसतीत करण्यास मदत होते. जलद संशोधनामुळे विद्यार्थ्यांना आता माहिती पुरविणे शक्य नाही कारण रोज एक नविन संशोधन माहिती पडते न तोच काही सेंकदांतच त्यापेक्षा फायदेशीर व आधुनिक माहिती प्राप्त झालेली पाहायला मिळत आहे. ज्ञानप्रसार माध्यमात बरीच प्रगती झाल्याने घरबसल्या कोणतेही ज्ञान उपलब्ध करता येणे शक्य झाले. आताचे ज्ञान अद्यावत असूनही अल्पायुषी आहे. कारण क्षणातच ते ज्ञान कालबाह्य ठरत आहे. म्हणून आताच्या शिक्षकाने त्यांना माहित असलेले ज्ञान देण्यापेक्षा त्यांनी अध्ययन कसे करावे, स्वअध्ययनाचे महत्व, जुन्या माहितीचा त्याग केव्हा करावा, आवश्यक तेव्हा माहिती कशी प्राप्त करावी या बाबत विद्यार्थ्यांना माहिती देणे गरजेचे आहे. दुर्बल घटकांना शिक्षण घेणे कठीण झाले. रोजगार कसा मिळू शकेल या दृष्टिने विचार करणे गरजेचे आहे.

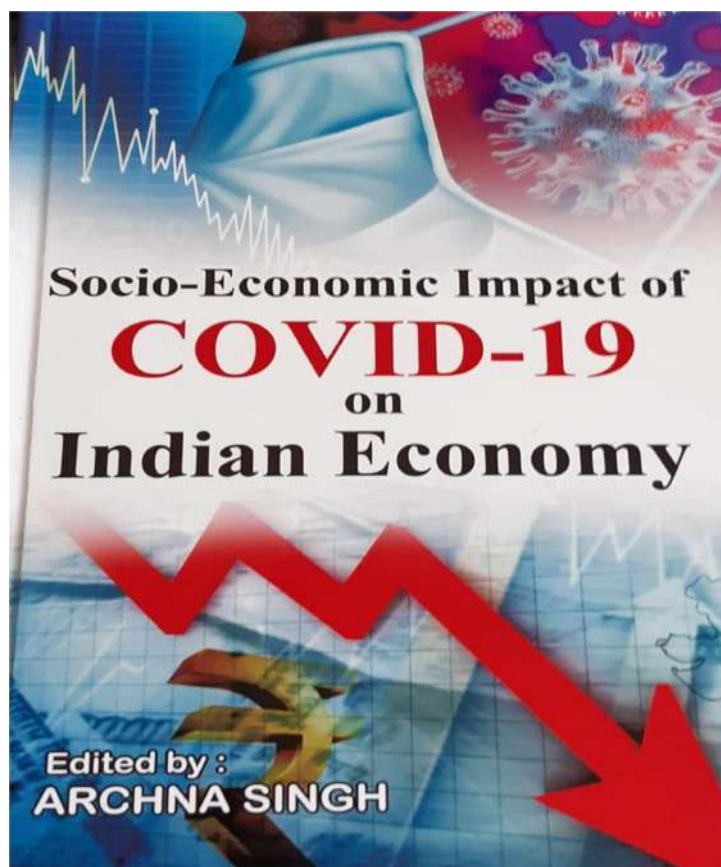
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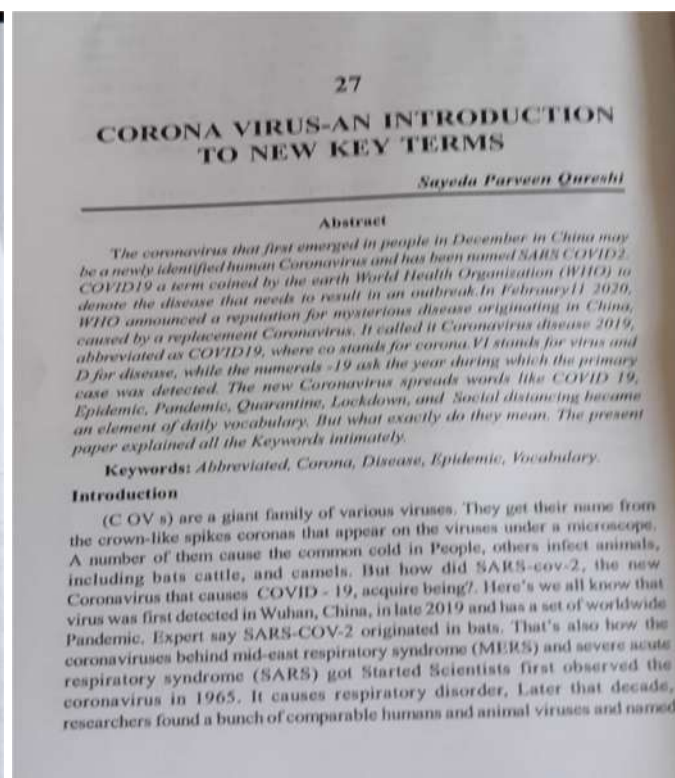
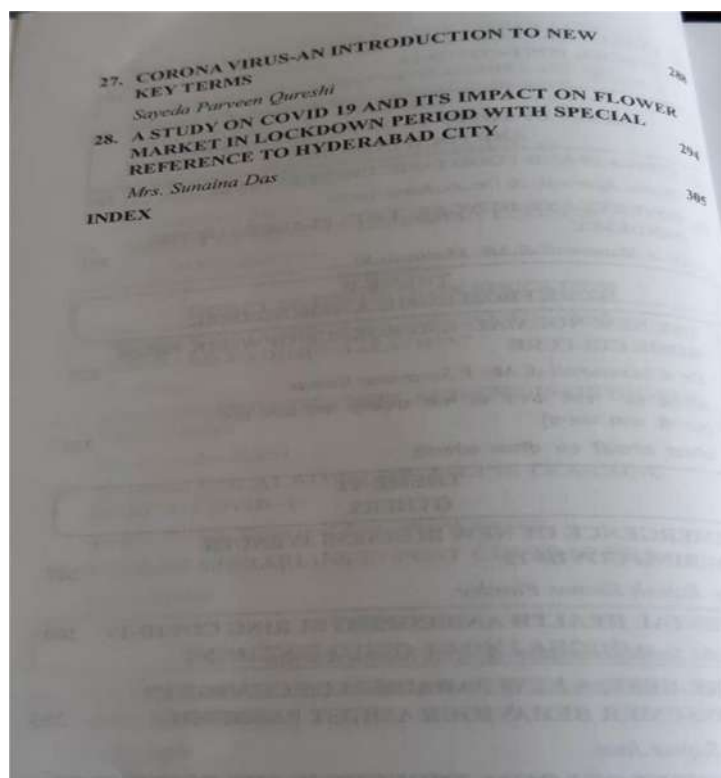
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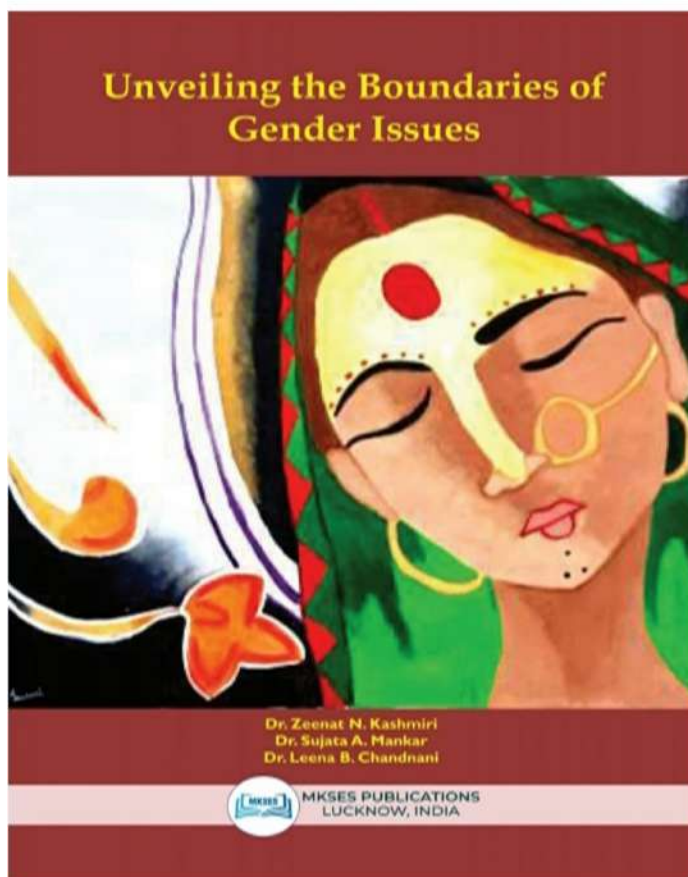
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Chapter-12

The Role of Women for Sustainable Agriculture in India

Dr. Sayeda Parveen Qureshi

P. G. Department of Botany

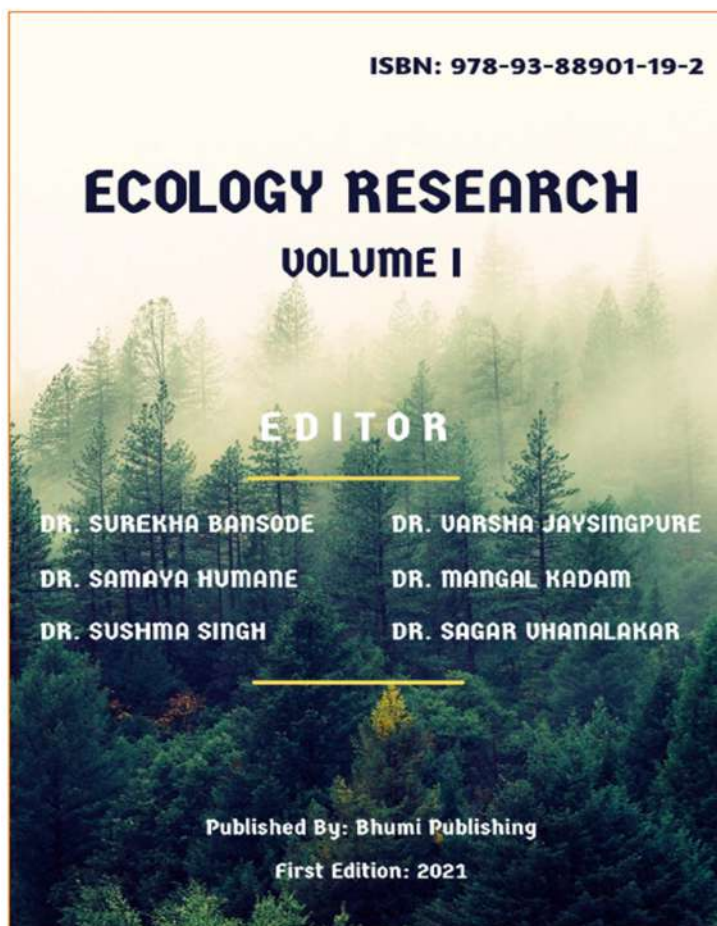
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Introduction

Agriculture is the vertical backbone of the Country. The Major parts of the Country's population earn its Livelihood from agriculture. The agriculture production in India encompasses field crops, fruit crop, Plantation crop, Live stocks, Forestry, Fishery etc. so overall it is huge industry which recruits or engages 52% of overall manpower of India. It is estimated that 38% of the agricultural Labour force consists of women. But a large number of women have remained as "Invisible workers." The role of women in agriculture as female labour is not highlighted in India. Despite of their presence in activities sowing, transplanting, weeding, postharvest operation they are considered as an invisible worker. This study is providing key on the agriculture situation in India and the role of women for sustainable agriculture.

Agriculture in India is livelihood for a majority of the population and can never be underestimated. India is predominately an agrarian economy. Despite having developmental Phase, seventy percent of its population is still in the rural background, of which sixty percent household are engaged in agriculture for their main source of income. Agriculture is an engine of growth and poverty reduction in developing countries where it is main occupation of the poor. (Slathia Nishi, 2014). Agriculture sector as a whole has developed and emerged immensely by empowering men with technology. But this emergence is incapable of lifting the status of women labour as an integral part of the industry. In a developing country like India, agriculture contributes 13.5% to the GDP of the economy. It provides 55% employment in the country out of which a good number of work force is shared by women. Role of women in this sector cannot be ignored they comprise 33% of the agriculture labour force and 48% of the self-employed farmers (Varsha Mohan, 2020). Gender, that is socially constructed relations between men and women, is an organizing element of existing farming systems worldwide and a determining factor of ongoing agricultural existing farming systems worldwide and a determining factor of



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ETHNO-ECOLOGICAL ATTRIBUTES OF SOME WEEDS OF FAMILY ASTERACEAE IN CROP FIELDS OF BHANDARA DISTRICT (M.S.)

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Abstract:

The present investigation is focused on weed diversity of Asteraceae members in crop fields and their folklore information gathered from tribal and rural people. Many members of the large and diverse plant family Asteraceae have become serious agricultural weeds, many of which frequent in vegetable fields. In view of this, some ethno-ecological aspects were studied for identifying the status of each species of the Asteraceae members in the present study site.

Keywords: Asteraceae, Diversity, Ethno-ecology, Tribal, Weed

Introduction:

In the total population of Bhandara district, 85% is residing in rural area and their source of income is Agriculture. The major cultivated crops are paddy, wheat, soybean, chick pea, pigeon pea, horticulture and vegetable crops. The main source of irrigation is canals, open wells, tanks, lift irrigation and drip irrigation methods. The district is occasionally drought and flood prone. But it is not affected by cold, frost and hail storm.

The present investigation is focused on weed diversity of Asteraceae members in crop fields and their folklore information gathered from tribal and rural people. Asteraceae is the one of the largest families of the Angiosperms. This family includes annuals, biennials, and perennials with or without taproots, rhizomes, or tubers. Many weeds in this family have strongly lobed or divided leaves, which grow in basal rosettes during the vegetative phase of the plant's lifecycle. They are generally easy to distinguish from other plants, mainly because of their characteristic inflorescence and other shared characteristics.



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Recent Trends of Rural Education in India

Dr. Anand A.¹ Muley¹ Prof. Rupali Petkar²

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Abstract:-

Education is the doorway to the wider world and an exposition on rural infrastructure is incomplete without an assessment of the extent to which we have been able to open this door for the children of rural India. India has the largest education system in the world after China. However, issues of Quality education and access remain challenges in some parts of the Country. The role of education in facilitating social and economic progress is well accepted. Access to education is critical to access emerging opportunities that accompany economic growth. Keeping in view of this accepted fact there has been a major thrust on education Since independence, but as far as ensuring quality education in rural India is concerned it has always been one of the biggest challenge for the governments. Now, In India there is so many new things are implemented. A trend implies a particular tendency or a movement or even a bias towards a certain issue. Due to the colonization, science as taught in the western world and the English language became integral parts of the school curriculum in India.

Keywords :-Rural ,Education ,Trends, Scenario.

Introduction:-

Education is recognized as one of the keys to fighting poverty, but despite the awareness of that fact too many children in rural India of which is in poverty itself. Which forces families to put children to work or into other situations because, they cannot afford to keep them at home and in school. In addition, some social customs deny education to girls, and children who are orphaned are almost always placed in situations that reduce their chances for education. In India, half of the population lives in the villages. The contribution of rural India towards the economic development is not hidden from any of us. Earlier the people used to correlate rural development with agricultural development and thus focus was only on the increased agricultural production. But with the changing time, this misbelieve has also changed. Today the concept of rural development is fundamentally different that it was used to be 2 or 3 decades ago. Now rural development includes development improving the quality of life of rural people. It constitutes improvement in their health and nutrition, education, safe and healthy environment, fairness in income distribution and no discrimination in gender. Indian society too is undergoing transitions in some areas. For example the liberalization of the economy and its becoming a part of the global economy is one such transition. As a result today there is an increasing presence of the private sector in many areas including education. The ongoing phenomenon of globalization too has a significant impact on the Indian society and in turn on the educational scenario. There is another new thought process, which is leading to the realization that development has to be sustained. Bringing about sustainable development is one of the Millennium Development Goals of the United Nations and we know that education is the key to attain it. Apart from privatization, globalization and education for sustainable development, there are many new trends in education such as technology mediated education, lifelong education, distance education, inclusive education, education for peace, etc. and all these trends are the consequences of the contemporary thoughts and practices.

Objectives:-

- To provide leadership for rural education – related conferences and workshops.
- To know about certain modern trends in education
- To promote state, regional and local delivery systems which bring about efficient and effective education for children in rural areas.
- To stimulate discussion, research, and policy development regarding equal educational opportunities for all students.
- To serve as a national advocate and representative for rural education at all levels: Local – State – Regional – National.
- To understand the impact of privatization of educational institutions.

Present Scenario:-

According to statistics and research, there is a wide gap between urban and rural education systems in India. In urban and metro cities, the number of schools is huge. These schools also have proper infrastructure and adequate teachers. Unfortunately, rural schools are deprived of good quality education. There are very few **schools** in the **rural** areas and children have to travel far away distances to avail these facilities and most **schools** in these locations do not provide drinking water. The quality of **education** is also very poor. Right to Education is the primary right of every citizen of India, whether a child resides in a high profile society or in a far away not so developed secluded village. In India, the condition of rural education is still improving, the conditions of these rural schools are still very poor. The teachers get very less income, so most of the time the teachers are either absent or they do not teach properly. Scenario of the rural education system in India.

Lack of local transportation: The rural areas and villages in India are struggling hugely when it comes to transportation. This is a basic and major problem faced by rural children and teachers. As a result, they are not able to attend the classes on time.

Lack of rural schools: Another saddest part is that, as compared to metro and urban cities, the number of schools is less in rural areas. The local transportation problem and less number of schools both are responsible for disrupting the rural education system in India.

Inadequate infrastructure: Inadequate infrastructure is one of the major problems of the rural education system. Inadequate infrastructure means a lack of well-trained teachers, poor classrooms, lack of books, poor laboratories, etc. This may lead to poor quality education.

Trends In Rural Education:-

➤ Boost free education

Poverty is one of the most critical and common problems in rural India. This is also one of the major obstructions in propelling the education in rural India. This problem can be solved only if free education or education at a very minimal fee is being offered. This is certainly going to bring up the literacy rate as more and more parents will be eager to send their kids to schools if they are not required to bear the expenses of their education.

➤ Establish more schools

Fortunately, with the changing times, the changes are being witnessed in the rural society as well. There is an increase in the number of parents in rural India who understand the importance of education in their children's lives. However, there exists a problem of lack of ample number of schools in India.

The solution can be found only if the government takes an initiative to establish affordable schools which are pocket-friendly to the middle as well as lower economic groups of the society.

➤ Bring innovative teaching methods

The level of education has gone a notch up in urban areas with newer teaching techniques being introduced; the state of teaching techniques is still primitive and traditional in rural India. The rural schools are still stuck on inculcating rote learning in its students. This has to change.

These schools must start adopting concept learning to develop their students holistically.

➤ Promote computer literacy

Our country is progressing technologically; however, sadly, the imprint of this advancement has yet not reached the rural areas. This has led to a digital gap in urban-rural India. The schools in rural India are required to get equipped with computer education and need to be imparted with technological education as well.

This will help them be at par with the level of urban education and develop themselves better.

➤ Shifting focus towards concept –based learning.

➤ Emerging trend of blended learning.

➤ DIY(Do-it-yourself) learning

➤ Personalized learning.(MOOCs)

➤ Lifelong education

➤ Open and distance learning.

➤ Integration of ICT

➤ Inclusive education.

Research Methodology

This paper is basically descriptive and analytical in nature. In this paper an attempt has been taken to analysis the recent trends of rural education in India. Here, the data from various research journals, websites and articles are collected in order to understand the trends of rural education & the data used in it is purely from secondary sources according to the need of this study.

Suggestions:-

➤ The curriculum of rural education can be updated and should accompany education related to farming, gardening etc.

➤ To attract more number of students and creating enthusiasm in them for learning, visual aids like projectors, television etc. can be used to show some educational movies.

➤ To motivate the teachers they should be made to feel proud that by teaching in the rural or remote area they are acting as a helping hand in the development of economy.

➤ Some special sessions or classes can be conducted for the parents to make them realize the significance of education for their children.

➤ To appreciate the efforts of students, some type of scholarships either in the form of gifts or books can be given to them who perform well in the class.

Conclusion:-

In India, education in the rural segments is not only important to eradicate poverty and illiteracy, but also for a variety of other social, economic as well as cultural and political reasons. In India there is

implemented the new trends in rural education. Now, peoples are more aware about the education and that's the reasons now they are ready to accept the changes in there lives. However the lack of infrastructure is being a major obstacle which needs an active intervention of the government.

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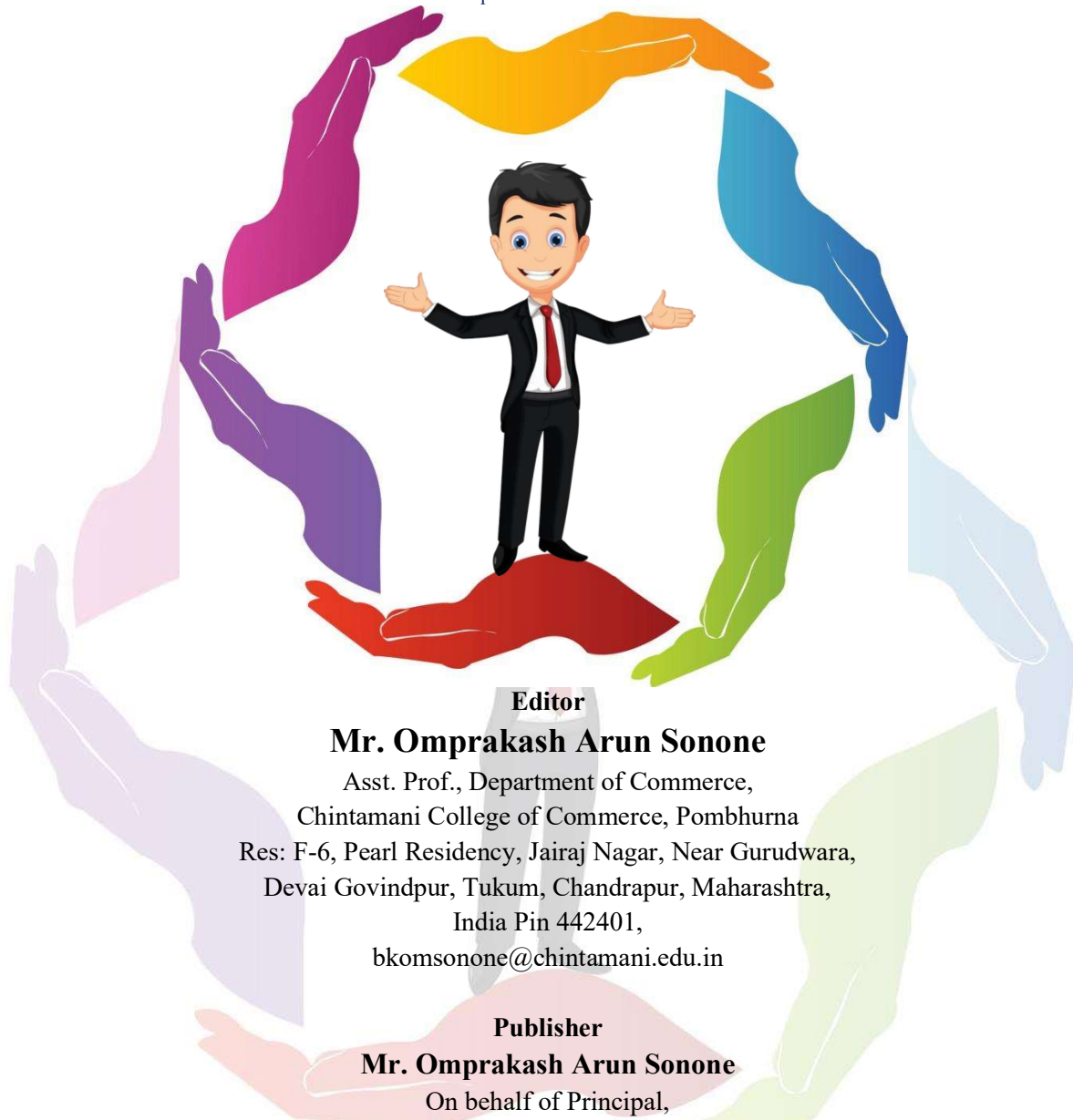


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ग्रामिण भागातील उच्च शिक्षण संस्थांसमोरील आव्हाने

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सारांश:

शिक्षणाचे प्राथमिक, माध्यमिक, उच्च माध्यमिक व उच्च शिक्षण असे वर्गीकरण करण करण्यात आले. भारतात उच्च शिक्षणाला सुरुवात ब्रिटीश काळात झाली. त्या काळात जिल्हयाच्या ठिकाणीच उच्चशिक्षणाची सोय उपलब्ध होती स्वातंत्र्यानंतरच खऱ्या अर्थाने उच्च शिक्षणाचा प्रसार व विस्तार झाल्याचे आढळते. त्यामुळे साक्षरतेचे प्रमाण वाढण्यास मदत झाली. तळागाळातील लोकांना शिक्षण घेता येणे सहज शक्य झाले. प्राचीन काळातील शिक्षण प्रणाली ही व्यक्तिगुणांवर भर देणारी होती. ग्रामीण समुदाय मात्र उच्चशिक्षणाची सोय उपलब्ध नसल्याने जास्त उच्च शिक्षणाकरीता संघर्ष करावा लागलेला आढळून आला. तालुका स्तरावरील महाविद्यालयात उपयोगी साधनसुविधा योग्य त्या प्रमाणात उपलब्ध करणे सोयीचे होत नसल्याने पाहिजे तसा विद्यार्थ्यांचा विकास होवू शकत नाही. परंतू आताच्या शिक्षणप्रणालीत पुस्तकी ज्ञानावर जास्त भर दिला जात असल्याने प्रत्यक्ष जीवन जगतांना त्या ज्ञानाची पाहिजे तशी उपयोगिता होत नसल्याचे लक्षात येत आहे. बेरोजगारीची गंभीर समस्या देशात निर्माण झाली आहे. त्यामुळे तरुण युवावर्ग निराशा, वाईट मार्गाने भरकटत असल्याचे चित्र दिसत आहे. ही देशाच्या विकासाला घातक ठरणारी बाब आहे. आधीच्या काळात शिक्षण घेणारे विद्यार्थी हे उत्तम दर्जाचे घडत असत. परंतू आताचे चित्र आपल्याला वेगळे दिसत आहे. स्वावलंबी जीवन जगण्याच्या दृष्टिकोणातून ज्ञान प्राप्त होणारे शिक्षण आज गरजेचे आहे. त्यामुळे बेरोजगारी सारख्या समस्या सुटण्यास मदत होवू शकेल.

हेतुकथन: शिक्षण पद्धती, शिक्षणाचे धोरण व संस्थेच्या समस्या

प्रस्तावना:

भारतावर इंग्रजांचे राज्य असल्याने त्यांचा राज्यकारभार चालविण्याच्या उद्देशाने इंग्रजी विषय उच्च शिक्षण प्रणालीत भारतीयांवर लादल्या गेला. स्वातंत्र्यानंतर मात्र भाषावार प्रांतरचना निर्माण झाल्यानेदेशी भाषेतून शिक्षणाचा आग्रह धरण्यात आला. '1962 साली पंडित जवाहरलाल नेहरू यांनी प्रादेशिक भाषा आज ना उद्या माध्यम बनतील याबद्दल संशय नाही, विद्यार्थ्यांच्या दृष्टीने ते योग्यही आहे असे मत मांडले. 'कारणप्राध्यापक व विद्यार्थी यांच्यात संपर्क साधण्यास अडचणी येण्याची शक्यता असल्याने संपर्क हिंदी किंवा इंग्रजी भाषेतून साधता येवू शकतो. हिंदी भाषा ही समजण्यास सोपी आहे. माध्यम म्हणून इंग्रजीचा स्वीकार न करता प्रथम क्रमांक प्रादेशिक भाषेला व नंतर हिंदी राष्ट्रभाषा व शिक्षणातील अभ्यासाचा एक विषय म्हणून स्थान देण्यात यावे असे विचार मांडण्यात आले. उच्च शिक्षणाबाबत सर्व तळागाळातील गरजा पूर्ण करण्यास व संस्कृती व परंपरांचे जतन व संवर्धन करण्यास

उच्च शिक्षणाची म्हणजे विद्यापीठीय शिक्षणाची पुनर्रचना करणे गरजेचे असल्याचे सरकारचे मत असल्याने 1948 डॉ. राधाकृष्णन आयोग स्थापीत करून 25 ऑगस्ट 1950 मध्ये या आयोगाने अहवाल सादर केला. 1950 नंतर विद्यापीठीय अनुदान आयोगाची स्थापना करण्यात आली. या आयोगावर महाविद्यालयातील विविध शैक्षणिक सोयी सुविधा निर्माण करण्याची आणि उच्च शिक्षणाची गुणवत्ता वाढविण्याची जबाबदारी देण्यात आली. तालुका स्तरापर्यंत अनुदानतत्वावर शासनाने महाविद्यालये सुरू करण्याची परवानगी दिली. ग्रामिण भागात नवनिर्मित महाविद्यालयातील वाचनालयाच्या, महाविद्यालयाच्या, वस्तीगृहाच्या इमारती सुसज्ज करण्यास, ग्रंथखरेदी, प्रयोगशाळेतील उपकरण खरेदीकरीता विद्यापीठीय अनुदान आयोगाने भरपुर अनुदान देवून सोयींची पूर्तता केली. तसेच पंचवार्षिक योजनाद्वारे केंद्र सरकारने नियोजनबद्ध पद्धतीने आर्थिक तरदूत केली होती. त्या कारणाने तालुकास्तरापर्यंत महाविद्यालयांची संख्या मोठ्या प्रमाणात वाढण्यात आलेली आढळते. विद्यापीठावर वाढण्यात येणाऱ्या अतिरिक्त कार्यभारामुळे नवीन विद्यापीठाची निर्मिती करण्यात आली. सरकारने ग्रामीण भागात विद्यापीठांची स्थापना केल्याने उच्च शिक्षणाचा विस्तार फार झपाट्याने झालेला आढळतो. निरक्षरता दूर करण्या करीता शासनाने शालेय आहार योजना, मुलींना उच्च माध्यमिक शिक्षण मोफत उपलब्ध केले. प्रौढ शिक्षण, अनौपचारिक शिक्षण, रात्रशाळा, मुक्त विद्यापीठ या माध्यमातून शिक्षणाचा प्रचार करण्यात आला. प्रत्येक व्यक्तीला आपल्या क्षमतेनुसार प्रगती करण्याची संधी प्राप्त झाल्याने कुवतीनुसार, आवडीनुसार व्यवसाय निवडून स्वतःचा विकास साधण्याची संधी प्राप्त झाली आहे.

समस्येचा उद्देश: वर्तमान समस्येला कार्यान्वित करण्याकरीता खालील उद्देश निर्धारित केले आहे.

1. प्राचीन शिक्षण प्रणाली व आधुनिक शिक्षण प्रणाली यांची माहिती प्राप्त करणे.
2. तालुका स्तरावरील उच्च शिक्षणाबाबत संस्थेची माहिती प्राप्त करणे व त्यांच्या समस्या बाबत अभ्यास करणे.

संशोधन पद्धती: यादृच्छिक पद्धतीने नमुना निवड करण्यात आली. भंडारा जिल्ह्यातील ग्रामिण भागातील महाविद्यालयांची निवड करण्यात आली. परसोडी, करडी, सडक अर्जुनी, नवेगाव बांध, झालीया, दिघोरी, अडयाळ अश्या विविध महाविद्यालयाला भेटी देण्यात आल्या व त्यांच्या समस्या जाणुन घेण्याचा प्रयत्न करण्यात आला.

शिक्षणाचा अर्थ:

बोर्गाडर्स यांच्या मते “सांस्कृतिक परंपरा व जीवनाला अर्थ प्रदान करणे म्हणजे शिक्षण होय. “²

प्रा. हाॅर्ने यांच्या मते शारीरिक व मानसिकदृष्ट्या विकसित झालेल्या जाणीव असलेल्या मानवाचे त्याच्या बौद्धिक, भावनिक व संकल्पात्मक परीसराशी घडून येणारे वरच्या पातळीवरील समायोजन. “³

हर्बर्ट: वैज्ञानिक पद्धतीचा पुरस्कार केला उदार शिक्षणाची सुधारित कल्पना, संस्कृतीची नविन व्याख्या षालेय जीवनात आणि प्रत्यक्ष जीवनात विज्ञान विषयाची आवश्यकता या बाबींना महत्त्व दिले. ⁴

विलीयम जेम्स : ज्या व्यक्तीला त्याच्या प्राकृतिक व सामाजिक परीसरात योग्य स्थान मिळविण्यास समर्थ करतात. अशा अर्जित सवयी, आचार व वर्तन प्रेरणा यांचे व्यवस्थापन म्हणजे शिक्षण होय. ⁵

साहित्याचे पुर्नविकोलन:

2001 मधे 64. 8 टक्के साक्षरतेचे प्रमाण असून त्यात 75. 3टक्के पुरूष 53. 7टक्के स्त्रियांचे प्रमाण आढळते. ⁶

जागतिकरणामुळे निर्यातीच्या उत्पादनात वाढझाली असली तरी, बेरोजगारीचे प्रमाण वाढतच आहे. सुशिक्षिताचे प्रमाण वाढलेले असूनही कामाच्या अभावाने हात मात्र रिकामेच असल्याचे चित्र पाहायला मिळत आहे. रोजगार मिळू शकेल असे उपयोगी म्हणावे तसे शिक्षण नाही. भारतात शिक्षणावर करण्यात येणारा खर्च अत्यंत कमी म्हणजे 4टक्के आहे. तर परदेशात मात्र 35 टक्के खर्च केला जातो. ⁷

जागतिकरणाच्या प्रक्रियेत भारताची झालेली बचत

वर्ष	परदेशी गुंतवणूक
1990 ते 1991	103
1999 ते 2000	5181
2001 ते 2002	5925

Source : R.B. I. Bulletin September 2002
Economic & Political Weekly Page No. 1678, April 27, 2002

उच्च शिक्षण बाबत शासनाची भूमिका: 1950 ते 1990 पर्यंत समाजवादी, संमिश्र अर्थव्यवस्था होती. या धोरणांमुळे शासनाकडे आर्थिक सत्तेचे केंद्रीकरण झाले होते. तसेच व्यावसायिक व उच्च शिक्षणावरही शासनाची मक्तेदारी असल्याने खाजगी संस्थावर नियंत्रण होते. 1990 नंतर शालेय स्तरावर शिक्षणाचे खाजगीकरण करण्यात आले. पूर्वप्राथमिक, माध्यमिक व उच्च माध्यमिक स्तरावर इंग्रजी माध्यम असणाऱ्या शाळा, स्कॉलरशाळा, निवासी शाळा, सैनिकी शाळा केंद्रीय शाळा अश्या स्वरूपात खाजगीकरणास सुरुवात झालेली आढळते. एकीकडे शाळांचे मदगतीने खाजगीकरण व दुसरीकडे सार्वजनिक शाळांचा शिक्षणाचा दर्जा खालावल्याचे दिसत होते. उच्च शिक्षणाच्या लोकांच्या अपेक्षा वाढल्याने उच्चशिक्षणाचे देखिल खाजगीकरण करण्यात आले. विनाअनुदान तत्वावर व्यावसायिक शिक्षणसंस्था सुरू काण्याची शासनाची अनुमती आणण्यास सत्तारूढ राजकीय पक्षातील नेते सहज करू शकल्याने 1090 ते 2000 मधे खाजगीकरण झपाट्याने वाढलेले आढळते. उच्च शिक्षण क्षेत्रात संशोधन कार्यात सातत्य, व्यावसायिक अभ्यासक्रमाची गुणवत्ता वाढविण्याचे कार्य बोटार मोजता येईल अश्या

संस्थांना जमले. अनेक संस्था शिक्षणातून समता प्रस्थापित करण्याचा आदर्श ऐवजी आर्थिक लाभ प्राप्त करण्याच्या नादात प्रारंभापासूनच गुणवत्तेचा दर्जा ढासळलेला आढळला.

सामाजिक आर्थिक विकासाच्या गतिमान प्रक्रियेतून निर्माण झालेले विशेषीकरण:

विभिन्न भागात वस्तूंचे व यंत्रसामुग्रीच्या उत्पादनाला सुरूवात झाल्याने विशेषीकरणास सुरूवात झाली. सरकारी क्षेत्रातील शिक्षणसंस्थांपेक्षा खाजगी शिक्षण देण्याची व्यवस्था अधिक वेगाने करत असल्याने दबाव निर्माण झाला व विशेषीकरणाचे प्रमाण वाढले.

ज्ञानाच्या स्फोटाचे युग: संगणक व इंटरनेट यांच्या ज्ञानामुळे आर्थिक विकासाचा वेग वाढण्यास मदत झाली. त्यामुळे विकसीत राष्ट्र बाजारपेठा काबीज करीत होत्या. विभिन्न विषयातील संशोधनाला उत्तेजन देवून तांत्रिक क्षेत्रात सुधारणा करणे देशाची गरज बनली. चौथी औद्योगिक क्रांतीमुळे कुशल कामगाराची गरज निर्माण झाली. 1090 नंतर नरसिंहराव यांच्या कालकिर्दीत आर्थिक धोरणात बदल करण्यात आला. त्यामुळे खाजगी उद्योगधंद्यावरील सरकारी नियंत्रणे रद्द करण्यात आल्याने खाजगीकरण, उदारीकरण, जागतीकरणात विकास झाला. खाजगी शिक्षणसंस्था शिक्षणाचे व्यापारीकरण करण्याच्या मार्गावर लागल्याने शिक्षणाचा दर्जा ढासळलेला आढळतो आहे. अश्या संस्थांमधे लोकशाही पेक्षा हुकुमशाही प्रवृत्तीने कारभार चालत असल्याचे निदर्शनात आले.

जागतिकरणामुळे निर्माण झालेले प्रश्न: औद्योगिकरणामुळे जुन्या प्रथा, मूल्य व परंपरांना स्थान राहिले नाही. तर व्यक्तित अद्यावतता, मुल्य प्रमाणक, विश्वास व्यवस्था यात बदल झाल्याचे आढळते. व्यक्तीच्या व्यक्तिमत्वामध्ये औपचारिक व अनौपचारिक शिक्षणाला अतिशय महत्व आहे. त्यांच्यावर विविध संस्कार केल्याने समाजमान्य उत्तम नागरिकाची निर्मिती होते. शिक्षणाला पूर्वीचे पवित्र आणि महत्वाचे क्षेत्र न समजता एक व्यावसायिक रूपात उदयास आले. पैश्यांवर पदवी ही अवलंबून असल्याचे चित्र दिसते आहे. जागतिकीकरणामुळे जगाला वैश्विक खेड्याचे स्वरूप प्राप्त झाले असून मोठ मोठ्या संस्था, संघटनांचा हस्तक्षेप वाढला असून विश्व बँक, आय. एम. एफ, विश्व व्यापार संघटना महासत्तांचे हितचिंतक असल्याचे आढळले. शिक्षण, व्यवसाय, रोजगार यांचे आंतरराष्ट्रीयकरण झाले आहे. विद्यार्थ्यांकडे व्यावसायिक दृष्टिने बघण्याचा कल आढळतो. शिक्षणामुळे उच्च पद भुषविता येईल, परदेशात जामा येईल, पैसा भरपूर कमवता येईल, शानशौकीन पुर्ण करता येईल परंतु माणुसकी मात्र मिळविता येणार नाही हे सत्य आहे. ज्यांच्याकडे गुण, कौशल्य आहे त्यांनाच पुढे विकसीत होता येईल. त्यामुळे समाजात फार मोठी विषमतेची दरी निर्माण होईल. व मूलभूत हक्क, अधिकारापासून वंचित राहावे लागण्याची शक्यता नाकारता येत नाही. जीवन उपयोगी शिक्षण, रोजगार निर्मिती साठी प्रयत्न करणे गरजेचे आहे.

निष्कर्ष:

1. ग्रामिण भागातील उच्च शिक्षण संस्था या विना अनुदान तत्वावर चालत असणाऱ्या संस्थांचे प्रमाण जास्त असल्याचे आढळले.

2. या संस्थांना अनुदान सरकार देत नसल्याकारणाने त्यांना स्वतःकडील पैसा वापरून कॉलेजचा पुर्ण आर्थिक भार सहन करावा लागतो.
3. अफिलेशन करीता येणाऱ्या कमिटीची मर्जी सांभाळावी लागते. त्यांचा खर्च सहन करावा लागतो.
4. कर्मचाऱ्यांचा पगार करावा लागत असल्याने त्यांचा पगाराच्या समस्या येवू नये याकरीता घरातील सर्व सदस्यांना कार्यकारीणी मध्ये सहभागी करून घेतल्या जाते.
5. या संस्थांमध्ये विद्यार्थ्यांना आवश्यक असणाऱ्या सुविधांचा अभाव आढळतो.
6. सुविधांच्या अभावामुळे विद्यार्थ्यांचा शैक्षणिक विकास पाहिजे त्या प्रमाणात होत नाही.
7. शहराच्या तुलनेत ग्रामिण भागातील विद्यार्थ्यांचा विकास निकृष्ट प्रतीचा आढळतो.
8. अश्या संस्थेचे संस्थापक अनुदानाची शासनाकडून मदत मिळत नसल्याने त्यांना योग्य शिक्षकांची भरती करू शकत नाही. त्यामुळे देखिल गुणवत्ता ढासळलेली आढळते.
9. कमी कालावधीत विद्यार्थ्यांना शिकवावे लागत असल्याने शिक्षणाचा दर्जा खालावलेला आढळला.
10. अश्या संस्थेत भ्रष्टाचाराची शक्यता नाकारता येत नाही.
11. कर्मचारी वर्गाचा पगार करणे, इतर कामे करण्यास आर्थिक बाबतीत खुप समस्या येतात.
12. इतर सोई सुविधा उपलब्ध करण्यास विद्यार्थ्यांच्या प्रवेश फी वर अवलंबून राहावे लागत असल्याने ग्रामिण हालाखीची परीस्थितीमुळे ॲडमिशनच्या वेळी सुट द्यावी लागते. त्यामुळे संस्थापकांना कॉलेज चालविण्यास अनेक समस्यांना तोंड देण्यास तारेवरची कसरत करावी लागते.

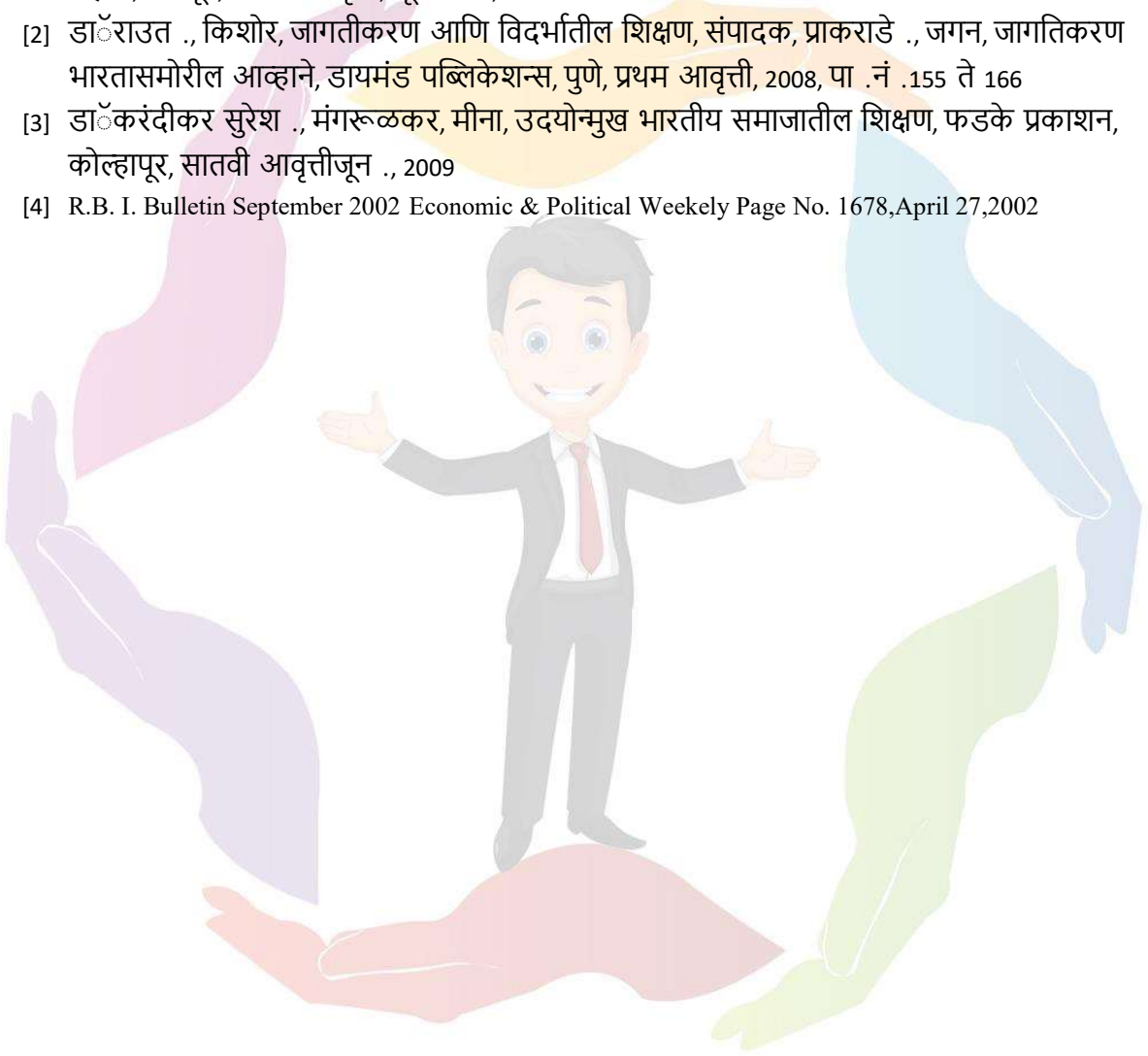
संगणक, इंटरनेट, माहिती तंत्रज्ञान याद्वारे जग अतिशय जवळ आलेत. चिंतन, मुक्तविचारांना, सर्जनशीलतेला विशेष महत्व प्राप्त झाल्याने शिक्षणासंबंधी भविष्याभ्यासात रचनात्मक विचारांमुळे विद्यार्थ्यांना प्रेरणा मिळण्यास मदत झाली. व विध्वंसक वृत्ती देखील नाहीशी झाली. या पध्दतीने विधायक दृष्टिकोण विद्यार्थ्याला भविष्याभ्यासाने जीवनाचे तत्वज्ञान विकसतीत करण्यास मदत होते. जलद संशोधनामुळे विद्यार्थ्यांना आता माहिती पुरविणे शक्य नाही कारण रोज एक नविन संशोधन माहिती पडते न तोच काही सेंकदांतच त्यापेक्षा फायदेशीर व आधुनिक माहिती प्राप्त झालेली पाहायला मिळत आहे. ज्ञानप्रसार माध्यमात बरीच प्रगती झाल्याने घरबसल्या कोणतेही ज्ञान उपलब्ध करता येणे शक्य झाले. आताचे ज्ञान अद्यावत असूनही अल्पायुषी आहे. कारण क्षणातच ते ज्ञान कालबाह्य ठरत आहे. म्हणून आताच्या शिक्षकाने त्यांना माहित असलेले ज्ञान देण्यापेक्षा त्यांनी अध्ययन कसे करावे, स्वअध्ययनाचे महत्व, जुन्या माहितीचा त्याग केव्हा करावा, आवश्यक तेव्हा माहिती कशी प्राप्त करावी या बाबत विद्यार्थ्यांना माहिती देणे गरजेचे आहे. दुर्बल घटकांना शिक्षण घेणे कठीण झाले. रोजगार कसा मिळू शकेल या दृष्टिने विचार करणे गरजेचे आहे.

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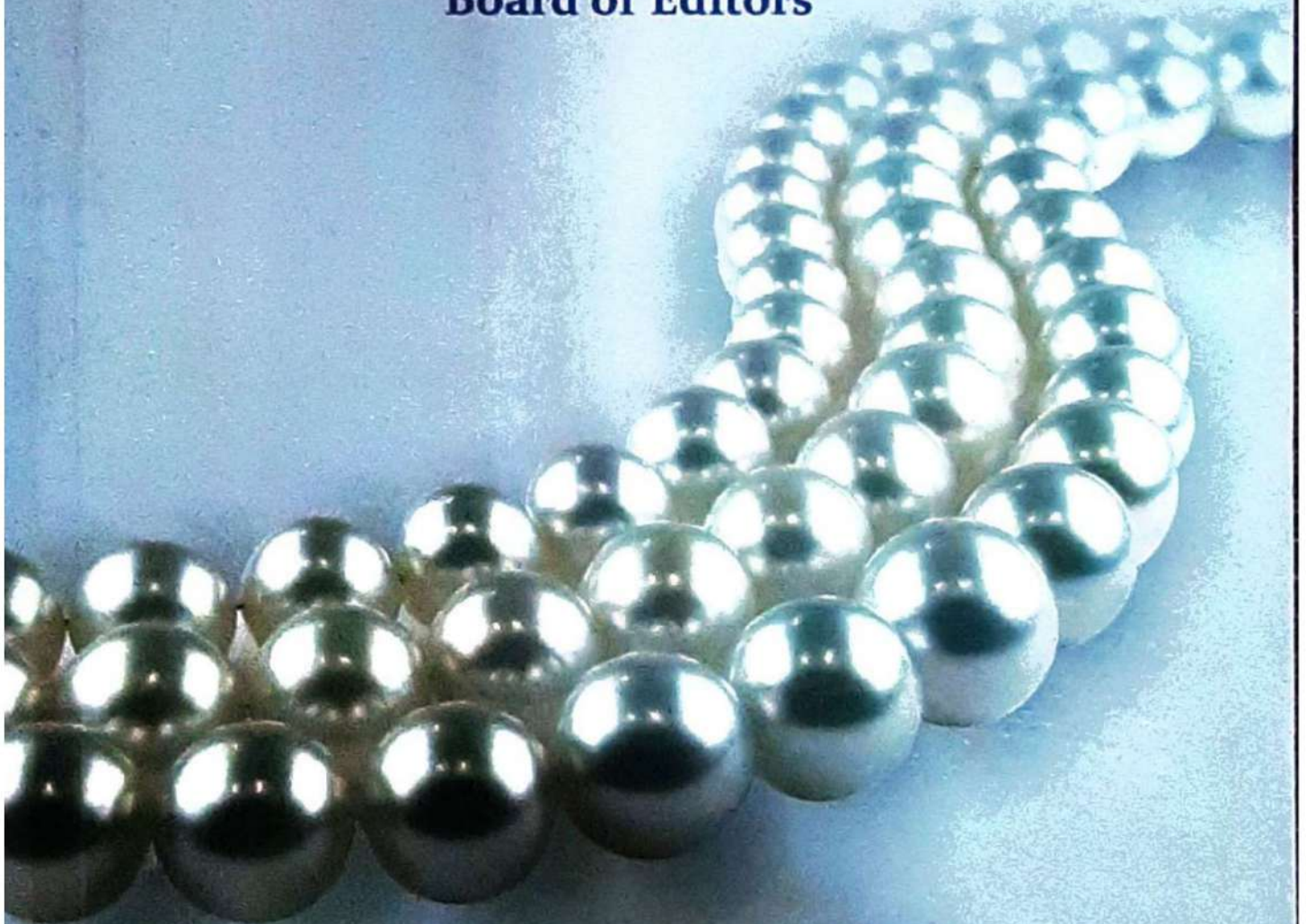
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PREFACE

Pearls of Wisdom is a collection of meaningful stories written by writers who cut across various time periods and nationalities but the common thread that holds them together is the universal values and truths of human experiences that they convey. This book would not only give the undergraduate students of science an opportunity to appreciate and enjoy literary pieces, but also introduce them to the nuances of human emotion, open their minds to multiple perspectives and also give them insight into motives that drive human action.

Literature is not only about ideas but also about experiences. As so aptly stated by Cleanth Brooks, John Thibaut Purser and Robert Penn Warren, "the truth of literature takes the form, not of abstract statement, but of concrete and dramatic presentation, which may allow us to experience imaginatively the "lived" meanings of a piece of life." The stories invite students to live through the experiences of the characters in the stories and cultivate the sensitivity and sensibility to appreciate what constitutes life. Questions for exploration follow every story so that students can draw on their own experiences and develop their ideas as they share and exchange them with their classmates. It has been our endeavour to foster critical thinking skills among the students as the questions that follow each story prompt them to peel the layers of the story and look for the message and values it promotes.

The process of designing this textbook has been a joyful one and we wish to place on record our thanks to the members of the Board of Studies for their unstinting support throughout.

We remain indebted to Honourable Vice-Chancellor Dr. Subhash Chaudhari for his support in getting the revised syllabus approved.

We gratefully acknowledge the co-operation received from the staff of the Academic Section of the University at all times in

this journey. Thanks are also due to Raghav Publishers & Distributors for defying all odds posed by Covid-19 pandemic and bringing out this anthology in time for the academic year.

As we present this textbook to our students, our only hope is that this anthology of short stories prompts them to dive deeper into the ocean of literature and collect the “pearls of wisdom” which it offers.

– Board of Editors

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Pearls of Wisdom has been so designed that it speaks to the learners' aspirations, touches a chord in them, stimulates their thinking and fills them with life-affirming wisdom. The rich selection of short stories representing a wide array of writers belonging to different time periods and nationalities would invite the learner to pause, ponder and understand themselves and those around them better. This textbook not only gives learners enough opportunities to revive their interest in reading but also invites them to critically discuss, analyze and explore the core values and arguments that each story expounds. As care has been taken to string together this variety of soul-stirring stories, it is only when the learner dives into them will s/he be able to collect the "**pearls of wisdom**".

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Empowering Minds

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B.Sc./B.Sc.(IT)/BCA Part-I Compulsory English Textbook**

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B.Sc./B.Sc.(IT)/BCA Part-I Compulsory English Textbook
(Semesters I & II)

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PREFACE

It is the prime concern of academicians to empower students with a holistic personality by addressing the student's academic, scientific, emotional as well as creative needs and tapping their full potential. Designing the text book, *Empowering Minds*, is our humble effort to further this cause and make our students future-ready. Due diligence has been exercised in selecting meaningful texts which have topics that are of relevance and of great interest to students. This will help the students to connect the text to their own lives and help them look within and reflect. Booker T. Washington's struggle for education brings to fore the role of grit and self-belief in the face of odds in order to achieve one's goals. The address by Subroto Bagchi drives home the point that a strong value system is at the foundation of all successful human endeavours and that there can be no greater wealth or success than staying true to one's core values. As nurses are our frontline health workers and form the heart and soul of the healthcare system, the students will surely appreciate the incredible journey of Florence Nightingale and her role in laying the foundation of modern nursing care. The story of the birth of Khadi narrated by Mahatma Gandhi will only inspire us to passionately embrace the *Atmanirbhar Bharat Abhiyan*. Saji Varghese's piece on social innovations will surely motivate the young minds to look for local solutions to the problems around us. Padma Shri Dr. Vijay Bhatkar's talk on synthesis of science and spirituality is bound to give the young minds a lot of food for thought. The messages contained in poems like *Ulysses* and *Yussouf* will add a new dimension to their lives. The wisdom contained in the poem *If* would continue to inspire and guide youngsters for generations to come. While the section on Phrasal Verbs would enrich the students' vocabulary, the one on summarizing would equip them with an important comprehension strategy and an equally useful academic writing skill.

We remain indebted to Honourable Vice-Chancellor Dr. Subhash Chaudhari for his support in getting the revised syllabus approved.

We would like to place on record our sincere thanks to Padma Shri Dr. Vijay Bhatkar, Shri Subroto Bagchi and Dr. Saji Varghese for the immediate and generous permission to include their talk/article in the book.

The editors take this opportunity to extend their sincere gratitude to the Members of the Board of Studies for their support in designing this textbook. Very special thanks to Raghav Publishers & Distributors for bringing out this anthology in time for the academic year despite the challenges posed by the Covid-19 pandemic.

– Board of Editors

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Empowering Minds has been designed with the purpose of equipping the students with fluency and accuracy in English language skills while enriching their reading experience with a variety of select texts drawn from both fiction and poetry. Care has been taken to select those meaningful texts which have topics that are of relevance and are of great interest to students so that they can connect the text to their own lives. They provide ample opportunities for personalization and discussion and can be used by teachers to promote communication skills among the students. The questions for exploration given at the end of each chapter allow for discussion, dialogue and debate which, in turn, would hone their critical thinking and communication skills. As the students straddle the real world and the world of letters, it is the enduring values and principles expounded in the text that will stay with them forever and guide them through life. An attempt has been made to engage both the mind and soul of the learner because this is what **Empowering Minds** truly entails.

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- ♦ Dr. Mundeep G. Awaley
- ♦ Dr. Anil S. Dahat
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Semester Pattern Syllabus

B. Sc. Botany (Semester – I)

PAPER – I : (VIRUSES, PROKARYOTES, ALGAE AND BIO FERTILIZERS)

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Unit-II: Cyanobacteria and Algae: 1. **Cyanobacteria**: Cell ultrastructure, Structure of heterocyst, Structure and Reproduction in *Nostoc*, Economic importance of Cyanobacteria. 2. **Algae**: General characteristics, Classification (Fritsch.1954), Economic importance of Algae.

Unit-III: Algae: Life cycles in Algae: *Chara, Vaucheria, Ectocarpus and Batrachospermum*.

Unit-IV: Skill Development: Biofertilizers: 1. **Bio fertilizers**: Definition, scope and importance 2. Various microbes used as Biofertilizers 3. Commercial production of Biofertilizers: *Rhizobium*, *Azotobacter*, PSB (Phosphate Solubilizing Bacteria, e.g. *Bacillus polymyxa*) and *Azolla*

PAPER – II : (FUNGI, PLANT-PATHOLOGY, LICHENS, BRYOPHYTES AND MUSHROOM CULTIVATION)

Unit – I : 1. **Fungi**: General characteristics. Classification (Alexopoulos. 1996), Economic importance. 2. **Life history of** *Albugo*, *Mucor*, *Puccinia* and *Cercospora*

Unit – II : **Plant Pathology and Lichens:**

1. **Plant-Pathology**: Host, Pathogen, Symptoms, Causes and control of diseases: Leaf curl of Papaya, Citrus canker and red rot of Sugarcane

2. **Lichens**: Introduction. Types Reproduction and Economic importance.

Unit –III : **Bryophyta:**

1. **Bryophyta**: General Characteristics, Classification (Troskauer. 1957), Economic importance.

2. **Life history of** *Marchantia*, *Anthoceros* and *Funaria*.

Unit –IV : **Skill Development: Mushroom Cultivation:**

1. **Introduction**: Nutritional and medicinal value of edible mushroom, Poisonous mushroom. Edible mushroom. Edible mushroom. *Volvariella volvacea*, *Pleurotus ostreatus*, *Agaricus bisporus*.

2. **Technology of Mushroom cultivation: Infrastructure**: Mushroom unit (Thatched house); Tools: Polythene bags, vessels, inoculation hook, inoculation loop, low cost stove, sieves, culture rack, water sprayer, tray, medium.

3. **Techniques**: Substrate, preparation of medium and spawn, sterilization, multiplication, bed preparation (Paddy straw, sugarcane trash, banana leaves)

NOTE: Developmental stages not expected

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Paper - 2 : Fungi, Lichen, Plant Pathology, Bryophyta



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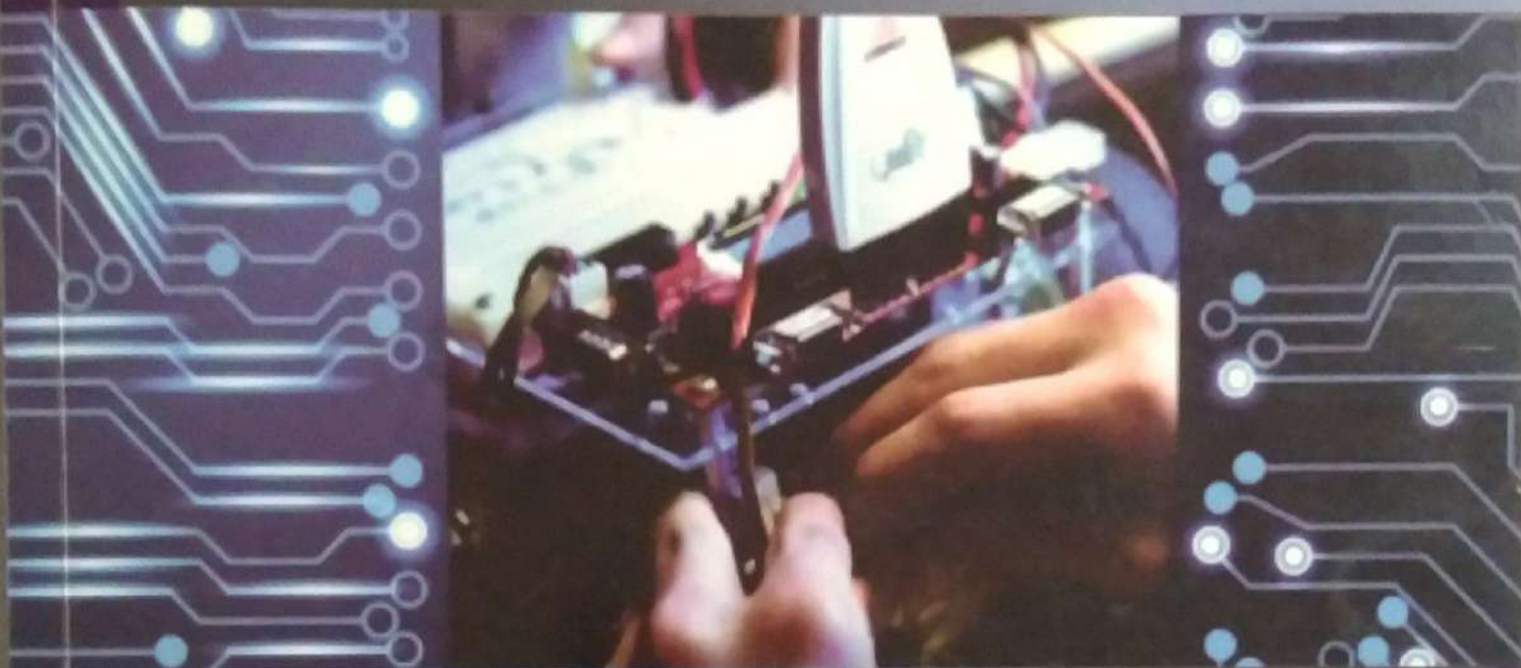
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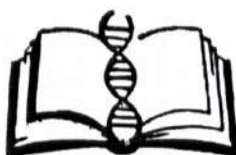
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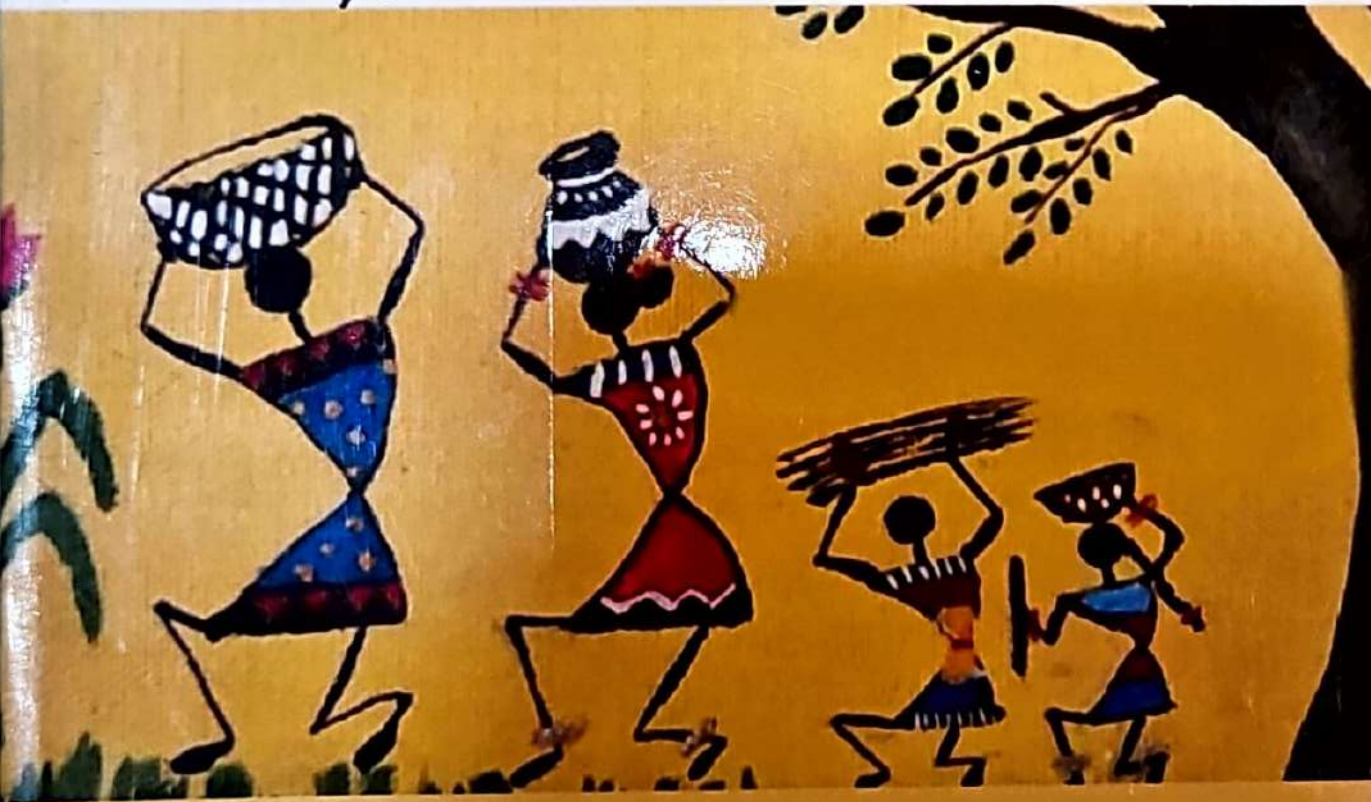
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