Research Methodology

By

M.Amalanathan

M.Sony Michael Mary

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Anson Publications

ISBN : 978-93-5636-112-6

978-93-5636-112-6

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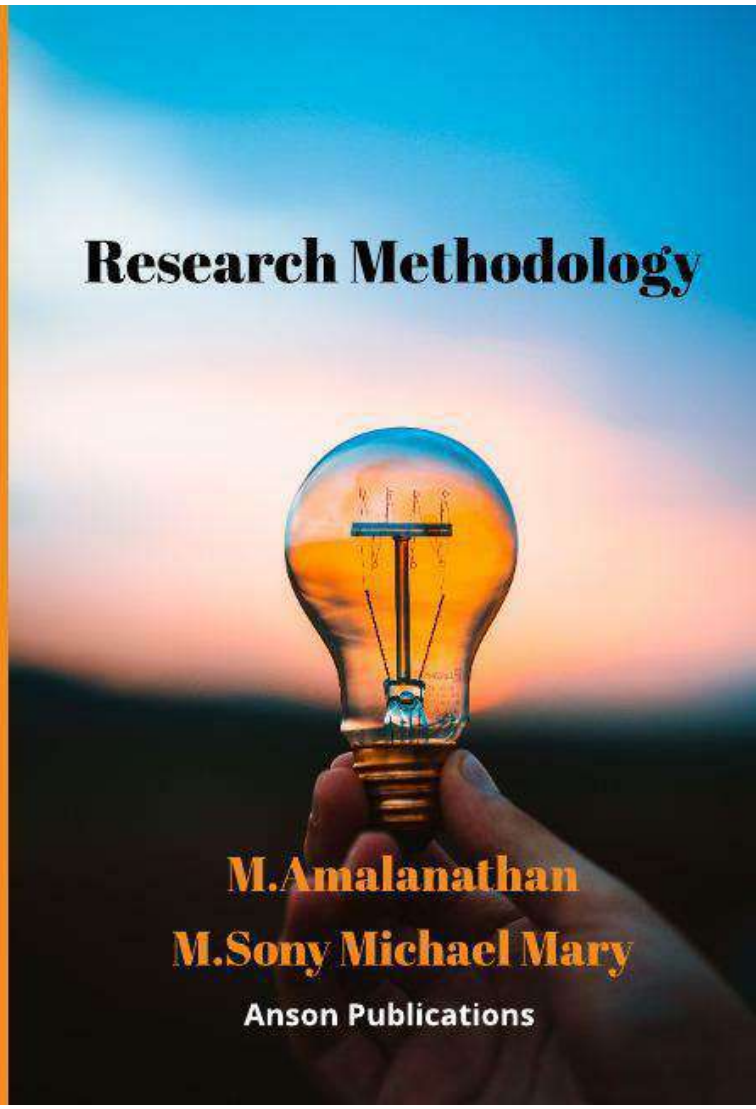

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As per *M S University* Latest Syllabus
I Year II SEM Alied Computer Science
With Solved Practical Exercises

Dr.D.SHARMILA

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ISBN NO: 978-81-957822-2-2

1st Edition

Published by,

ERES PUBLICATIONS
Nagercoil, Tamilnadu
eresjournal@gmail.com,
www.eresjournals.org

First print: January 2023

Preface

We present material in a simple straight forward manner. Programming In C is a manual for II Sem Allied Computer Science Syllabus. It covers the Programming in C lab and theory B.Sc Course of M.S. University.

Main reference Book followed for all chapters is Programming in ANSI C – 6th Edition by E Balagurusamy – Tata McGraw Hill Publishing Company Limited. This is the prescribed text book given for the students.

Author Team

Dr. D. Sharmila received her B.Sc degree in Computer Science from Womens Christian College Nagercoil. She obtained her MCA & MPhil degrees from Madurai Kamaraj University. She received her Doctor of Philosophy (Ph.D) in Computer Science in the area of Digital Image Processing from Mother Teresa Women's University, Kodaikanal. Previously she worked as Professor/HOD in the Department of Master of Computer Applications, Lord Jegananth College of Engg & Technology. At present she is working as an Assistant Professor in the Department of Computer Applications, Government Arts and Science College, Palkulam, Kanyakumari. She has published many research papers in International Journals and Conferences. She has presented many papers in National and International Conferences. She has attended many Faculty Development Programmes , Seminars, Workshops and Training Courses.

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We welcome suggestions and feedback on the book.

The Authors

ACKNOWLEDGEMENTS

First of all, we thank our GOD ALMIGHTY who has granted countless blessing and knowledge to complete this book successfully.

Next, we would like to thank our family members and friends for their support and understanding for many hours dedicated to this work. No text of this book can be developed without the support of many people. To name them all is impossible. We would also thank ERES publications for their services.

The Authors

CONTENTS

PROGRAMMING IN C

Objective: To obtain knowledge about the structure of the programming language C and to develop the program writing and logical thinking skill.

Unit – I: INTRODUCTION C Declarations:

Character Set – C tokens – Keywords and Identifiers – Identifiers – Constants – Variables – Data types – Declaration of Variables – Declaration of Storage Class – Assigning Values to Variables – Defining Symbolic Constants – Declaring Variable as Constant. Operators and Expressions: Introduction – Arithmetic Operators – Relational Operators – Logical Operators – Assignment Operators – Increment and Decrement Operators – Conditional Operator – Bitwise Operators – Special Operators – Arithmetic Expressions – Evaluation of Expressions – Precedence of Arithmetic Expressions. Managing Input and Output Operations: getchar( ) – putchar( ) – scanf( ) – printf( ).(14L)

Unit – II: CONTROL STRUCTURES

Decision Making and Branching: Decision Making with IF Statement – Simple IF statement – The IF…Else Statement – Nesting of IF…Else Statements – The ELSE IF ladder – The Switch Statement – The? Operator – The GOTO statement. Decision Making and Looping: The WHILE Statement – The DO Statement – The FOR statement. (10L)

Unit – III: ARRAYS

One-dimensional arrays – Declaration of One-dimensional arrays – Initialization of One-dimensional arrays - Two-dimensional arrays – Initialization of Two-dimensional arrays – Multi-dimensional arrays. Character Arrays and Strings: Declaring and Initializing String Variables – Reading Strings from Terminal – Writing Strings to Screen – String Handling Functions. (10L)

Unit – IV: FUNCTIONS

User-Defined functions: Need for User-defined functions – Definition of functions – Return Values and their Types – Function Calls – Function Declaration – Category of functions – No Arguments and No return values – Arguments but No return Values – Arguments with return values – No arguments but a return a value – Recursion – Passing Arrays to functions – Passing Strings to functions – The Scope, Visibility and lifetime of a variables. Structures and Unions: Defining a Structure – Declaring Structure Variables – Accessing Structure Members – Structure Initialization – Arrays of structures –Unions. (14L)

Unit – V: POINTERS AND FILES

Pointers: Understanding pointers – Accessing the Address of a Variable – Declaring Pointer Variables – Accessing a variable through its pointer – Pointer Expressions –Pointers as function arguments. File Management in C: Defining and Opening a file – Closing a File – Input/output Operations on files – Error Handling during I/O Operations. (12L)

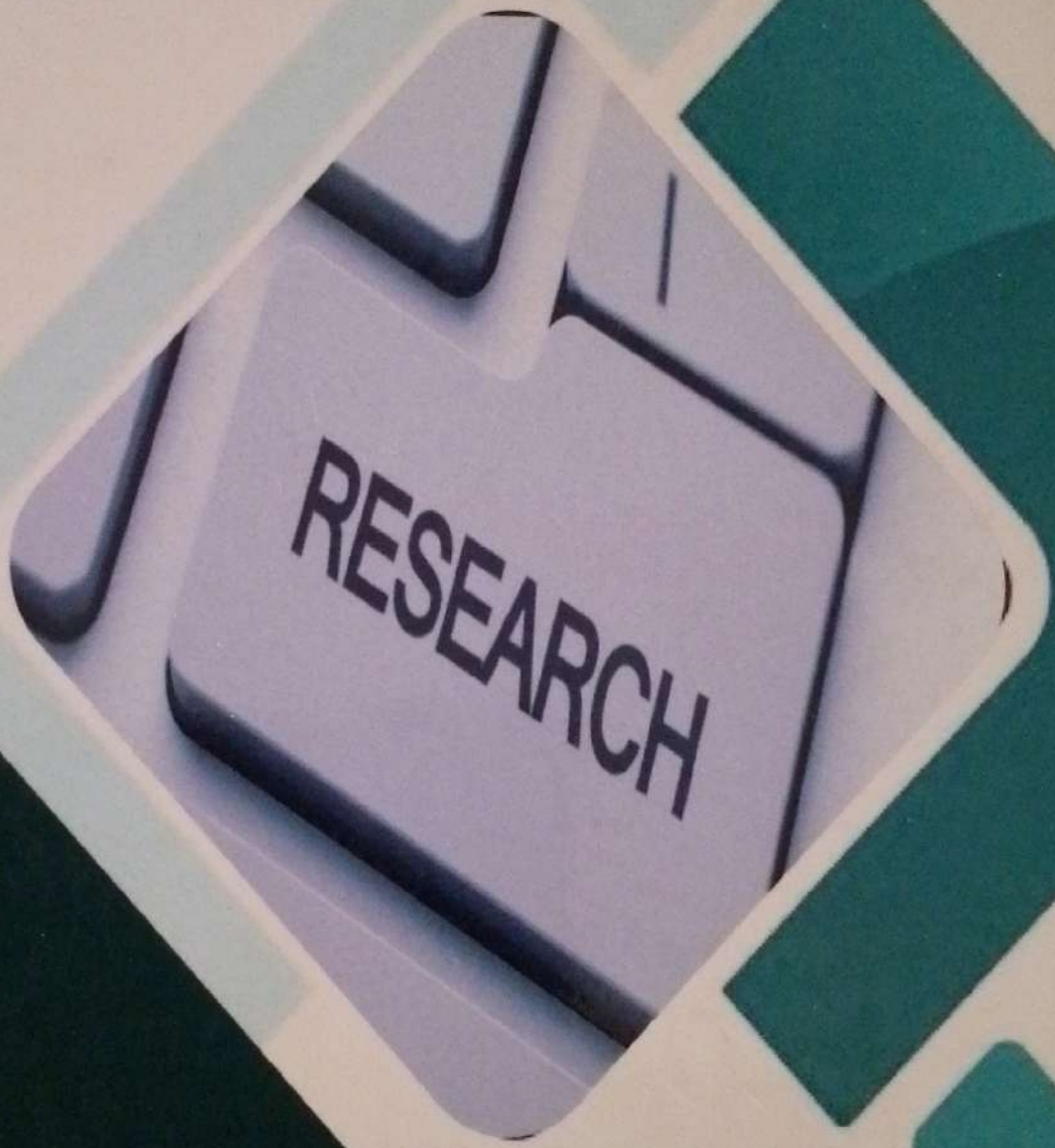
Text Book:

Programming in ANSI C – 6th Edition by E Balagurusamy – Tata McGraw Hill Publishing Company Limited.

C PROGRAMMING - LIST OF PRACTICALS

S. No	Name of the Program
1	Write a program to convert the temperature from Fahrenheit to Celsius.
2	Write a program to test whether the given year is leap year or not.
3	Write a program to read two integers m and n and print the prime numbers in between them.
4	Write a program to evaluate the series ex=1+ x/1!+x2 /2!+…
5	Write a program to arrange the given set of numbers in ascending order.
6	Write a program to read two matrices and to find the sum and product of the matrices.
7	Write a program to check whether a given string is Palindrome or not.
8	Write a program to find Factorial value, Fibonacci, GCD value-Recursion.

Research Methodology



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July 2022

Price : 180 -

ISBN : 978-93-5577-188-9

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ACKNOLDGEMENT

First and foremost, I thank **God Almighty** for his blessing that has made this book work possible.

I'm always grateful to **Rev.Fr.Dr.M.Eckermens Michael**, the secretary, Nanjil Catholic College of Arts and Science, Kaliyakkavilai for his support and encouragement.

I wish to record my sincere thanks to **Dr.A.Meenakshi Sundarajan**, the principal, Nanjil Catholic College of Arts and Science, Kaliyakkavilai for his advisory support.

I also convey my hearty thanks to **Dr.R.Jolly Rosalind Silva**, HOD, Department of commerce Nanjil Catholic College of Arts and Science, Kaliyakkavilai for her help and encouragement for the successful completion of this book.

I express my sincere thanks to my dear friends and my colleagues in the department **Ms.V.Vincy** and **Dr.N.Vinil Kumar** who have always encouraged and supported me.

I thank immensely my husband **Mr.M.D.Raymond Anelin,** my mother **Mrs.N.Saroja** and my daughters **R.S.Annsbert Anelin, R.S.Bensbert Anelin**. Their efforts encouragement, motivation and sacrifice have enabled me to come up to this level. I am deeply indebted forever and remain grateful to them.

I convey my gratitude to **Mr.M.Bharathi, Ms.V.Geetha Priya** and the entire team of Charulatha Publications for having extended immense co-operation in the publication of this book.

Dr.M.SINDHU

SYLLABUS

RESEARCH METHODOLOGY

Objectives

1. To understand the basic concepts of research and its methodologies.
2. To organize and conduct research in a more appropriate manner.

Unit - I

Introduction to Research – Types of Research – Significance of Research –Research methods vs. Methodology – Research – Research process – Criteria of Good Research

Unit - II

Research Design– Meaning of Research design – need for research design – features of a good design – different research designs.

Unit - III

Design of sample surveys– sample design – sample survey Vs census survey – Types of sampling designs – Non probability sampling – probability sampling – Complex random sampling design.

Unit - IV

Data Collection and preparation– Collection of Primary Data – Methods of Collecting Primary Data - Guidelines for Constructing Questionnaire / Schedule- Difference between Questionnaire and schedule - Collection of secondary data – Data Preparation process.

Unit - V

Interpretation and report writing – Meaning of interpretation – techniques of interpretation – precautions in interpretation – significance of report writing – different steps in writing report – layout of the research report – mechanics of writing a research report – precautions for writing research report.

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1

INTRODUCTION TO RESEARCH

Introduction and Meaning of Research

Research in common parlance refers to a search for knowledge. Once can also define research as a scientific and systematic search for pertinent information on a specific topic. In fact, research is an art of scientific investigation.

The Advanced Learner's Dictionary of Current English lays down the meaning of research as "a careful investigation or inquiry especially through search for new facts in any branch of knowledge."

Definition

1) **Redman and Mory** defines research as a —systematized effort to gain new knowledge‖.

2) According to Fred N. **Kerlinger (2004)** scientific research is systematic controlled, empirical &critical investigation of hypothetical propositions about the presumed relations among the natural phenomenon.

3) According to **Kothari (2002)** Research is a systematic investigation to find solution to a problem.

4) According to **John W.Best (2002)** Research may to define as systematic and objective analysis of controlled observations that may lead to development of organizations, principles & possibility ultimate control of events.

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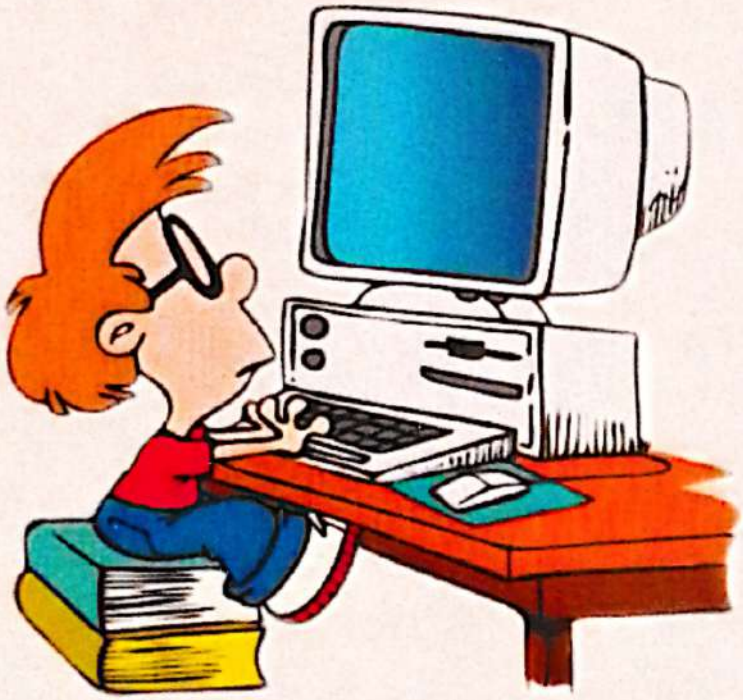

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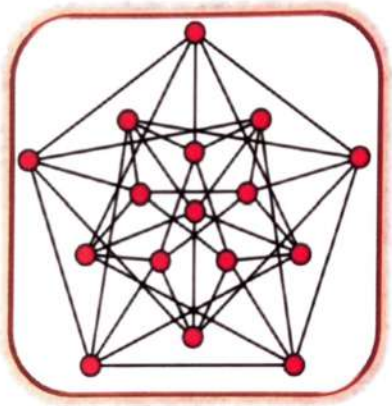

17th February 2023

PROCEEDINGS

ISBN: 978-93-5786-769-6

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Venue: College Seminar Hall

PROGRAMME

REGISTRATION	:	9:00am
INAUGURATION	:	10:00 am - 10:30 am
PRAYER SONG	:	Students
WELCOME ADDRESS	:	Dr.A.Ajitha Head of the dept.,Department of Mathematics.
PRESIDENTIAL ADDRESS	:	Rev. Fr.Dr.M. Eckermens Michael, Secretary.
INAUGURAL ADDRESS	:	Dr. A. Meenakshi Sundararajan Principal.
VOTE OF THANKS	:	Mrs.S.Jerlin Mary Assistant Professor, Department of Mathematics.
TECHNICAL SESSION-I	:	10:30 am – 11.15 am
TOPIC	:	Some New Graph Parameters
RESOURCE PERSON	:	Dr.R. Kala,Professor, Dept of Mathematics, MSU, Tirunelveli.

TEA BREAK	:	11.15 am – 11:30 am
TECHNICAL SESSION-II	:	11:30 am to 12:15 pm.
TOPIC	:	Genus of Graphs
RESOURCE PERSON	:	Dr.T.Asir, Associate Professor, Pondicherry University.
PAPER PRESENTATION	:	12:15 pm – 1:00 pm.
VALEDICTORY SESSION	:	1.00 pm
LUNCH	:	1:30 pm.

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GEODETIC COTOTAL DOMINATION NUMBER OF A GRAPH

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ABSTRACT

In this paper the concept of the geodetic cototal domination number of a graph is introduced. Also, geodetic cototal domination number of some graphs like path graph, complete bipartite graph and some special graphs are studied. It is shown that for any three integers a, b and c such that $3 \leq a \leq b \leq c$, there exists a connected graph G with $g(G) = a$, $\gamma_g(G) = b$ and $\gamma_{gcr}(G) = c$. Also, it is shown that for every pair of integers a, p with $2 \leq a \leq p$, there exists a connected graph G of order p such that $\gamma_{gcr}(G) = a$.

Keywords:

geodetic set, geodetic number, cototal domination number , geodetic cototal domination number.

AMS subject Classification: 05C12.

INTRODUCTION

By a graph $G = (V,E)$ we consider a finite undirected graph without loops or multiple edges. The order and size of a graph are denoted by p and q respectively. For the basic graph theoretic notations and terminology we refer to Buckley and Harary[3]. For vertices u and v in a connected graph G, the distance $d(u,v)$ is the length of a shortest u-v path in G. A u-v path of length $d(u,v)$ is called a u-v geodesic. A geodetic set of G is a set $S \subseteq V(G)$ such that every vertex of G is contained in a geodesic joining some pair of vertices in S [4].

The neighborhood of a vertex v is the set $N(v)$ consisting of all vertices which are adjacent with v. A vertex v is an extreme vertex if a subgraph induced by its neighborhood is complete[5]. A vertex v in a connected graph G is said to be a semi-extreme vertex if $\Delta(< N(v) >) = |N(v)| - 1$. A graph G is said to be semi-extreme graph if every vertex of G is a semi-extreme vertex. An acyclic connected graph is called a tree [3]. A dominating set in a graph G is a subset of vertices of G such that every vertex outside the subset has neighbor in it. The size of a minimum dominating set in a graph is called the domination number of G and is denoted by $\gamma(G)$ [6]. A geodetic dominating set of G is a subset of $V(G)$ which is both geodetic and dominating set of G. The minimum cardinality of a geodetic dominating set is called the geodetic domination number and is denoted by $\gamma_g(G)$. A dominating set $S \subseteq V(G)$ is said to be cototal dominating set if the subgraph $G[V - S]$ induced by $V - S$ has no isolated vertices[1,2,7].

Definition 1. A subset $S \subseteq V(G)$ in a graph G is called a geodetic cototal dominating set if S is both a geodetic set and a cototal dominating set of G . The minimum cardinality of a geodetic cototal dominating set is called the geodetic cototal domination number of G and is denoted by $\gamma_{gct}(G)$.

Example 2. Consider the graph given in Figure 1.

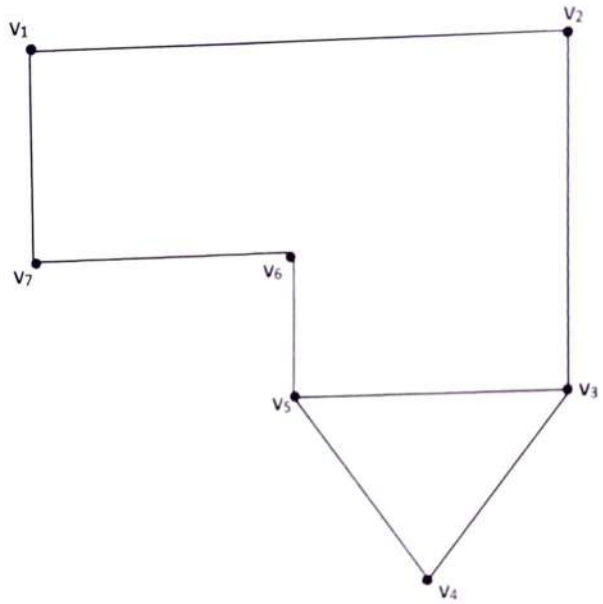

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Figure 1(Example of geodetic cototal domination number)

In the Figure 1, $S = \{v_1, v_4, v_5\}$ is a minimum geodetic cototal dominating set of G and hence $\gamma_{gct}(G) = 3$.

Remark 3. The minimum geodetic cototal dominating set of a graph is not unique.

In a graph given in the Figure 1, $S_1 = \{v_3, v_4, v_7\}$ is also a minimum geodetic cototal dominating set of G.

Result 4. If G is a complete graph of order p then $\gamma_{gct}(G) = p$.

Result 5. If G is a star graph $K_{1,n}$ where $n \geq 1$, then $\gamma_{gct}(G) = n + 1$.

Result 6. If G is a complete bipartite graph $K_{m,n}$ then $\gamma_{gct}(G) = m + n$.

Result 7. If G is a cycle on n ($n \geq 3$) vertices then

$$\gamma_{gct}(G) = \begin{cases} 2 + 2\left\lceil \frac{n-2}{6} \right\rceil & if\ n\ is\ even \\ 3 + 2\left\lceil \frac{n-3}{6} \right\rceil & if\ n\ is\ odd \end{cases}$$

Result 8. If G is a path on n ($n \geq 2$) vertices then

$$\gamma_{gct}(G) = 2 + \left\lceil \frac{n-2}{3} \right\rceil$$

Result 9. If G is a fan graph F_m of order $2m + 1$ then

$\gamma_{gct}(G) = 2m + 1$.

Result 10. If G is a bull graph (as shown in Figure 2) then

$\gamma_{gct}(G) = 3$.

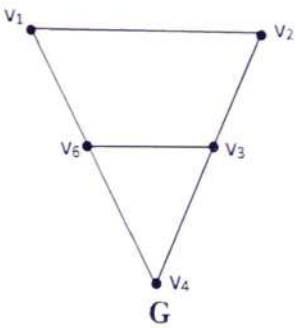

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Figure 2 (Figure for Result 10)

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Result 11. If G is an n- Barbell graph (3- Barbell graph and 4- Barbell graph are shown in Figure 3 and 4 respectively) then $\gamma_{gct}(G) = n - 2$.

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Figure 3 (Figure for Result 11, [3 - Barbell graph])

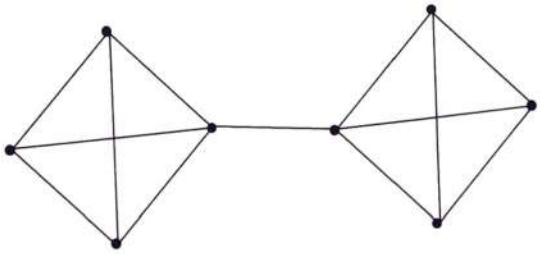

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Figure 4 (Figure for Result 11, [4 - Barbell graph])

REALISATION RESULTS

Theorem 12. For any three integers a, b and c such that $3 \leq a \leq b \leq c$, there exists a connected graph G with $g(G) = a$, $\gamma_g(G) = b$ and $\gamma_{gct}(G) = c$.

Proof.

Case 1. Let $3 \leq a = b < c$.

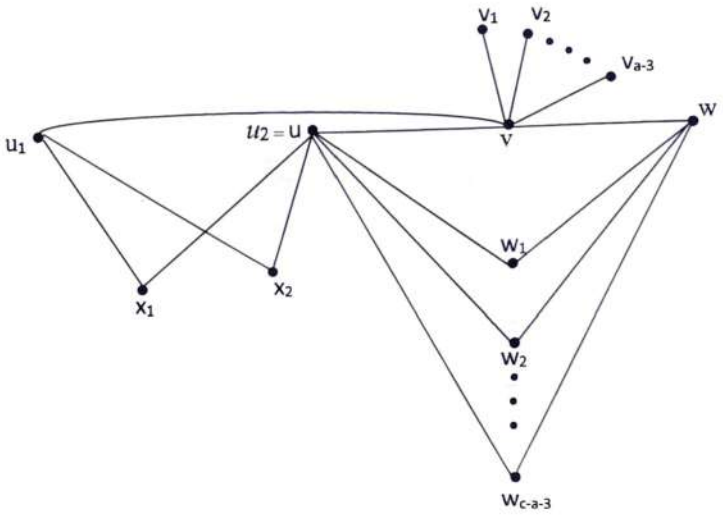

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Figure 5(Figure for case 1 of Theorem 12)

Let $G_1 = K_{2,2}$ be a complete bipartite graph with partite set $U = \{u_1,u_2\}$ and $V = \{x_1,x_2\}$ and let P:u,v,w be a path on three vertices. Let H be a graph obtained from G_1 and P by identifying the vertex u_2 in G_1 with the vertex u on P. We then add a -3 new vertices $v_1, v_2, \ldots v_{a-3}$ to H and join each vertex each vertex vi ($1 \le i \le a - 3$) with the vertex v. Now, we add c - a - 3 new vertices $w_1, w_2, \ldots w_{c-a-3}$ and join each vertex $w_i (1 \le i \le c - a - 3)$ to both the vertices u and w. The resulting graph G is shown in Figure 5.

Let $S_1 = \{v_1,v_2,\ldots,v_{a-3}\}$ be a set of all extreme vertices of G. Then S_1 is a subset of every geodetic cototal dominating set of G. It is clear that S_1 is not a geodetic set of G and so that $g(G) > a - 3$. It is clear that $S_2 = S_1 \cup \{u_1, u_2, w\}$ is a geodetic set of G, so that $g(G) = a$. It is clear that S_2 is a minimum geodetic dominating set of G and so $\gamma_g(G) = a$.

Also, it is clear that $S_3 = S_2 \cup \{x_1, x_2, v, w_1,w_2,\ldots,w_{c-a-3}\}$ is a minimum geodetic cototal dominating set of G, so that $\gamma_{gct}(G) = c$.

Case 2. Let $a + 1 = b < c$.

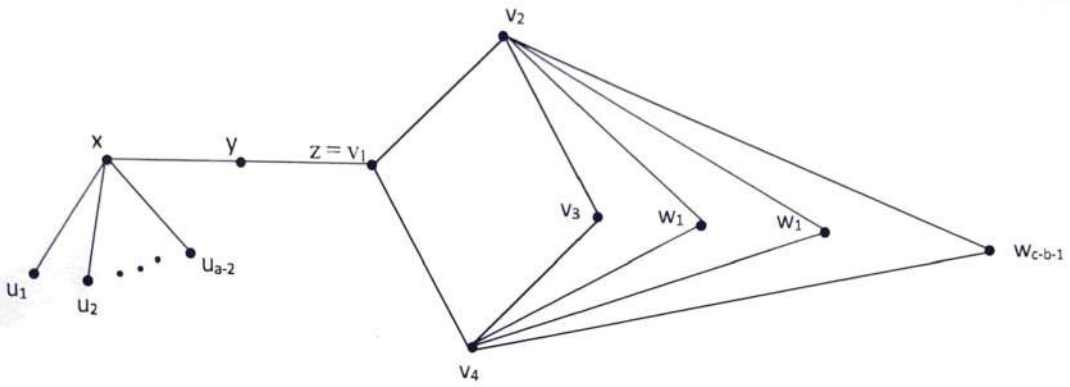

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Figure 6(Figure for case 2 of Theorem 12)

Let C_4: v_1, v_2, v_3, v_4, v_1 be a cycle of order 4 and let P : x, y, z be a path on three vertices. Let H be a graph obtained from C_4 and P_3 by identifying the vertex v_1 in C_4 and the vertex z in P_3. We first add a - 2 new vertices u_1, u_2,…,u_{a-2} to H and join the vertices to the vertex x. We then add c – b – 1 new vertices w_1,w_2,…,w_{c-b-1} and join each vertex $w_i(1 \le i \le c - b - 1)$ to both the vertices v_2 and v_4., there by producing the graph G given in Figure 6.

Let $S_1 = \{u_1,u_2,\ldots,u_{a-2}\}$ be a set of all extreme vertices of G. Then S_1 is a subset of every geodetic set, geodetic cototal dominating set. It is clear that S_1 is not a geodetic set of G and so that $g(G) > a - 2$. It is clear that $S_2 = S_1 \cup \{v_2, v_4\}$ is a geodetic set of G, so that $g(G) = a$. It is clear that S_2 is not a minimum geodetic dominating set of G and therefore $S_3 = S_2 \cup \{z\}$ is a minimum geodetic dominating set of G and so $\gamma_g(G) = a + 1 = b$. Also, it is clear that $S_4 = S_3 \cup \{v_3,w_1,w_2,\ldots,w_{c-b-1}\}$ is a minimum geodetic cototal dominating set of G, so that $\gamma_{gct}(G) = c$.

Case 3. Let $a + 2 \le b < c$.

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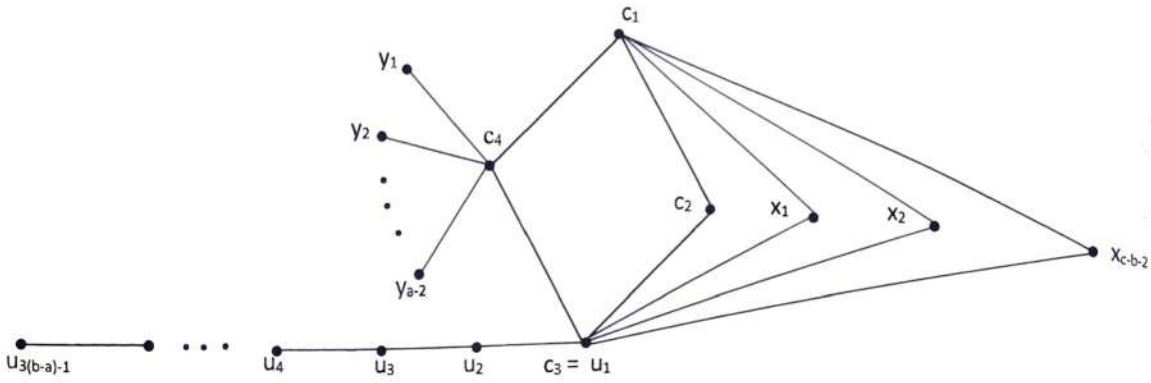

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Figure 7(Figure for case 3 of Theorem 12)

Let C_4: c_1, c_2, c_3, c_4, c_1 be a cycle of length four and P: $u_1,u_2,\ldots,u_{3(b-a)-1}$ be a path on $3(b-a) - 1$ vertices. Let H be a graph obtained from C_4 and P by identifying the vertex c_3 in C_4 and the vertex u_1 in P. We add $a - 2$ new vertices $\{y_1,y_2,\ldots,y_{a-2}\}$ to H and join the vertices to the vertex c_4 of C_4. Then we add $c - b - 2$ new vertices $\{x_1, x_2,\ldots,x_{c-b-2}\}$ and join the vertices to both the vertices c_1 and c_3, there by producing the graph G given in Figure 7.

Clearly $S_1 = \{c_1, u_{3(b-a)-1}, y_1, y_2,\ldots,y_{a-2}\}$ is a minimum geodetic set of G and so $g(G) = a$. Let $S_2 = S_1 \cup \{u_1, u_4,\ldots,u_{3(b-a)-2}\}$ and clearly the set S_2 is a minimum geodetic dominating set of G and therefore $\gamma_g(G) = b$. Also, it is clear that $S_3 = S_2 \cup \{c_2, c_4, x_1, x_2,\ldots,x_{c-b-2}\}$ is a minimum geodetic cototal dominating set of G so that $\gamma_{gct}(G) = c$.

Theorem 13. For every pair of integers a, p with $2 \leq a \leq p$, there exists a connected graph of order p such that $\gamma_{gct}(G) = a$.

Proof. Let u, v, w, v_1, u be a cycle on four vertices. Take a copy of star $K_{1,a-1}$ with leaves $u_1,u_2,\ldots,u_{a-1}$ and the support vertex w. Add the new vertices $v_1,v_2,\ldots,v_{n-a-2}$ and join each v_i $(1 \leq i \leq n - a - 2)$ with both the vertices u and w, there by obtaining the graph G in Figure 8.

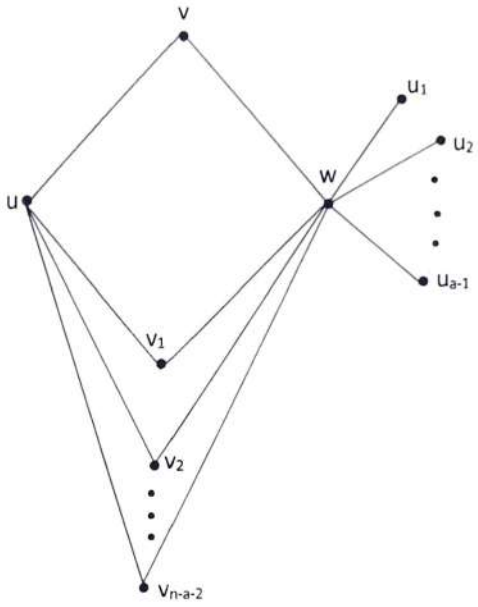

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Figure 8 (Figure for Theorem 13)

Consider a set $S_1 = \{u, u_1, u_2,\ldots,u_{a-1}\}$. Clearly, S_1 is a minimum geodetic cototal dominating set of G. Hence $\gamma_{gct}(G) = a$.

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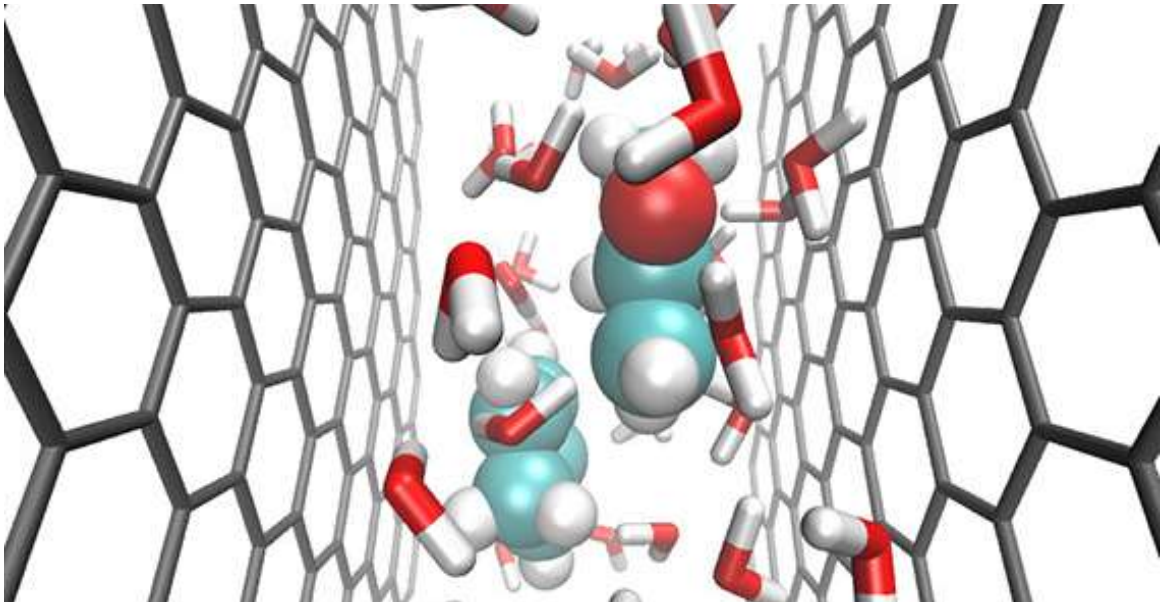
FIFTH NATIONAL CONFERENCE ON ADVANCED MATERIALS NCAM -2023



Conference Proceeding
By

Dr. M. Amalanathan M.Sc, M.Phil, Ph.D.
Dr. N. Suma, M.Sc, M.Phil, Ph.D

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DEPARTMENT OF PHYSICS

Nanjil Catholic College of Arts and Science
Kaliyakkavilai

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ADVANCED MATERIALS

(NCAM-2023)

March 25, 2023

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Proceedings of Fifth National Conference on Advanced Materials (NCAM-2023)

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Printed & Published by Anson Publications

First Published in 2023

ISBN: 978-81-962422-0-6

Price **Rs.300/-**

For Copies please contact:

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25th March 2023

PROGRAMME SCHEDULE

8.30 am to 9.30 am	-	***Registration***
9.30 am to 10 am	-	***Inaugural Session***
Tamil Thai Vazhthu	:	Department Choir
Welcome Dance	:	Ms. M.U.Ariya, II B.Sc. Physics
Lighting the Lamp		
Welcome Address	:	Dr. M. Amalanathan,HOD, Dept. of Physics, NACCAS
Presidential Address	:	Rev.Fr. Dr.M.Eckermens Michael, Secretary, NACCAS
Inaugural Address	:	Dr. A. Meenakshisundararajan, Principal, NACCAS
Releasing the Conference Proceeding	:	Rev.Fr. Dr.M.Eckermens Michael, Secretary, NACCAS
Honouring the Rank Holders	:	
10.30 am to 12.30pm	-	***Technical Session***
Introducing the Chief guest	:	Mrs. V. Beena, Asst. Prof., Dept. of Physics, NACCAS
Invited Talk 1	:	**Dr. I. HUBERT JOE** Head, Department of Nanoscience and Nanotechnology, University of Kerala, Kariavattom Campus, Thiruvananthapuram.
Introducing the Chief guest	:	Dr. T. R. Jeena, Asst. Prof., Dept. of Physics, NACCAS
Invited Talk 2	:	**Dr. SATHISH A.V** Officer in charge, Nuclear Information Centre, Kudankulam, Nuclear Power Project, Tirunelveli
12.30 pm to 1.15pm	-	***Lunch Break***
1.15 pm onwards	-	***Presentation Session***
Oral & Poster presentation		
3 pm	-	***Tea Break***
3.15 pm to 4pm	-	***Valedictory Session***
Valedictory Address	:	Rev. Fr. A. Domi Lilil Raja, Bursar, NACCAS
Distribution of Certificates	:	Rev. Fr. A. Domi Lilil Raja, Bursar, NACCAS
Vote of Thanks	:	Dr. N. Suma,Asst. Prof., Dept. of Physics, NACCAS
		National Anthem

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18. A computational and Topological analysis of Gallic acid doped Silver using DFT method (J. Jeni James[1], M. Amalanathan[2])

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37. Synthesis and characterization of titanium oxide (Blessy S.S[1], Dr. S. Murugavel[2])

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40. Computational investigation, on optimized structure with topological parameters (ELF, LOL) of 5-(4-isopropoxy-3-methoxyphenyl)-3-methyl-4,5-dihydro-1H-pyrazole-1-carbaldehyde.(P.M. Banisha[1], R. Febiline Seles[2], M. Amalanathan[3])

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48. The structural and topological analysis of 5- (4-Butoxy-3-Methoxyphenyl)-3Methyl-4, 5-Dihydro-1H-Pyrozole-1-Carbaldehyde using DFT method (Aarathy.B.krishna[1], S. Sijana[2], M. Amalanathan[3])

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50. Growth and XRD characterization of pure L. Threonine single crystal (Subi.S.K[1], Dr.Antony Dominic Christopher[2])

51. Growth and XRD characterization of $MgSO_4$ doped L. Threonine single crystals with the ratio 0.002 (Aiswariya M U[1], Dr. Antony Dominic Christopher[2])

52. Growth and XRD characterization of pure $MgSO_4$ single crystal (Vinithra.R.A[1], Dr. Antony Dominic Christopher[2])

53. Growth and XRD characterization of $(C4H9NO3)_{0.5}$ $(MgSO4)_{0.5}$ mixed crystal (Jeni. J. T[1], Dr. Antony Dominic Christopher[2])

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55. Solar wind observed by ACE (R.Punitha Kevisha[1], Dr.S.S.Bidhu[2])

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57. Kodaikkanal solar observatory (Anchu.S[1], Dr.Bidhu S.S[2])

OP-13	**Spectroscopic and Quantum Chemical Computation on Molecular Structure, AIM, ELF, RDG Of 4-Cumene: A DFT Approach**

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[2]Department of Physics & Research Centre, Nesamony Memorial Christian College, Marthandam- 629165, TamilNadu, India.
corresponding mail id: aruldhas@nmcc.ac.in

Abstract

The structural, vibrational, electronic, and nonlinear optical properties of 4-cumene (4CM) were obtained using spectral methods and density functional theory calculation. By using density functional theory (DFT) using B3LYP method with 6-31 G(d,p) basis sets. Intra-molecular hydrogen bonding interaction was examined through reduced density gradient plot. Molecular electrostatic potential were also performed. Wave functional study like electron localization functions were analyzed. Bader's theory of atoms-in-molecule conjointly with natural bond orbital have been analyzed. The natural bond orbital (NBO) analysis enabled in comprehending the stability and charge delocalization in the title molecule. The first hyperpolarizability which is an important parameter for future studies of nonlinear optics (NLO) was calculated to check the potential of the molecule to be an NLO material.
Keywords: DFT, RDG, NLO, AIM.

OP-14	**Synthesis And Characterization Of Nickel Oxide (Nio) Nanoparticles Using Carica Papaya Leaves**

A. Benifa, Dr. A. Darlin Mary [1], M. Amalanathan [2] .

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Abstract:

Nanoscience and nanotechnology represent an expanding researcharea, which involves structures, devices, and systems with novelproperties and functions due to the arrangement of their atoms onthe 1-100 nm scale. In this study, the nickel Oxide (NiO) nanoparticles were successfully synthesized by green synthesis method using Nickel Nitrate as the precursor, mediated by Carica Papaya leaves. The prepared sample is characterized for XRD, UV and FTIR characterization. The structure of the sample was identified using XRD and the crystals were found to be in good crystalline nature and the average size was about 46 nm. The energy band gap value was also calculated from the UV spectrum. The use of medicinal plants indicates the particles are combining well with the medium added and showed a stunning effect. The prepared Nickel Oxide (NiO) nanoparticles showed an excellent larvicidal activity.
Key Words: Nano, Nickel oxide nanoparticles, green synthesis, carica papaya.

OP-15	Vibrational Spectra and DFTstudy of anticancer molecule Orotic Acid

Sukanya R[1, 2], D. Aruldhas[2]
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Abstract

Molecular structure, FT-IRand FT-Raman spectra of Orotic acid have been computed by density functional theory using B3LYP/6-311++G(d,p) basis set.Theexperimentalvibrationalfrequencies are compared with the calculated vibrational frequencies and they are in good agreement with each other. Natural bond orbital (NBO)analysis reveals the hyper conjugative interaction and the possible interactions. The lowering ofHOMO-LUMOenergy shows the possibilities of intra molecular charge transfer interaction and leads to the anticancer activity of the molecule. AIM analysis reveals the covalent nature of the molecule. The low value of binding energy shows the anticancer property of the drug is obtained through docking analysis.
Keywords: Molecular Structure**;** DFT Computation; Natural Bond Orbital analysis; Homo- Lumo; Molecular Docking,

OP-16	Molecular structure, Frontier molecular orbital and Topological analysis of orotic acid

S.Sijana[1], M. Amalanathan [2]

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[1,2] Affilated to Manonmanium Sundararnar University Tirunelveli, Tamil Nadu, India.

Abstract
The optimized parameters of orotic acid were determined by utilizing density functional method at B3LYP/6-31G level of theory. The intra and intermolecular interactions which exist within these compounds were analyzed by different methods namely the topological analysis ELF, LOL and the reduced gradient of the density. These approaches make it possible in particular to study the properties of hydrogen bonds. The highest occupied molecular orbital and the lowest unoccupied molecular orbital energy levels were constructed and the corresponding frontier energy gaps were determined to realize the charge transfer within the molecule. The densities of state diagrams were determined to calculate contributions to the molecular orbitals. The molecular electrostatic potential surfaces are determined to give a visual representation of charge distribution of these ligands and to provide information linked to electrophilic and nucleophilic sites localization.
Keywords: Orotic acid, DFT calculation, HOMO, LUMO, ELF, RDG

OP-17	DFT Studies And Topological Analysis of 1 Acetyl -2-(4-Butoxy-3-Methoxyphenyl) Cyclopropane

Jothy Jisha B.R [1], M. Amalanathan [2]

[1] Research Scholar, Department of Physics, Nanjil Catholic College of Arts and Science,Kaliyakkavilai, Kanyakumari, Tamil Nadu, India.
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[1,2,3] Affilated to Manonmanium Sundararnar University Tirunelveli, Tamil Nadu, India

Abstract:

Theoretical quantum chemical calculations of 1 acetyl -2-(4-butoxy-3-methoxyphenyl) cyclopropane have been carried out by density functional theory method. The optimized geometrical parameters were computationally obtained at the DFT/B3LYP level of theory.Mulliken population analysis was performed on the atomic charges were calculated.The electron distribution and reactive site on the surface of the molecule are analysed using ELF and LOL analysis.. The interpreted HOMO and LUMO energies indicate the chemical stability of the molecule.The obtained results indicates that the compound possess good kinetic stability.

Key words: DFT, HOMO-LUMO, Mulliken,

OP-18	A Computational And Topological Analysis Of Gallic Acid Doped Silver Using DFT Method

J. Jeni James[1], M. Amalanathan[2]

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[1,2]Affilated to ManonmaniamSundaranar University Tirunelveli, Tamil Nadu, India.

Abstract

Gallic acid, a natural phenolic compound present in medicinal plants has been reported to possess several health benefits. In the present study gallic acid is optimized on the basis of DFT calculations using B3LYP/6-311++G(d,p) and LANL2DZ for silver atom. Molecular electrostatic potential (MEP) surface was plotted over the geometry to elucidate the reactivity of the molecule. The limits of electrostatic potential are found to be $-8.060e^{-2}$ and $+8.060e^{-2}$. The Mulliken and natural atomic charge distributions were also computed. A comparison of HOMO-LUMO energy calculation before and after doping of silver has been done and it shows the charge transfer within the molecule. The nature of the molecule including electron distribution and reactive sites has been analyzed using Electron Localization Function (ELF) and Localized Orbital Locator (LOL).

Keywords: LANL2DZ, silver, ELF, LOL, MEP

OP-19	**Computational and Topological Analysis Of Acethyl 2(3-Methoxy -4 Propoxy Phenyl) Cyclopropane.**

R. Febiline Seles[1], M. Amalanathan[2]

[1]Research Scholar, Department of Physics, Nanjil Catholic College of Arts and Science, Kaliyakkavilai, Kanyakumari, Tamil Nadu, India.
[2]Assistant Professor, Department of Physics, Nanjil Catholic College of Arts and Science, Kaliyakkavilai, Kanyakumari, Tamil Nadu, India.
[1,2]Affiliated to Manonmaniam Sundaranar University Tirunelveli, Tamil Nadu, India.

Abstract:
In this study, the density functional theory (DFT) technique was used to investigate the compound Acethyl 2(3-Methoxy -4 Propoxy Phenyl) Cyclopropane. The input wavefunction files were generated by Gaussian 09W software using B3LYP/6-311++G(d,p) as the basis set.The molecular structure of the title compound was optimized. The interpreted HOMO and LUMO energies of the molecule is generated and analysed. The softness and electrophilicity indices were determined.Mulliken's net charges have been calculated and compared with the atomic natural charges.The topological analysis of the electron localization function (ELF) and localized orbital locator (LOL) are interpreted using wave function analyzer, multiwfn 3.7.
Keywords: DFT, HOMO, LUMO, Mulliken.

OP-20	**Synthesis And Characterization Of Silver Doped Zinc Selenide Nanoparticles For Photocatalytic Activity**

V.Beena[1], S.L. Rayar[2], S. Ajitha[1]

[1]Research Scholar, Department of Physics, Nanjil Catholic College of Arts and Science, Manonmaniam Sundaranar University, Kanyakumari-629 153
[2]Department of Physics, St. Judes College, Thoothoor, Kanyakumari-629 176

Abstract:
Environmental pollution is major pollution in the world. The pollution can be eliminated by using nanomaterials. The current work reports on the synthesis of Ag-doped ZnSe nanoparticles and their photocatalytic dye degradation. The noble metal doped nanomaterials attained much focus for their specific altitude towards wastewater treatment. The noble metal substitute by ZnSe lattice was confirmed by x-ray diffraction and electron microscopic analysis. The valency of the silver, zinc and selenium were measured by XPS. The bandgap values of the Ag-doped ZnSe nanoparticles indicate the mobility of photocarriers. Methyl Orange degradation is achieved for 86% for 120 min visible light irradiation.. The plasmonic doped zinc selenide NP's most suitable material for the environmental remediation process.
Keywords: Photocatalysis, ZnSe, MO, Visible light.

OP-25	**Spectroscopic profiling, Topology Analysis, and Charge Transfer Excitation of ethyl-4-(3-phenylureido) benzoate**

B.S. Arun Sasi [a] , A. R.Twinkle [b] , C .James [c]

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Abstract
Recently compounds of urea derivatives and phenyl urea derivatives are reported to have strong antibacterial and antimicrobial activity. In this paper we present the antibacterial evaluation of ethyl-4-(3-phenylureido) benzoate along with spectral and Quantum Chemical characterization. This study provides a complete vibrational spectroscopic investigation on the molecule to give a detailed assignment of the fundamental bands in FTIR and FT Raman spectra on the basis of calculated PED and electronic analysis under both theoretical and experimental background. In title compound, C 1 -H 7 (1.076 Å) contracts while comparing to another C-H bond lengths in phenylring1 is due to the influence of strong C 1 -H 7 …O 15 intramolecular hydrogen bonding interaction as supported by NBO analysis. The ρ(r)value for all the C-H bonds in the molecule except for C 1 -H 7 is 0.29. But for C 1 -H 7, the value is 0.30. This slight increase in the value also confirms the noncovalent interaction of H 7 with O15. The up-shifted carbonyl stretching as well as the presence of an infrared inactive but Raman active overtone transition at the carbonyl stretching region, the blue-shifted NH bending modes and the occurrence of multiple bands in the NH stretching region were evidently confirmed the possibility of N- H···O=C bond formations in the solid phase.

OP-26	**Molecular Structure and Spectral Investigation Of NLO Material 2 -Amino 3 -Nitro Pyridine by Density Functional Theory Methods**

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Abstract
Nonlinear optical (NLO) materials showing second harmonic generation (SHG) have been in demand over the last few decades due to technological importance in the fields of optical communication, signal processing, and instrumentation. In the search of new non-linear optical (NLO) materials compared to inorganic materials organic counterparts have high Second Harmonic Generation(SHG) efficiency. Quantum mechanical calculation is an effective tool to study the molecular behavior. 2 -Amino 3 -Nitro Pyridine an efficient NLO material is analyzed quantum mechanically by ab initio and Density Functional(DFT) method. The first order hyperpolarizability of the molecule is calculated and the large value of hyperpolarization along z direction shows a substantial delocalization of charges in these directions. Highest Occupied Molecular Orbital (HOMO) energy and Lowest Unoccupied Molecular (LUMO) energy were calculated and molecular energy gap also calculated. This HOMO is mainly localized on the amino group so that its energy is indicative of the donating character and LUMO is localized on Pyridine group.

Keywords: Optimized geometry, DFT, NLO, NBO. HOMO-LUMO

OP-27	**Thermal Performances and Characterization of nano Cobalt– Chromium Coated Solar Air Heating System**

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Abstract
Recently compounds of urea derivatives and phenyl urea derivatives are reported to have strong antibacterial and antimicrobial activity. In this paper we present the antibacterial evaluation of ethyl-4-(3-phenylureido) benzoate along with spectral and Quantum Chemical characterization. This study provides a complete vibrational spectroscopic investigation on the molecule to give a detailed assignment of the fundamental bands in FTIR and FT Raman spectra on the basis of calculated PED and electronic analysis under both theoretical and experimental background. In title compound, C 1 -H 7 (1.076 Å) contracts while comparing to another C-H bond lengths in phenylring1 is due to the influence of strong C 1 -H 7 …O 15 intramolecular hydrogen bonding interaction as supported by NBO analysis. The ρ(r)value for all the C-H bonds in the molecule except for C 1 -H 7 is 0.29. But for C 1 -H 7, the value is 0.30. This slight increase in the value also confirms the noncovalent interaction of H 7 with O15. The up-shifted carbonyl stretching as well as the presence of an infrared inactive but Raman active overtone transition at the carbonyl stretching region, the blue-shifted NH bending modes and the occurrence of multiple bands in the NH stretching region were evidently confirmed the possibility of N- H···O=C bond formations in the solid phase.

OP-28	**Spectroscopic and molecular structure investigation of 2amino-4,6-dimethoxy pyrimidineherbicide**

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Abstract Extensive spectroscopic investigations along with theoretical quantum chemical studies on 2amino-4,6-dimethoxy pyrimidine have been consummated. The geometry has been optimized at B3LYP level of the theories with 6-311G(d,p) basis set using Gaussian '09 program package. FT-IR and FT-Raman spectra in solid state were observed in the region 400–4000 cm^{-1} and 50–3500cm^{-1} respectively. Potential energy surface (PES) scanning with six dihedral angles is performed to identify the stable conformer and to discover the herbicidal active region. The NBO analysis showed the intramolecular C-H…O and C-H…N hydrogen bonds in the crystal structure of 2amino-4,6-dimethoxy pyrimidine. The natural charges and the HOMO-LUMO energy gap were also calculated. As a result, the optimized geometry and calculated spectroscopic data show a good agreement with the literature value.

Key words: FT-IR, FT-Raman, NBO, HOMO-LUMO

OP-31	Molecular structure, Vibrational and Topology ann Analysis of 1-Acethyl 2(3-Methoxy -4 Proporxy Phenyl) Cyclopropane

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Abstract

Quantum chemical computations are excellent methods in the design of biological and pharmcetical molecules and help to predict some properties of the new materialsThe present works deals with the vibrational spectra and the molecular structural analysis of 1-Acethyl 2(3-Methoxy -4 Proporxy Phenyl) Cyclopropane have been analyzed. The equilibrium geometry, harmonic vibrational wavenumbers of 1-Acethyl 2(3-Methoxy -4 Proporxy Phenyl) Cyclopropane investigated with the help of density functional theory (DFT) method. The calculated vibrational are well agreement with experimental spectra. The value of HOMO-LUMO energy was also calculated, it confirm its Charge transfer interation and the bio activity of the molecule. The possible interaction present in the molecule is analyzed using Natural Bond Brbital (NBO) analysis. The mulliken and natural charge of the compound were calculated and analyzed

Keywords: DFT, Optimized geometry, NBO, HOMO-LUMO, Biomaterial

PP-01	Synthesis And Characterization Of Zinc Oxide Nanoparticles

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Abstract

In the present study,ZnO nano particles were prepared by SOL-GEL method. The prepared sample was characterized by X-ray diffraction technique. The XRD study confirmed that the synthesized samples are Zinc oxide nano particles. Ultraviolet spectroscopic studies proved that the prepared sample act like a semiconducting material. Nano size of the sample was confirmed by scanning electron microscopy technique.

Keywords: Zinc oxide, X-ray Diffraction, SEM, Nano particles.

PP-02	Coronal Mass Ejection and their Effects During Solar Cycle 24

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Abstract:
Coronal mass ejection (CME) is a significant ejection of magnetic field and accompanying plasma mass from the sun's corona into the heliosphere. The study of CME and their heliospheric consequences are done by the Large Angle and Spectrometric Coronagraph (LASCO) instrument of Solar and Heliospheric Observatory (SOHO). The relationship between CMEs and other energetic phenomena helps to understand the impact of CMEs on the heliosphere. SOHO/LASCO CMEs were obtained from the LASCO catalogue during the solar cycle 24. Solar wind linear speed and its angular width determines the nature of CMEs. In Cycle-24 CMEs expand anomalously due to the reduced ambient pressure. The property such as linear speed of CME was analysed during solar cycle 24. It had prominent relation with 24th solar cycle.
Keywords: CME, Solar cycle, Solar wind.

PP-03	Preperation And Energy Dispersion Analysis X-Ray Study Of Zinc Oxide Nanoparticles

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Abstract:
In the present study, ZnO nano particles were prepared by SOL-GEL method. The prepared sample was characterized by energy dispersive analysis of X-ray (EDAX). The EDAX study confirmed that the synthesized samples are zinc oxide nano particles. Fourier transform infrared spectroscopic studies proved that thecharacteristic peak is related with the zinc oxide vibration. The prepared nano particles act like a semiconducting material. Nano size of the sample was confirmed by scanning electron microscopy technique.
Keywords: Nano particle, Zinc oxide, Scanning Electron Microscope, Energy Dispersive Analysis of X-ray.

PP-04	Preperation and Energy Dispersion Analysis X-Ray Study of Titanium Oxide Nano Particles

Santhiya D[1], Dr.S Murugavel[2]
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Abstract:
In the present study, TiO_2 nano particles were prepared by SOL-GEL method. The prepared sample was characterized by energy dispersive analysis of X-ray (EDAX). The EDAX study confirmed that synthesized samples are Titanium dioxide nano particles. Fourier transform infrared spectroscopic studies proved that thecharacteristic peak is related with the metal oxide vibration. The prepared nano particles act like a semiconducting material.Nano size of the sample was confirmed by scanning electron microscopy technique.
Keywords: Nano particle, Titanium oxide, Scanning Electron Microscope, Energy Dispersive Analysis of X-ray

PP-05 Solar Magnetic Field Observations During Solar Cycle 25

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Abstract

In February 2006, NASA will launch the twin STEREO spacecraft from Kennedy Space Center aboard a Delta 7925 launch Vehicle. The purposes of the Mission are to understand the causes and mechanisms of coronal mass ejection initiation and to follow the propagation of CMEs through the heliosphere. Additionally, STEREO will study the mechanisms and sites of energetic particle acceleration and develop 3D time-dependent models of the magnetic topology, temperature, density and velocity of the solar wind between the Sun and Earth. The SECCHI suite of instruments includes two white light coronagraphs covering the range from 1.4 to 15 solar radii, an extreme ultra violet imager covering the chromosphere and inner corona, and two heliospheric white light imagers covering the outer corona from 12 Solar radii to 1 AU. The SECCHI data were collected and detailed study of solar wind was done. Interpreting these, the features of solar wind was predicted.

Keyword: Solar Wind, Secchi, Solar Cycle

PP-06 Synthesis And Characterization Of Titanium Oxidenanoparticles

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Abstract

In the present study, TiO_2 nano particles were prepared by SOL-GEL method. The prepared sample was characterized by X-ray diffraction technique. The XRD study confirmed that the synthesized samples are Titanium dioxide nano particles. Ultraviolet spectroscopic studies proved that the prepared sample act like a semiconducting material. Nano size of the sample was confirmed by scanning electron microscopy technique.

Keywords: Titanium oxide, X-ray Diffraction, Scanning Electron Microscope, Nanoparticle.

PP-07 Synthesis And Functional Group Analysis Of Pure And Mg Doped Zinc Oxide Nanoparticles Using Co-Precipitation Method

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ABSTRACT

Pure and Mg doped ZnO nanoparticles are synthesized by co-precipitation method. The prepared nanoparticles were characterized by Fourier Transform Infrared Spectroscopy (FTIR). The metal oxide formation and phase purity of the prepared samples were confirmed using FTIR analysis. The band corresponding to pure ZnO formation is found around 444.54 cm^{-1}.

Keywords: ZnO nanoparticles, FTIR, Co-precipitation.

PP-08	New Insight Into The Solar Wind

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Abstract

The Parker Solar Probe is the first spacecraft to fly into the low solar corona. It will assess the structure and dynamics of the Sun's coronal plasma and magnetic field, the energy flow that heats the solar corona and impels the solar wind, and the mechanisms that accelerate energetic particles. FIELDS measures waves and turbulence in the inner heliosphere with high time resolution to understand the fields associated with waves, shocks and magnetic reconnection, a process by which magnetic field lines explosively realign. SWEAP (Solar Wind Electrons Alphas and Protons). This investigation will count the electrons, protons and helium ions, and measure their properties such as velocity, density, and temperature. Findings: PSP observed switchbacks traveling disturbances in the solar wind that caused the magnetic field to bend back on itself. On November 6, 2018, Parker Solar Probe observed first magnetic switchbacks – sudden reversals in the magnetic field of the solar wind. They were first observed by the NASA-ESA mission Ulysses, the first spacecraft to fly over the Sun's poles. These data were analyzed and the significant features were found out

Keyword: Solar Wind, FIELDS, SWEAP

PP-09	Computational Investigation, On Optimized Structure With Topological Parameters (ELF, LOL) Of 5-(4-Isopropoxy-3-Methoxyphenyl)-3-Methyl-4,5-Dihydro-1H-Pyrazole-1-Carbaldehyde.

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Abstract

In the present work, a theoretical investigation on the properties of 5-(4-isopropoxy-3-methoxyphenyl)-3-methyl-4,5-dihydro-1H-pyrazole-1-carbaldehyde is reported. The optimized geometry of the molecule have been computed using the density functional theory. This is calculated by B3LYP method using 6-311++G(d,p) as a large basis set. The HOMO and LUMO analysis is used to determine the charge transfer within the molecule. The calculated geometrical parameters are in agreement with that of similar derivatives. Molecular electrostatic potential was performed by DFT method. The softness and electrophilicity indices for selected atomic sites were determined.Mulliken's net charges have been calculated and compared with the atomic natural charges. Furthermore, topology analysis of electron localization function (ELF) and localized orbital locator (LOL) theories were analysed using wavefunction analyzer, multiwfn 3.7.

Keywords: HOMO- LUMO, DFT calculation, ELF, LOL, Optimized geometry.

PP-10	**The structural and topological analysis of 5-(4-ethoxy-3-methoxyphenyl)-3-methyl-4, 5-dihydro-1H-pyrazole-1-carbaldehyde by DFT method.**

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Abstract:

The aim of this study is to find out the molecular characteristic and structural parameters that govern the chemical behaviour of a new 5-(4-ethoxy-3-methoxyphenyl)-3-methyl-4, 5-dihydro-1H-pyrazole-1-carbaldehyde compound. Density functional theory was used to understand the structural and electronic properties of the receptor. B3LYP with the 6-311++G (d, p) basis set produces the optimized molecular structure of the title molecule. In addition, global chemical reactivity descriptors, Molecular Electrostatic Potential map (MEP), Frontier Molecular Orbitals (FMOs) and Mulliken population analysis has also been studied. Moreover, we not only simulated Frontier Molecular Orbitals (FMOs) and the Molecular Electrostatic Potential (MEP) but evaluated the transition state and energy band gap. The frontier energy gap value reveals the chemical reactivity and intermolecular charge transfer occur between the molecules. Multiwave function analysis like ELF (Electron Localisation Function) and LOL (Localized Orbital Locator) are analyzed.

Keywords: DFT, HOMO-LUMO, Mulliken, MEP, RDG.

PP-11	**Dft Investigations On The Structural And Electronic Properties Of 5-(3,4-Dimethoxy Phenyl)-3-Methyl-4,5-Dihydro-1 H -Pyrozole -1-Carbaldehyde**

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Abstract

The molecular geometry of 5-(3,4-dimethoxy phenyl)-3-methyl-4,5- dihydro-1 H -pyrozole -1-carbaldehyde was optimized by density functional theory (DFT) method with B3LYP hybrid functional and 6-31G(d,p) basis set . The structural parameters like bond lengths, bond angles, and dihedral angles were obtained from the optimized molecular geometry and discussed. Frontier molecular orbital (HOMO-LUMO) energies, molecular electrostatic potential as well as Mulliken charges were calculated by DFT method. The obtained results indicates that the compound possess good kinetic stability. Topological analysis such as Electron Localization Function (ELF) and Localized Orbital Locator (LOL) has been performed to understand the nature of the molecule.

Keywords: DFT, ELF, HOMO-LUMO.

PP-12	**Exploring 5-(4 hydroxy-3-methoxy phenyl)-3 methyl-4,5 dihydro-1H-pyrazole-1-carbaldehyde by electronic, ELF, LOL, RDG analysis using DFT method.**

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Abstract

Density functional theory (DFT) finds increasing use in applications related to biological systems. In the present contribution, we provide an overview of the properties that can be calculated with DFT, such as geometries, energies and reaction mechanisms. To understand the structural behaviour of 5-(4 hydroxy-3-methoxy phenyl)-3 methyl-4,5 dihydro-1H-pyrazole-1-carbaldehyde, a detailed computational study has been taken up. The molecular structure has been optimized by using the B3LYP/6–311 ++G (d,p) calculations. The interpreted HOMO and LUMO energies indicate the chemical stability of the molecule. The chemical reactivity sites have been revealed by molecular electrostatic potential (MEP) analysis. Furthermore MEP, HOMO– LUMO and Global chemical reactivity descriptors of the title compound were studied extensively. Electron localization function (ELF) and Localized Orbital locator (LOL) maps were generated to show electron delocalization in the molecule.

Keywords: DFT, MEP, ELF, B3LYP, Pyrazole

PP-13	**Synthesis And Structural Analysis Of Pure And Mg Doped Zinc Oxide Nanoparticles Using Co-Precipitation Method**

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Abstract

The study involves synthesis and structural analysis of pure and Mg doped Zinc Oxide nanoparticles. The pure and Mg doped ZnO nanoparticles of size less than 50nm are synthesized by co-precipitation method. The prepared nanoparticles were characterized by X-ray powder Diffraction (XRD). The structure, crystallite size, lattice parameters and microstrain of the prepared samples were studied using XRD analysis. The XRD spectra indicated hexagonal wurtize structure for both pure and doped samples.

Keywords: ZnO nanoparticles, XRD, Co-precipitation.

PP-14	Synthesis And Elemental Analysis Of Pure And Mg Doped Zinc Oxide Nanoparticles Using Co-Precipitation Method

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Abstract
The study involves synthesis and elemental analysis of pure and Mg doped Zinc Oxide nanoparticles. The pure and Mg doped ZnO nanoparticles are synthesized by co-precipitation method. The prepared nanoparticles were characterized by Energy Dispersive X-Ray Analysis (EDAX). Elemental analysis of pure sample confirmed the presence of both Zinc (Zn) and Oxygen(O) elements. Elemental analysis of the doped sample confirmed the presence of Zinc (Zn), Oxygen (O) and Magnesium (Mg) elements.
Keywords: ZnO nanoparticles, EDAX, Co-precipitation.

PP-15	Synthesis And Functional Group Analysis Of Pure And Fe Doped Zinc Oxide Nanoparticles Using Co-Precipitation Method

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Abstract
The study involves synthesis and functional group analysis of pure and Fe doped Zinc Oxide nanoparticles. The pure and Fe doped ZnO nanoparticles are synthesized by co-precipitation method. The prepared nanoparticles were characterized by Fourier Transform Infrared Spectroscopy (FTIR). The metal oxide formation and phase purity of the prepared samples were confirmed using FTIR analysis. The band corresponding to ZnO formation are found around 444.54 $cm^{-1.}$
Keywords: ZnO nanoparticles, FTIR, Co-precipitation.

PP-16	The Structural And Topological Analysis Of 5-(4-Butoxy-3Methoxyphenyl)-3methyl-4,5-Dihydro-1h-Pyrozole-1-Carbaldehyde Using DFT Method

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Abstract
The computational investigations on 5-(4-Butoxy-3-methoxyphenyl)-3methyl-4,5-dihydro-1H-pyrozole-1-carbaldehydewere done using dft/b3lyp/6-311g (d,p) basic set byGaussian 09W software. The HOMO and LUMO energies, Ionisation potential (I), Electron affinity (A), Energy gap, chemical hardness (η), chemical potential (μ), Electrophilicity Index (ω), Nucleophilicity Index (N), Global Softness (S) and Optical Softness ($\sigma_{\circ}$) were calculated.Molecular electrostatic potential as well as Mulliken charges were calculated by DFT method.The intra and intermolecular interaction exist within this compound was analyzed by different methods namely topology analysis ELF and LOL.
Keywords: DFT calculation, ELF, HOMO and LUMO

PP-17	Synthesis And Elemental Analysis Of Pure And Fe Doped Zinc Oxide Nanoparticles Using Co-Precipitation Method

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Abstract

The study involves synthesis and elemental analysis of pure anode doped Zinc Oxide nanoparticles. The pure and Fe doped ZnO nanoparticles are synthesized by co-precipitation method. The prepared nanoparticles were characterized by Energy Dispersive X-Ray Analysis (EDAX). Elemental analysis of pure sample confirmed the presence of both Zinc (Zn) and Oxygen(O) elements. Elemental analysis of the doped sample confirmed the presence of Zinc (Zn), Oxygen (O) and Iron (Fe) elements.
Keywords: ZnO nanoparticles, EDAX, Co-precipitation.

PP-18	Growth and Xrd Characterisation of $Mgso_4$ Doped L-Theronine Single Crystals With The Ratio 0.004.

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Abstract:
Crystal, any solid material in which the component atoms are arranged in a definite pattern and whose surface regularity reflects its internal symmetry**.** $MgS0_4$ doped L-Threonine single crystals with the ratio 0.004 were grow by slow evaporation method XRD analysis were done for the grown crystals. L-threonine crystalize doped with $MgSO_4$ in the aqueous solution in the concentration ratio 0.004. The grown crystal is harvested after 21 days. The grown crystals belong to orthorhombic system. The values are a=5.6218, b=7.7328, c=13.4428.
Key words: doped, evaporation, XRD.

PP-19	Growth And Xrd Characterisation Of Pure L- Threonine Single Crystal.

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[1]Msc physics student, Nanjil Catholic College of arts and Science, Kaliyakkavilai.
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Abstract

Crystal growth is major stage of a crystallization process and consists of the addition of new atoms, ions or polymer strings into the characteristic arrangement of the crystalline lattice. Pure L-Threonine($C_4H_9NO_3$) single crystals were grown by slow evaporation method. XRD analysis were done for the grown crystals. The grown crystal is harvested after 21 days. The grown crystals belong to orthorhombic system. The values are a=5.8123, b=7.6321, c=13.452.

Keywords: Evaporation, XRD.

PP-20	Growth And Xrd Characterisation of Mgso4 Doped L. Threonine Single Crystals With the Ratio 0.002

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[2]Assistant Professor, Department of physics, Nanjil catholic college of arts and science, Kaliyakkavilai

Abstract
A crystal is a homogeneous solid in which particles (atoms, molecules or ions) are arranged in a definite pattern due to which they have a definite geometrical shape with a plane surface. MgSo4 doped L. Threonine single crystals in the ratio 0.002 were grown by slow evaporation method analysis were done for the grown crystals. The grown crystals belong to Orthorhombic system. L. Threonine crystalise doped with MgSo4 in the aqueous solution in the concentration ratio 0.002. The grown crystal is harvested after 21 days. The values are a= 5.7128, b=7.7182, c=13.4473
Keywords: doped, evaporation, XRD

PP-21	Growth and XRD Characterisation of pure ($Mgso_4$) Single Crystal.

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[1]Msc physics student, Nanjil Catholic College of arts and Science, Kaliyakkavilai.
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Abstract
The periodic arrangement of atoms in all three dimensions space is called crystal. It has irregular shape. Crystal growth refers to the artificial synthesis of crystals. Pure Magnesium Sulphate ($MgSO_4$) single crystals were grown by slow evaporation method. XRD analysis was done for the grown crystals. The grown crystal is harvested after 21 days. The grown crystals belong to orthorhombic system. The values are a=4.9264, b=7.5232, c=6.5431.
Keywords: Evaporation, XRD.

PP-22	Growth And Xrd Characterisation Of $(C4h9no3)_{0.5}$ $(Mgso4)_{0.5\ Mixed}$ Crystal

[1]Jeni. J. T, [2]Dr.Antony Dominic Christopher

[1]M.Sc Physics student, Nanjil Catholic College Of Arts And Science, Kaliyakkavilai
[2]Assistant Professor, Nanjil Catholic College Of Arts And Science, Kaliyakkavilai

Abstract:

A Crystal growth is a process by which a crystal grows by progressive addition of atoms or molecule to the surface of the initial seed crystal. MgSO4 MixedL.Threonine single crystals in the ratio 0.5 and 0.5 were grown by slow evaporation method XRD Analysis were done for the grown crystals. The grown crystals belong to orthorhombic system. L.Threonine crystalize mixed with MgSO4 in the aqueous solution. The grown crystal is harvested after 21 days. The values are a=4.6328, b=7.7328, c=8.4245.

Keywords: Evaporation, XRD.

PP-23	Growth of XRD Characterisation of $(C_4h_9no_3)_{0.2}$ $(Mgso_4)_{0.8}$ Mixed Crystal

[1]Joslin Blessy.J,[2]Dr. Antony Domnic Christopher

[1] M.Sc Physics student, Nanjil Catholic College Of Arts And Science, Kaliyakkavilai
[2]Assistant Professor, Nanjil Catholic College Of Arts And Science, Kaliyakkavilai

Abstract:
A Crystal is a solid where the atoms form a periodic arrangement. (Quasicrystals). Not all solids are crystals.For example, when liquid water starts freezing, the phase change begins with small ice crystals that grow until they fuse,forming a polycrystalline structure. $MgSO_4$ MixedL.Threonine single crystals in the ratio 0.2 and 0.8 were grown by slow evaporation method XRD Analysis were done for the grown crystals.The grown crystals belongs to orthorhombic system. L.Threonine crystalise mixed with $MgSO_4$ in the aqueous solution. The grown crystal is harvested after 21 days. The values are a=5.7328, b=7.3428, c=10.3438.
Keywords: evaporation, XRD

PP-24	Solar Wind Observed By Ace

[1]R. PunithaKevisha, [2] Dr.S.S. Bidhu

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[2]Assistant Professor, Nanjil Catholic College Of Arts And Science, Kaliyakkavilai

Abstract:
The Advanced Composition Explorer was launched August 25,1997 carrying six high resolution spectrometers that measure the elemental, isotopic, and ionic charge state composition of nuclei from H to Ni from solar wind energies (1 KeV/nuc) to galactic cosmic ray energies (500 MeV/nuc). Data from these instruments is being used to measure and compare the elemental and isotopic composition of the solar corona, the nearby interstellar medium, and the galaxy, and to study particle acceleration processes that occur in a wide range of environments. The three instruments that provide the heliospheric context for ion composition studies by monitoring the state of the interplanetary medium. From its orbit about the Sun-Earth liberation point 1.5 million km sunward of Earth. In this study the real-time solar wind measurements were analysed and interpreted for use in forecasting space weather.
Key words: ACE mission, Solar Wind, Solar energetic particles, Cosmic rays.

PP-25	Solar Wind Observatory	

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Abstract
The current status of our understanding of the nature and origin of the solar wind is briefly reviewed, with emphasis being placed on the need for wave particle interactions to account for the main energy source as well as details of the particle distribution in functions. There has been considerable progress in the theoretical treatment of various aspects of the physical aspects of solar wind but a complete understanding is not yet is sight. Arguments concerning the fact of the solar wind are reviewed, in particular those concerning the distance to the shock wave which marks the termination of supersonic flow. The present study of the characteristics of solar wind observations from solar wind observatory is collected and interpreted in terms of current findings.
Keywords: Solar wind, Electron plasma , Solar Magnetic field.

PP-26	Kodaikanal Solar Obsevatory

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[2]Assistant Professor, Nanjil Catholic College Of Arts And Science, Kaliyakkavilai

Abstract:
Kodaikanal solar observatory (KoSO) possesses one of world's longest and homogeneous records of sunspot observations that span more than a century (1904-2017). Interestingly, these observations were taken with the same setup over this entire time period which makes this data unique and best suitable for long-term solar variability studies. A large part of this data between 1921-2011 were digitized. Asemi-automated sunspot detection and automated umbra detection algorithm are implemented on to their calibrate images to detect sunspots and umbra. Additionally, during this catalog updation, we also filled data gaps in the existing KoSO sunspot catalog (1921-2011) by virtue of re-calibrating the 'rouge plates. These updated sunspot area series covering nearly 115 years (1904-2017) are being made available to the community and will be a unique source to study the long term variability of the sun.

Keywords: Solar cycle, sunspot, magnetic fields, photosphere.

NANJIL CATHOLIC COLLEGE OF ARTS AND SCIENCE
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FIFTH

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978-81-962422-0-6

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This is to certify that ~~Mr./Ms.~~/Dr. Antony Dominic Christopher, Asst. Professor, NACAS has been Participated for Poster/Oral Presentation of the paper entitled Growth & XRD characterisation of Pure $MgSO_4$ single crystal at the Fifth National Conference on Advanced Materials (NCAM-2023) organized by the PG Department of Physics & Research Centre, Nanjil Catholic College of Arts and Science, Kaliyakkavilai on March 25, 2023.

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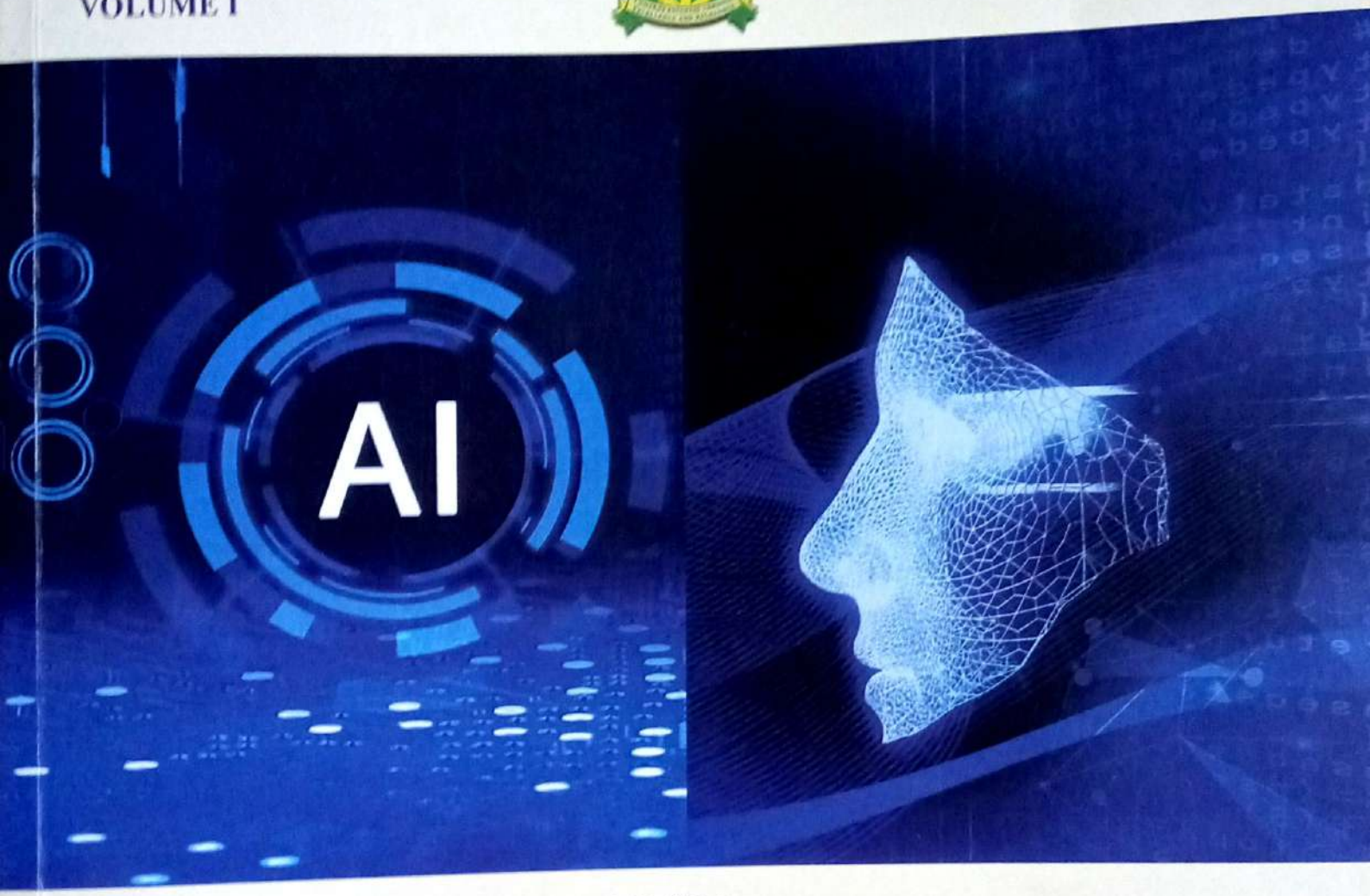
INTERNATIONAL JOURNAL OF BUSINESS INTELLIGENCE AND INNOVATIONS

(SAASC – RAIEEW '23)

QUARTERLY ISSUE
VOLUME I

APRIL 2023
ISSN: 23484705



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INDEX

10. Single Image Haze Removal from Image Enhancement Perspective for Real-Time Vision-Based Systems

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ABSTRACT

Image-based systems are expressively affected by weather conditions, notably those related to atmospheric turbidity. Accordingly, haze removal algorithms, actively being researched over the last decade, have come into use as a pre-processing step. Although numerous approaches have existed previously, an efficient method coupled with fast implementation is still in great demand. This paper proposes a single image haze removal algorithm with a corresponding hardware implementation for facilitating real-time processing. Contrary to methods that invert the physical model describing the formation of hazy images, the proposed approach mainly exploits computationally efficient image processing techniques such as detail enhancement, multiple-exposure image fusion, and adaptive tone remapping. Therefore, it possesses low computational complexity while achieving good performance compared to other state-of-the-art methods. Moreover, the low computational cost also brings about a compact hardware implementation capable of handling high-quality videos at an acceptable rate.

KEYWORDS: Dehazing, DCP, Real Time Vision-Based Systems.

INTRODUCTION

Images taken outdoors usually suffer from a loss of contrast and details owing to the inevitable adverse effects of bad weather conditions. Haze removal eliminating the undesirable effects of the transmission medium and restoring clear visibility. Haze removal algorithms fall into two categories—single- and multiple-image algorithms. Multiple-image algorithms due to the difficulties in the input acquisition process. Hence, consequently leading to the rapid development of single-image haze removal algorithm. Haze removal, proposes a novel and simple image enhancement-based haze removal method capable of producing satisfactory results. Based on the observation that haze often obscures image details and increases brightness, a set of detail-enhanced and under-exposed images derived from a single hazy image is employed as inputs to image fusion. The corresponding weight maps are calculated according to DCP, which is well recognized as a good haze indicator. Then, the fusion process is simply equivalent to a weighted sum of images and weight maps. Finally, a post- processing method known as adaptive tone remapping is employed for expanding the dynamic range. Thus, the proposed algorithm is computationally efficient and

haze-aware, while its compact hardware counterpart is capable of handling videos in real-time.

RELATED WORK

Classic haze removal requires us to provide the depth information of the image, so that the transmission coefficientcan be calculated at every pixel. A transmission map is henceobtained, and is used recover the original RGB image by using equation (1). Kopf et. al [2] did this by calculating the depth from multiple images, or a 3D model.

Single image dehazing is under-constrained, as we do nothave additional depth information. Several approaches underthis domain involve the creation of an image prior, based on certain assumptions. Most of these approaches work locally,on patches of the image, with maybe prone to artefacts. Theyapply guided filtering to smoothen and reduce such artefacts.

Tan [5] observed that haze-free images must have highercontrast than its hazy counterpart, and attempts to remove haze by maximizing the local contrast of the image patch. Heet. al. [4] found that most patches have pixels that have a verylow intensity in at least one-color channel. In its hazy counterpart, the intensity of the pixel in that channel is mostlycontributed by air light. Using this information, a dark channel prior is calculated, and is used for dehazing as well as estimating the transmission map of the image. The drawbackis that, removing haze from regions which naturally have high intensity, such as the sky, is error prone. Improving on that, Meng et. al [16] imposed boundary constraints on the transmission function to make the transmission map prediction more accurate. Berman et. al [17] suggested a non-local approach to perform dehazing. They observed that colors in a haze-free image can be approximated by a few 100 distinct colors that form clusters in the RGB space. They find that pixels in a hazy image can be modelled as lines in the RGB space (haze lines), and using this, they estimate the transmission map values at every pixel.

All of these methods are based on one or more keyassumptions, which exploit haze relevant features. Some of these assumptions do not hold true in all possible cases. A way to circumvent this issue is to use deep learning techniques, and let the algorithm decide the relevant features. DehazeNet is a CNN that outputs a feature map, from whichthe transmission map is calculated [6]. Going a step further, Ren et. al [7] have calculated the transmission map using a multiscale deep CNN.

Conditional GANs [10] have proved to be immensely effective in several image translation applications such as Super Resolution, De-Raining, and several others [11, 12]. Zhang et. al. [8] used three modules of neural networks, to perform guided dehazing of an image. The first module is a conditional GAN used to estimate the transmission map. The second module estimates the haze relevant features, and is concatenated with the transmission map. Finally, the third module translates this concatenated combination to obtain a haze-free image. While this approach is

systematic, usage ofthree modules makes the learning process computationally expensive and parameter heavy.

PROPOSED MODEL

In proposed system, introduce a computationally efficient haze removal algorithm. First exploited Koschmieder's law to deduce the use of under-exposed images for haze removal. Next, compute detail enhancement, gamma correction,single-scale image fusion, and adaptive tone remapping. The weight maps are calculated according to DCP, which is well recognized as a good haze indicator. Then,the fusion process is simply equivalent to a weighted sum of images and weight maps.Finally, a adaptive tone remapping is employed for expanding the dynamic range. As under-exposing an image requires human intervention for adjusting either shutter speed or lens aperture, it cannot be attained in an automated manner. Accordingly, a simple-and-efficient technique called gamma correction is exploited to mimic the physical under-exposure. However, since gamma correction simply applies the same amount of decrease to the entire image, bright details faded by haze still remain obscure in the artificially under-exposed images.

Fig 1.1. System Architecture

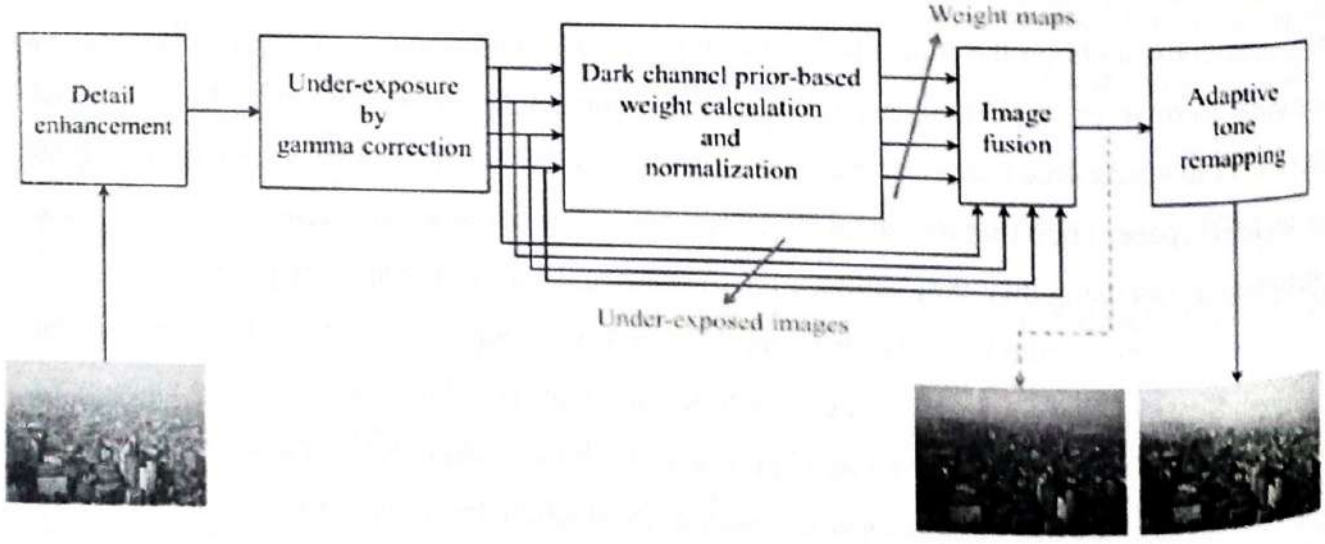


Figure1.1. depicts the overall block diagram of the proposed algorithm. The input of a hazy scene is pre-processed by a detail enhancement algorithm to restored faded details. For accurately blending haze-free areas into the fused image, weight maps are first calculated with regard to dark channels and then are normalized to avoid the out- of-range problem. The fused image is darker than the hazy input as a result of fusing aset of under-exposed images. Hence, a post-processing algorithm called adaptive tone remapping is employed to enhance the luminance and emphasize the chrominance.

To overcome this issue, the sole input of a hazy scene is pre-processed by a detail enhancement algorithm to restored faded details. For accurately blending haze-free areas into the fused image, weight maps are first calculated with regard to dark channels and then are normalized to avoid the out-of-range problem. Nevertheless, the fused image is darker than the hazy input as a result of fusing a set of under-exposed images.

DATA COLLECTION

Figure 2.2. Initially illustrates a real hazy scene obscured by moderate haze. The proposed algorithm produces a satisfactory result due to the effective use of detail enhancement before image under-exposure and a DCP-based weighting scheme to guide the fusion process. The darkening effect due to the use of under-exposed imagesare effectively resolved through adaptive tone remapping in post-processing.

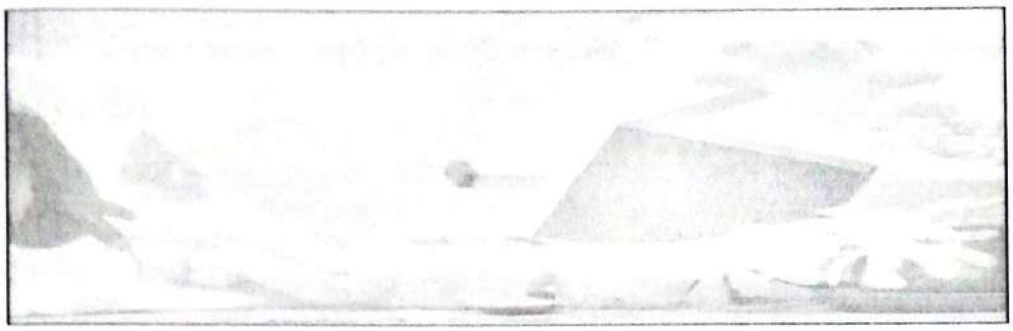


Fig: 2.2 Original Image

DISCUSSION

As under-exposing an image requires human intervention for adjusting either shutter speed or lens aperture, it cannot be attained in an automated manner. Accordingly, a simple-and-efficient technique called gamma correction is exploited tomimic the physical under-exposure. However, since gamma correction simply applies the same amount of decrease to the entire image, bright details faded by haze still remain obscure in the artificially under-exposed images. To overcome this issue, the sole input of a hazy scene is pre-processed by a detail enhancement algorithm to restored faded details. For accurately blending haze-free areas into the fused image, weight maps are first calculated with regard to dark channels and then are normalized to avoid the out-of-range problem. Nevertheless, the fused image is darker than the hazy input as a result of fusing a set of under-exposed images.

RESULT

The proposed algorithm and four benchmarking methods were all programmed in MATLAB R2013a and tested on a computer with an Intel Core i3-7500 (3.4 GHz) CPU and 16 GB RAM.

This section utilized three evaluation metrics, including structural similarity (SSIM), tone-mapped image quality index (TMQI), and feature similarity extended to color images (FSIMc), to access the five algorithms quantitatively. SSIM takes the luminance of both a dehazed image and a ground-truth reference as inputs and produces a value in [0, 1] representing the degree of similarity in structural information. A higher SSIM implies a greater degree of similarity. Supposing that X and Y denote the dehazed and ground-truth reference images' luminance channel, respectively,

$$SSIM(X,Y) = \frac{(2\mu_x\mu_y + C_1)(2\sigma_{xy} + C_2)}{\left(\mu_x^2 + \mu_y^2 + C_1\right)\left(\sigma_x^2 + \sigma_y^2 + C_2\right)}$$

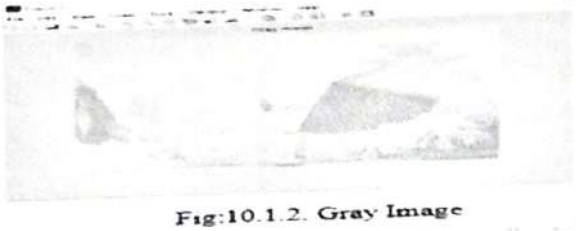


Fig:10.1.2. Gray Image

Fig:10.1.3. Enhanced Image

Fig: 10.1.4 DCP Image

Fig:10.1.5. Restored Image

The second metric, TMQI, works on the luminance of images and assesses the multi-scale fidelity measure based on the structural fidelity (S) and the naturalness. ies. As with the SSIM mentioned above, X and Y denote the dehazed and ground-truthreference i

$$TMQI(X,Y) = aS^{\varphi} + (1-a)N^{\Phi} \qquad \text{eqn(11)}$$

Methods	SSIM	TMQI
Proposed	0.7431	0.6800
Existing	0.6952	0.6318

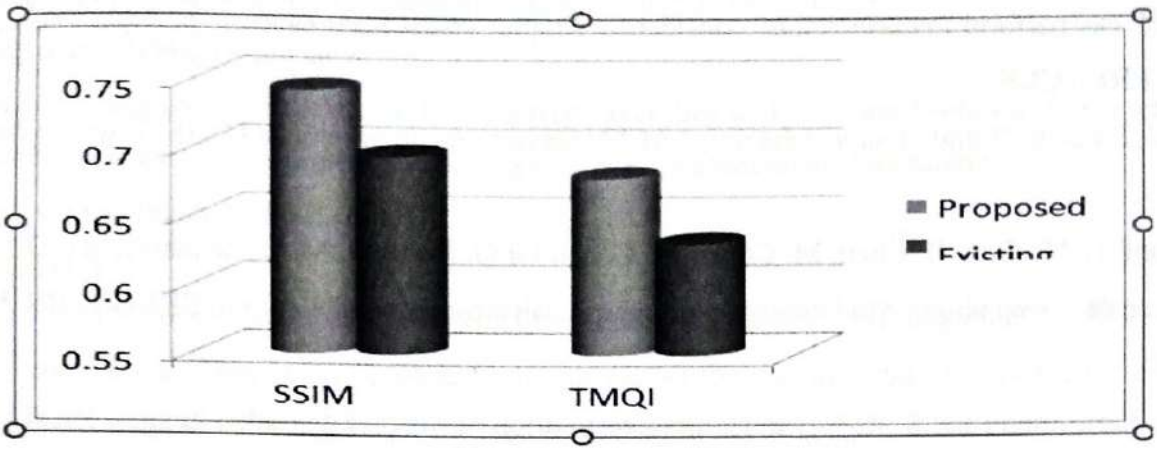
In proposed system, introduce a computationally efficient haze removal algorithm,

First exploited Koschmieder's law to deduce the use of under-exposed imagesfor haze removal.

Next, compute detail enhancement, gamma correction, single-scale imagefusion, and adaptive tone remapping

The weight maps are calculated according to DCP, which is well recognized asa good haze indicator

- Then, the fusion process is simply equivalent to a weighted sum of images andweight maps
- Finally, a adaptive tone remapping is employed for expanding the dynamicrange.



- In existing system, a single image dehazing approach based on informationfidelity and image entropy
- The global atmospheric light is estimated by quad-tree subdivision usingtransformed hazy images
- Then, transmission is estimated by an objective function which is comprised ofinformation fidelity and image entropy at non-overlapped sub-block regions
- This is further refined by a Weighted Least Squares (WLS) optimizationprocedure to alleviate block artifacts.

CONCLUSION

A computationally efficient haze removal algorithm is proposed in the project. It was discovered that dehazing methods based on the Koschmieder's model are computationally expensive, mainly due to the inevitable estimation process of unknown variables, that is, transmission map and atmospheric light. Therefore, first exploited Koschmieder's law to deduce the use of under- exposed images for haze removal. Then, simple image processing techniques such as detail enhancement, gamma correction, single-scale image fusion, and adaptive tone remapping were employed to carry our deduction into effect. The use of detail enhancement before artificial under-exposure by gamma correction effectively mimicked the physical exposure adjustment, while the DCP-based weighting scheme accurately guided the fusion process to blend image areas with clear visibility into the fused image. A novel adaptive tone remapping algorithm enhanced the darkened result obtained after fusing under- exposed images. Here, exploited Koschmieder's law to deduce the use of under-exposed images for haze removal. The use of detail enhancement before artificial under-exposure by gamma correction effectively mimicked the physical exposure adjustment. The DCP-based weighting scheme accurately guided the fusion process toblend image

areas with clear visibility into the fused image. A novel adaptive tone remapping algorithm enhanced the darkened resultobtained after fusing under-exposed images. In future, AMEF is based on the multi-scale fusion of a set of progressively over-exposed versions of the initial hazy image. AMEF can perform fog removal by considering simpler visual features from the input image.

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11. DETECTION OF PHISHING SCAMS ON WEBSITES BASED ON PHISHING CHARACTERISTICS

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ABSTRACT

Phishing website attacks are targeting network system users depending on the techniques of social engineering. This phishing attack compromise all the website fraud but that affecting the normal website users. The scam website presentation same like as legal website work methods like commands, popups and links, but it attract the website users and mislead them. The malicious scam website threatens the confidentiality, privacy security of the website information. In this paper focus on, to improve detection of website scam through feature selection using multi label classification method and identify features that distinguish phishing web sites from legitimate ones.

INTRODUCTION

Internet is the very powerful communication tool in the social media. Social media are applications, services, and platforms on the Internet with high, mostly interactive and personalize creative potential. They are characterized by the active generation and creation of diverse content through the cooperative participation of users. User-generated content in conjunction with platform services forms social networks that enable users to network in a communicative and content-related way [1]. Phishing is targeted exploratory attack on social networks carried out by e-mail spoofing or instant messaging and it often technical procedural action that directs users to enter details at a fake website whose look and feel are almost identical to the legitimate one. The attacker develops a malicious website and sends links to social network platforms like Facebook, emails, you tube, Twitter, etc. by conveying a message of panic, urgency, or a financial bid, and instructs the recipient to take immediate action [2]. When a user unwittingly clicks the link and updates any sensitive credentials, cyber attackers gain access to the user's information like financial data, personal information, username, password, etc. This stolen information is used by cybercriminals for a variety of illegal activities, including blackmailing victims [3]. Attempts to deal with the growing number of reported phishing incidents include legislation, user training, public awareness, and technical security measure [4].

Web site phishing attacks usually start with an e-mail that arrives in the victim's mailbox pretending to be a legitimate and known entity. Once a user is convinced an email message is valid

and clicks the link, he is extremely likely to believe the delivered Web pages to be authentic, regardless of his prior security awareness straining. To avoid phishing attacks is to create list of millions of web pages to identify all web sites that closely imitate one of their customers' sites. Once a web site is proved to be a phishing site, the necessary actions are taken to shut down the site as soon as possible. Phishing websites were linked with the spear phishing emails and are exact duplicates of the original websites, undefined by the victims [5].

BACKGROUND AND OVERVIEW OF WEBSITE SCAM

In the research platform phishing becomes the area of security threat, because the phisher creates fake website which looking like original website. Atharva Deshpande [6] proposed this technique to differentiate Phishing website depends on the examination of authentic site server log knowledge. An application Off-the Hook application displays a couple of outstanding properties together with high preciseness, whole autonomy, and nice language-freedom, speed of selection, flexibility to dynamic phish and flexibility to advancement in phishing ways.

The classification algorithm used for website scam detection by extracting websites' URL features and feature selection bases on analyzing subset methods. It implements feature extraction and selection methods for the detection of phishing websites. The extracted features about the URL of the pages and composed feature matrix are categorized into five different analyses as Alphanumeric Character Analysis, Keyword Analysis, Security Analysis, Domain Identity Analysis and Rank Based Analysis [7]. Most of these features are the textual properties of the URL itself and others based on third party services. The widely used machine learning algorithm identified an optimal spam detection model based on Random Forests (RF) to enable parameters optimization and scam-based feature selection [8]. The Random Forest algorithm provided the parameters importance of each feature and to eliminate the irrelevant features from the website. Furthermore, the algorithm decided an optimal number of selected features during the training of the overall feature selection and attempt to all feature elimination phase.

Kan and Thi [9] proposed representing lexical features with a bag of words method have been applied in a machine learning classifier which provide 95% accuracy. Examining the machine learning with URLs lexical features can lead to a high accuracy and lightweight phishing detection systems. Lexical features can be used with supporting of other URLs features such as host information. Thomas and Grier [10] presents that the lexical features had been take long processing time is a result of using host information features and in turn does not satisfy. The social network users are making this method not suitable for the online marketing environment. Lexical features are then input to a Support Vector Machine is effectiveness to assessed on two categories of hidden fraudulent URLs: hidden phishing pages and hidden defacements [11].

DATASET

URLs of webpages were collected from www.kaggle.com[12]. There are 48 features extracted from 5000 phishing webpages and 5000 legitimate webpages. The legitimate URLs are labeled as "0" and phishing URLs are labeled as "1". The dataset contains the features id, Num dots, Subdomain level, Path level, Ur l length, Num dash, Num dashin hostname, At symbol, Tide symbol, Num underscore etc. Anti-phishing researchers and experts may find this dataset useful for phishing features analysis, conducting rapid proof of concept experiments or benchmarking phishing classification models [13].

FEATURE EXTRACTION

To implemented the problem through the python program to extract features from URL. Presence of IP address in URL

If IP address present in URL, then the feature Ur1lenght is present it is set to 1 else set to 0. Most of the benign websites do not use IP address as an URL to download a legitimate or phishing webpage. Use of IP address in URL indicates that attacker is trying to steal sensitive information from the website users.

PRESENCE OF ATSYMBOL IN URL:

If @ symbol present in URL then the feature at symbol is set to 1 else set to 0. Phishers add special extra symbol @ in the URL leads the browser to ignore everything preceding the "@" symbol and the real address often follows the "@" symbol.

1.NUMBER DOTS IN HOSTNAME:

The number of dots present in the URL then count how many dots in URL. The average number of dots in legitimate URLs is 3. If the number of dots in URLs is more than 3 then the feature Num dots is set to 1 else to 0.

2.NUMBER OF DASH IN HOST DOMAIN:

The domain name separated by number of dash (-) symbol. If the number dashes is correct then feature Num dashin hostname is set to 1 else to 0. The dash symbol is rarely used in legitimate URLs. Phishers add dash symbol (-) to the domain name so that users feel that they are dealing with a legitimate webpage.

3.NUMBER OF UNDERSCORE:

If "_" present in URL path then feature Number underscore is set to 1 else to 0. Phishers add underscore symbol (_) to the domain name so that website users feel that they are dealing with a legitimate webpage.

4. INFORMATION SUBMISSION TO EMAIL:

Phisher use submitting information to email web form might use "mail ()" or "mailto:" functions to redirect the user's information to his personal email. If such functions are present in the URL, then submission Email feature is set to 1 else to 0.

IMPLEMENTATION AND RESULT

labeled data which has samples as phish domains and legitimate domains in the training phase. The training phase dataset is a very important point to build successful detection mechanism. The samples dataset which are labeled as phishing must be absolutely detected as phishing. Likewise, the samples dataset which are labeled as legitimate must be absolutely detected as legitimate.

Phishing web pages design were the same visual effect as their corresponding real websites design. A phishing webpage is an illegitimate web page, it does not provide services similar to the original legitimate webpage. An attacker can download the legitimate webpage and build the phishing webpage Detecting Phishing webpage is a classification problem, so it means the dataset contains. The phishing webpage has contained some hyperlinks which redirect the users to the corresponding legitimate webpage. To verify the hyperlinks relation, from Kaggle website 5000 phishing webpages and 5000 legitimate webpages are chosen. Received that various feature selected for machine learning classification is shown in Figure 1.

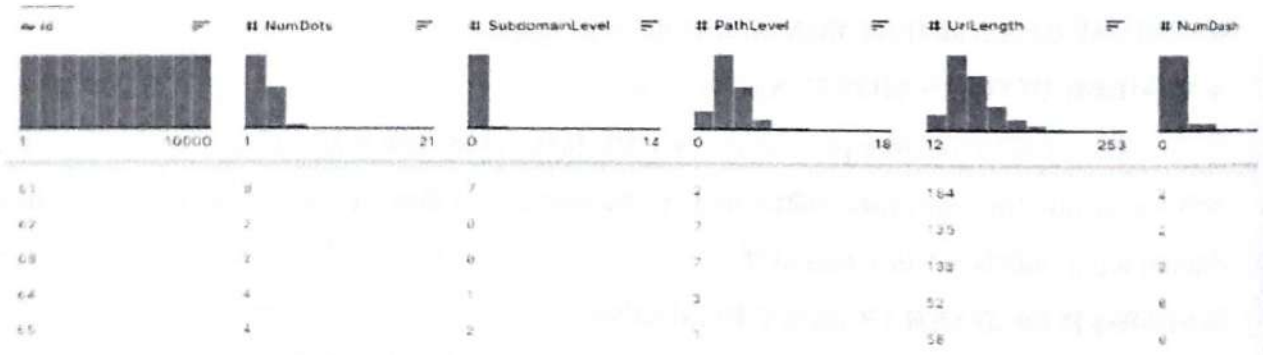

Figure 1 Features selected for the implementation

The machine learning classification models K-Nearest Neighbours Decision Tree, Random Forest and Support vector machine has been selected to detect phishing websites. The support vector machine is a category of function-based classifier. Decision tree, Random Forest, K-Nearest Neighbours and Kernel approximation are tree-based classifiers

In the python programming language tool Scikit-learn tool has been used to import Machine learning models. Dataset is divided into training dataset and testing dataset in 50:50, 0:40, 70:30 and 90:10 ratios respectively. Each machine learning classifier is trained using training dataset and testing dataset is used to evaluate performance of classifiers. Performance of classifiers has been

evaluated by calculating classifier's accuracy score, split-up, false negative rate and false positive rate is shown in Table 1.

Dataset split-up Ratio	Classifiers	Accuracy	False Negative Rate	False Positive Rate
50:50	KNN	96.76	3.24	2.62
	Decision Tree	96.77	3.73	2.31
	Random Forest	96.2	3.8	2.15
	Support vector Machine	96.5	3.5	2.16
60:40	KNN	96.81	3.1	2.88
	Decision Tree	96.9	3.13	2.7
	Random Forest	96.4	3.2	2.26
	Support vector Machine	96.5	3.5	2.28
70:30	KNN	97.1	3.7	2.53
	Decision Tree	96.8	3.14	2.64
	Random Forest	96.7	4.5	2.17
	Support vector Machine	97.13	3.2	2.25
90:10	KNN	98.1	3.18	2.4
	Decision Tree	97.4	3.22	2.31
	Random Forest	98.12	4.2	2.17
	Support vector Machine	96.6	4.73	2.18

Table 1. Classification models performance

Result shows that Random Forest algorith1m gives 97% accuracy of better detection accuracy with lowest false negative rate than decision tree, support vector machine algorithms and K Nearest Neighbor. The detection accuracy of phishing websites increases when more dataset used as training dataset. All classifier machine learning models perform well when 90% of data used as training dataset. Figure 2 show the detection accuracy of all classifiers when 50%, 60%, 70% and 90% of data used as training dataset and graph clearly shows that detection accuracy increases when 90% of data used as training dataset and random forest detection accuracy is maximum than other three classifiers.

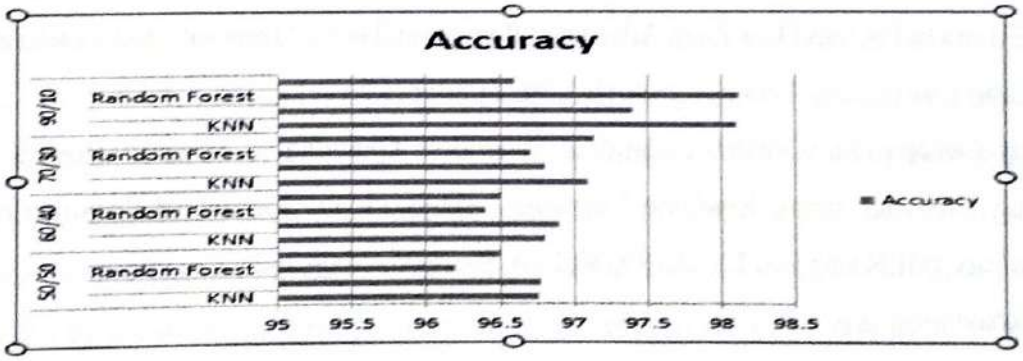

Figure 2 Detection of phishing website comparison

The machine learning detection methods to detect phishing websites using machine learning technology.

CONCLUSION AND FUTURE WORK

In this work, a methodology has been developed to detect phishing webpages. Although the use of URL lexical features alone has been shown the Random Forest tree to result in high accuracy 97%, phishers have learned how to make predicting a URL destination difficult by carefully

manipulating the URL to evade detection. Therefore, combining the lexical features with others such as host, is the most effective approach.

For future enhancements, to intend to build the phishing webpage detection system as a more scalable web service which will incorporate online social networks so that new phishing website scam attack patterns can easily be learned and improve the accuracy of our models with better feature extraction.

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http://www.ijert.org

on the terms and concepts of green marketing, importance of green marketing, examine some of the reason that organizations are adopting a green marketing philosophy and mention some of the problems with green marketing.

PRESENT TRENDS IN GREEN MARKETING IN INDIA

Organizations are Perceive Environmental marketing as an Opportunity to achieve its objectives. Firms have realized that consumers prefer products that do not harm the natural environment as also the human health. Firms marketing such green products are preferred over the others not doing so and thus develop a competitive advantage, simultaneously meeting their business objectives. Organizations believe they have a moral obligation to be more socially responsible. This is in keeping with the philosophy of CSR which has been successfully adopted by many business houses to improve their corporate image.

THE FUTURE OF GREEN MARKETING

There are many lessons to be learned to avoid green marketing myopia, the short version of all this is that effective green marketing requires applying good marketing principles to make green products desirable for consumers. The question that remains, however, is, what is green marketing's future? Business scholars have viewed it as a "fringe" topic, given that environmentalism's acceptance of limits and conservation does not mesh well with marketing's traditional axioms of "give customer what they want" and "sell as much as you can". Evidence indicates that successful green products have avoided green marketing myopia by following three important principles:

1) Consumer value positioning
2) Calibration of consumer knowledge
3) Credibility of product claim

REVIEW OF LITERATURE

The literature has been reviewed from the reputed journals of both National and International, pertaining to Green Marketing and its related issues. Also the literature has been reviewed from Text Books, Magazines, & Websites.

Murugesan (2008) underlined that firms can use green marketing as an attempt to address cost or profit related issues. Disposing of environmentally harmful by-products, such as polychlorinated biphenyl contaminated oil are becoming increasingly costly and the firms that can reduce harmful wastes can incur substantial cost savings.

Anup Sinha & Jamie Gilpin (2009) primarily focused on finding inefficiencies in the carbon value chain of energy production using renewable methods. By utilizing anaerobic

digestion and gasification technology Aura could produce biogas from cattle, swine, and other farm animals.

Dileep Kumar (2010) analysed that how far the hotel business organizations in the tourism sector meet the customer's needs through green marketing effort and how they influence the consumer behaviour and their satisfaction by inducing environmentally responsible behaviour.

Moloy Ghoshal (2011) examined that green marketing was still in infancy. In the perception of marketing scholars, green marketing refers to eco-level and market segmentation and the role of structural factors and economic incentives in influencing consumer behavior. The green marketers must understand to satisfy two objectives: improved environmental quality and customer satisfaction.

Ann Kronrod et al (2012) highlighted and explained the surprising prevalence of assertive environmental messages in the media. Environmental agencies, which are populated with people who perceive protecting the environment as a highly important issue, should understand that not all consumers are as informed and concerned about the environment.

SCOPE OF THE STUDY

The present study about the consumer attitude towards green marketing will bring about the problems and prospects of consumer in green marketing. Most of the consumers are willing to use green marketing products. The standard of living of consumers in Tiruchirappalli is comparatively low. In this study, the researcher aims at findings solutions to the above problems of consumers in green marketing products.

OBJECTIVES OF THE STUDY

1. To understand the awareness of consumers towards green marketing.
2. To assess the attitude of consumers towards green branding.
3. To explore awareness level of people of Tiruchirappalli region about green marketing in respect of product and services.
4. To analyze the attitude of consumers for green products.
5. To suggest and recommend how green marketing initiatives can be made successful for government, industry and consumers.

RESEARCH METHODOLOGY

The researcher has used structured questionnaire and a five point balanced liker scale for measuring consumer attitude towards green marketing and green branding. The study was undertaken at Tiruchirappalli. Both the primary and secondary data were collected for this study.

a) Primary Sources of Data: -

The primary data were collected from the respondents of Tiruchirappalli through a

questionnaire designed for a sample of 150 respondents by using the direct questionnaire method.

b) Secondary sources of Data: -

The secondary data were collected from books, Journals, Magazines, Newspapers, Reports, Websites and other supplementary sources.

c) Sample Design: -

A random sampling method was adopted by the researcher and selected the samples from Tiruchirappalli region representing both genders, different age groups, education level, and monthly income. A well framed questionnaire was circulated among the customers. Totally 175 questionnaires were circulated among them; and only 160 were returned the filled in questionnaire. Out of this, 150 questionnaires were found usable for the study. Hence the exact size of the study is 150.

d) Analysis of data: -

The researcher has analysed the collected data with the help of average and percentages. The data from collected respondents are coded, tabulated and analysed into logical statement.

ANALYSIS OF DATA

TABLE-1

Frequency Distribution of Occupational Status of Consumers

Occupational Status	Number of consumers	Percentage
a) Business	40	27%
b) Employed	110	73%
Total	150	100%

Occupation of respondents will also determine the green marketing of consumers. From the above table it is found that 27 % of the consumers are having business; and 73% of the consumers are employed. It is concluded that the most of the consumers are employed.

TABLE -2

Frequency Distribution of Educational Status

Educational status	Number of consumers	Percentage
a)School level	40	27%
b)Under Graduate	60	40%
c)Post-Graduate	30	20%
d)Professional	20	13%
Total	150	100%

Educational qualification is an index of social status. Education is not only basis for acquire knowledge but also getting livelihood. From the above tale it is found that 27% of consumers

studied at School level; 40% of consumers studied up to under graduate; 20% of consumers studied up to post graduate; and 13% of consumers studied up to professional level. It is concluded that most of the consumers have studied up to undergraduate education.

TABLE-3

Frequency Distribution of Monthly Income

Monthly income	Numbers of consumers	Percentage
a)Less than Rs.5000	40	27%
b)Rs.5001 to Rs.10000	60	40 %
c)Rs.10001 to Rs.20000	30	20%
d) More than Rs 20000	20	13%
Total	150	100%

The level of income determines the level of green marketing of consumers. From the above table it shown that 27% of the of consumers earn less than Rs.5000 ;40% of the of consumers earn Rs 5001to10000; 20% of the consumers earn Rs.10001to Rs.20000;and 13% of the consumers earn more than Rs.20000.Therefore, it is examined from the study that majority of the respondents are earning monthly income of RS,5001 to 10000.

TABLE-4

Consumers believe in the Concept of Green Marketing

Rating scale	No. of. consumers	Percentage
Strongly Agree	89	59%
Agree	42	28%
Neither Disagree Nor agree	8	5.3%
Disagree	9	6%
Strongly Disagree	2	1.7%
Total	150	100%

From the above table it is found that 59% consumers are Strongly Agree; 28% consumers Agree; 5.3% consumers Neither Disagree Nor agree; 6% consumers Disagree; and 1.7 % consumers Strongly Disagree about the concept of green marketing. Most of the consumers strongly agree believe in the concept of green marketing.

TABLE-5

Awareness of Companies Going Green

Rating scale	No. of. consumers	Percentage
Strongly Agree	90	60%
Agree	25	16%

Neither Disagree Nor agree	15	10%
Disagree	10	7%
Strongly Disagree	10	7%
Total	150	100%

From the above table it is found that 60% consumers Strongly Agree; 16% consumers Agree; 10% consumers Neither Disagree Nor agree; 7% consumers Disagree; and 7 % consumers Strongly Disagree that they are aware of companies going green. Majority of the consumers strongly agree that they are aware of companies going green.

TABLE-6

Difficulties to Implement Green Marketing concept

Rating scale	No. of. consumers	Percentage
Strongly Agree	100	67%
Agree	34	22%
Neither Disagree Nor agree	10	7%
Disagree	6	4%
Strongly Disagree	-	-
Total	150	100%

From the above table it is found that 67% consumers Strongly Agree; 22% consumers Agree; 7% consumers Neither Disagree Nor agree; 4% consumers Disagree; that it is difficult for all companies to implement green marketing concept. Majority of the consumers strongly agree with the difficulties to implement green marketing concept.

TABLE-7

Everyone is Responsible for Successful Green Marketing Concept

Rating scale	No. of. consumers	Percentage
Strongly Agree	95	63%
Agree	38	25%
Neither Disagree Nor agree	10	7.5%
Disagree	4	2.5%
Strongly Disagree	3	2%
Total	150	100%

From the above table it is found that 63% consumers Strongly Agree; 25% consumers Agree;7.5% consumers Neither Disagree Nor agree; 2.5% consumers Disagree; and 2 % consumers Strongly Disagree that they are responsible for successful green marketing concept. Most of the consumers strongly agree with the responsibility for successful green marketing concept.

TABLE-8

Green Marketing is More Effective than Regular Marketing

Rating scale	No. of. consumers	Percentage
Strongly Agree	31	20.5%
Agree	30	20%
Neither Disagree Nor agree	54	36%
Disagree	17	11.5%
Strongly Disagree	18	12%
Total	150	100%

From the above table it is observed that 20.5% consumers Strongly Agree; 20% consumers Agree; 36% consumers Neither Disagree Nor agree; 11.5% consumers Disagree; and 12 % consumers Strongly Disagree that they green marketing is more effective than regular marketing. It is examined that Most of the consumers neither Disagree nor agree that Green marketing is more effective than regular marketing.

TABLE-9

Realizing the Importance of Green Branding

Rating scale	No. of. Consumers	Percentage
Yes	103	69
No	47	31
Total	150	100

The above table clearly indicates that 69% of the Respondents realize the importance of green branding and 31% of the Respondents do not realize the importance of green branding. It is concluded that most of the consumers realize the importance of green branding.

FINDINGS & CONCLUSION

Green marketing is a tool for protecting the environment for future generation. It is not going to be an easy concept. The firm has to plan and then carry out research to find out how feasible it is going to be. Green marketing has to evolve since it is still at its infancy stage. Adoption of Green marketing may not be easy in the short run, but in the long run it will definitely have a positive impact on the firm. Green Marketing is still in the stage of childhood in the Indian companies. Lots of opportunities are available. Now this is the right time to select Green Marketing globally. It will come with drastic change in the world of business if all nations will make strict rules because green marketing is essential to save world from pollution. From the business point of view because a clever marketer is one who not only convinces the consumer, but also involves the consumer in marketing his product. Ultimately green marketing requires that consumers want

a cleaner environment and are willing to pay for it, possibly through higher priced goods, modified individual lifestyles, or even governmental intervention. Until this occurs it will be difficult for firms alone to lead the green marketing revolution. An environmental committed organization may not only produce goods that have reduced their detrimental impact on the environment, they may also be able to pressure their suppliers to behave in a more environmentally responsible fashion. Final consumers and industrial buyers also have the ability to pressure organizations to integrate the environment into their corporate culture and thus ensure all organizations minimize the detrimental environmental impact of their activities.

RERSULT

Green marketing is still in its infancy and a lot of research is to be done on green marketing to fully explore its potential. There are some suggestion that an organizations should implement for catering challenges of green marketing and successful exploitation of green marketing. Consumer needs to be made more aware about the merits of Green products. The consumer needs to be educated and made aware of the environmental threats. It should be made sure that the consumer is aware of and concerned about the issues that the product attempts to address. Green Marketing campaign and green advertising is good step towards it. Consumers must be motivated to switch brands or even pay a premium for the greener alternative.

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42. INNOVATIONS IN DEEP LEARNING TECHNIQUES FOR HUMAN FACE RECOGNITION

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ABSTRACT

Human Face recognition system is mainly used to ensure verification and authorization of human face under various circumstances. Several researchers adopted enormous Deep learning methods where Face Recognition is a challenging one when certain difficulties affect the original data in various aspects. Hence it is more important to overcome the challenges of facial recognition system. When the data that were collected for processing tent to non-cooperative and causes serious facial appearance/expressions, a perfect solution through deep learning algorithm helps to achieve the target. A better way to measure a face is by employing deep learning techniques. The final step is to train a classifier that can take in the measurements from a new test image and identifies the exact match. This exact match helps to overcome various challenges in Face Recognition. Due to the outbreak of Covid-19 the entire world had moved towards touchless facial recognition technology. A python based application helps to implement the innovations in Face Recognition System.

KEYWORDS: Facial Recognition, Biometric Face Verification, Face Identification Deep Learning, classifier

INTRODUCTION

Human face recognition system is a Biometric system for identifying the exact person in this challenging environment. It is much important that human has to recognize the exact face as it specifies unique identification. Plenty of techniques, methods and models were adopted but efficiency and accuracy were more challenging. Hence the innovations in deep learning help to attain better solution. Face recognition concentrates on two aspects: Face Verification and Face Identification. In Face verification a perfect matching was done for two images in order to determine whether the images are from the same person or not. But in Face Identification the matching was done to display the exact match with the faces in the dataset. Face Recognition system includes the following three sub operations as Face Detection, Feature Extraction and Face Verification or Identification.

RELATED WORK

Face detection and Recognition focuses on various methods and algorithms proposed by various authors. The criminal Identification [1] using Machine Learning and deep learning implementation used several deep learning models methods and techniques. Face detection technique using Artificial Intelligence [3] and video based detection [4] recognizes the system using features of face such as colors, features and distances. Face recognition includes Principal Component Analysis approach for Identification and Verification [5] of images. PCA implements face feature extraction [6] of images using deep learning algorithms [7]. Deep learning using dual transfer is more efficient than single transfer [8]. Face detection done for deep learning based low illumination images [9] recognition methods. The Deep learning technology uses CNN (Convolutional Neural Network) [10] to train the dataset and extract features. The Deep learning model for face recognition using Normalization method [11] reconstructs the face into a standard frame by frame cropping method. The CNN image will match the images with registered images in the databases and check whether the person is authenticated or not. The Deep Learning methodology helps to use voice recognition with Eigen object detector algorithm, which gives the voice output [12] when the person is detected. It is a best voice recognition system. Deep Convolutional Neural Network [13] for extracting features with SVM to predict the identity of Individuals. Deep Learning- a branch of Machine Learning can find out the features needed for classification automatically in training process without feature extraction steps. In face detection using Haar classifier [2] the result is based on the comparison of trained images with real time images Face recognition schemes enhances the detection and recognition by ANN, CNN and DNN [21].

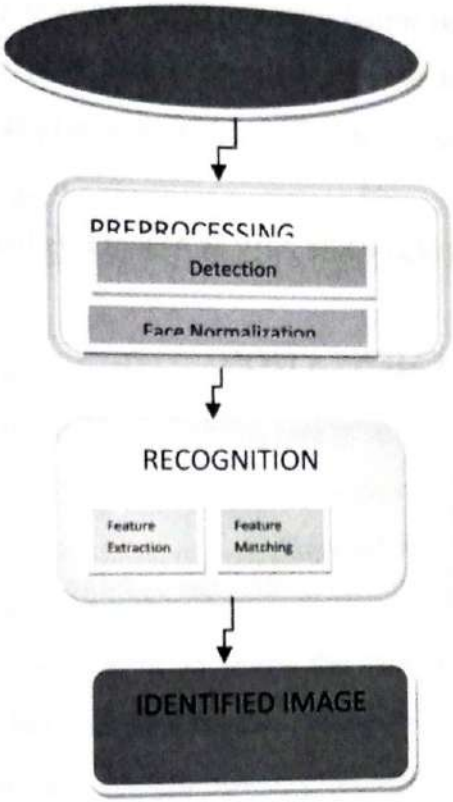
FACE DETECTION A VIEW

Face detection is a computer vision problem that involves finding the features of a human face from images stored in the database. The first step in face detection is image acquisition where the input image is fed into the system for feature extraction. By employing deep learning algorithm feature extraction task was performed. The final mechanism is face verification with a classifier in which the matching was done with the original image with the image in the database. If both the images match, then the information related to the corresponding image is displayed.

DEEP LEARNING ALGORITHM IN FACE RECOGNITION

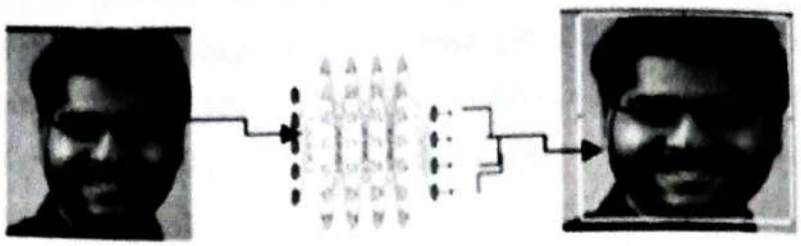
Deep learning is an approach to perform face recognition and seems to be an adequate method to carry out face recognition due to its high accuracy. The Principal Component Analysis

(PCA) is a popular unsupervised learning technique for reducing the dimensionality of data. It increases interpretability yet, at the same time, it minimizes information loss. It helps to find the most significant features in a dataset and makes the data easy for plotting in 2D and 3D. Deep Learning has proved to be a very powerful tool because of its ability to handle large amounts of data.



Face Recognition Block Diagram

The interest to use hidden layers has surpassed traditional techniques, especially in pattern recognition. One of the most popular deep neural networks is Convolutional Neural Networks in deep learning. Development of Deep Neural Network (DNN) and applying the same into face recognition systems allows the user recognition further DNN can specify extract more diverse features effectively from inputs which are never possible for ANN or other statistical methods. DNN is an extended version of ANN with multiple hidden layers in it. With some disadvantages, the more hidden layers in the DNN network, the more robust feature it can extract.



ACCURACY:

The accuracy of the system will be tested via recognition of three peoples with multiple times at different locations, mainly to test how light intensity affects the accuracy of the system. The accuracy is verified using confusion matrix. The calculation is based on

((ANV + APV) / Total) x 100)

Where ANV is Actual Negative Value while APV is Actual Positive Value.

FACE RECOGNIITION IMPLEMENTATION

Figure 1

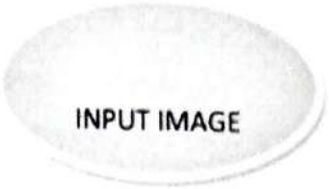


Figure 2
DETECTION

Figure 3
ALIGNMENT

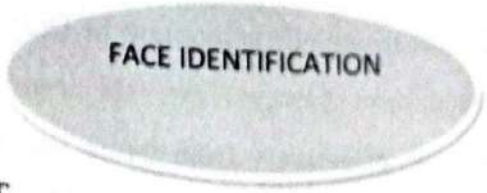


Figure 4
FACE DETECTION

INPUT IMAGE

Input image represents the original image that is used for recognition

PREPROCESSING

The pre processing is a mechanism to train a network and the prediction of new data. It includes reading input image, resize the image according to user's wish, and remove the noise so that the image is clear to detect, process segmentation and finally perform smoothing of edges. Image pre processing includes the following

- Preprocess Images for Deep Learning.
- Resize Images Using Rescaling and Cropping.
- Augment Images for Training with Random Geometric Transformations.
- Perform Additional Image Processing Operations Using data set.
- Apply Custom Image Processing Pipelines Using Combine and Transform

FACE DETECTION

Detection is the process of finding a face in an image. Facial recognition can detect and identify individual faces from an image containing one or many people's faces. It can detect facial data in both front and side face profiles under different lighting conditions. When the exact match is found, it is considered as the perfect match it displays all the information related to the image.

CONCLUSION AND FUTURE WORK

Human Face Recognition system involves the recognition of Criminals by detecting mechanisms, methods, approaches and algorithms. The mechanisms were presented through deep learning This system enhances face recognition system by identifying the face along with the details of the victim. DNN (Deep Learning Neural Network) approach is used to train the data set and to achieve better solution. The accuracy was improved rapidly by comparing the same with other techniques.

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Proceedings of

INTERNATIONAL CONFERENCE ON SMART INNOVATIVE TECHNOLOGIES ON DATA ANALYTICS

ICSITDA '23

26th MAY 2023

organized by

Department of Computer Applications

AYYA NADAR JANAKI AMMAL COLLEGE

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SIVAKASI - 626 124, TAMIL NADU

ISBN: 978-93-83191-92-5

Contents

ISBN: 978-93-83191-92-5

 ISBN: 978-93-83191-92-5

DIGITAL MEDIA MARKETING TREND ANALYSIS ON SOCIAL MEDIA USING DNN AND SVM

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ABSTRACT

Social Media has quickly gained growing opportunity to the people in the world to communicate and share posts and topics. The internet or cellular based applications share the information to the people. Tremendous value lies in automated analyzing, exploring and reasoning about such data in order to derive meaningful insights, which provides potential opportunities for businesses, marketing users, and consumers. Many events in the world are accompanied by the Hash-Tag trends on social media. Social media platforms are constantly improving and changing, which can make it stimulating to identify short term and long-term trends. If marketers only focus on current trends, they may miss opportunities to develop new and innovative approaches to reach their target audience. This research paper aims at utilizing the data collected from the three of the most popular social media platforms that are Facebook, Twitter and Instagram. Also this paper focus to provide such data by Personal Engagement by providing a deep insight into the user's' content and thus would generate quality data resulting in better customer base, high conversion and lower bounce rates.

Keywords:- Social Media marketing, Convolutional Neural Networks, Deep Neural Networks, Multilayer Preceptron, Support Vector, Stochastic Gradient descent

I. INTRODUCTION

Social media marketing (SMM) is the use of social media the platforms on which users build social networks and share information to build a company's brand, increase sales, and drive website traffic. In addition to providing companies with a way to engage with existing customers and reach

new ones, social media marketing (SMM) has purpose-built data analytics that allow marketers to track the success of their efforts and identify even more ways to engage.

With over 80% of consumers reporting that social media especially influencer content significantly impacts buying decisions, marketers across industries are driving the evolution of social media marketing (SMM) from a stand-alone tool to a multipronged source of marketing intelligence on an increasingly important and growing audience. As the use of social media trends upward, marketers are perfecting strategies to capture the significant competitive advantage that engagement with this key audience can deliver even more rapidly and more effectively than traditional marketing.

The power of social media marketing (SMM) is driven by the unparalleled capacity of social media in three core marketing areas: connection, interaction, and customer data. The users would be classified into different categories based on the preferences. The sufficient data for classification is obtained from the APIs from all the three platforms Facebook, Twitter and Instagram. The data from all the three platforms is integrated and combined for a specific user. The analysis is performed on the combined data that was generated for a user. The user is then accordingly classified on the basis of the analysis performed. The classification is done using the classifier algorithm is shown in figure1. The categorized users targeted for Marketing, which would lead to better results targeted for only those advertisements that match with their interests.

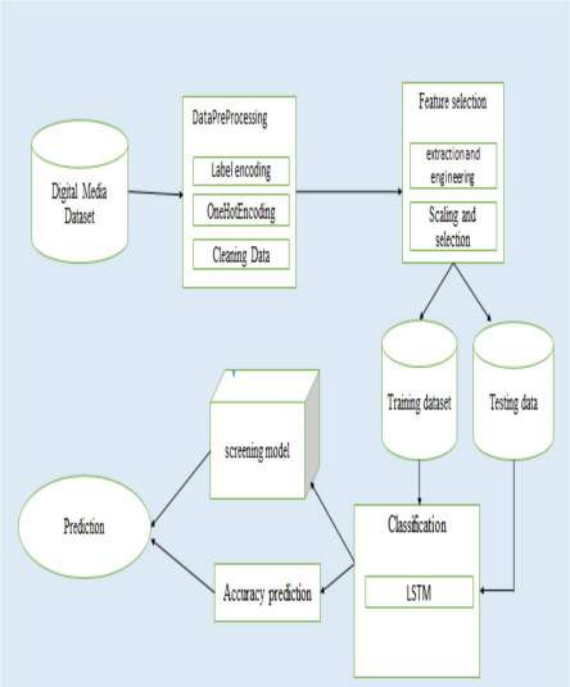

Figure 1 Block diagram of Classification of Digital Media data

The main purpose is to create a personal engagement system which would be helpful in various different ways other than existing system. They would be having details of customer base they can target and excel by increasing the “Conversion Rate”,

such that the yield from paid advertisement increases.

The conversion rate increases as the system maintains a copy of historic data that is updated on multiple instances to filter out the invalid data that is gathered over time. The data also would include local data along with global data to help targeting region based users. The 'Generate Data' request from the client would query the required responses from the APIs as well as the central database. This should satisfy the historic data need required for analytical purposes like historic analysis and trend analysis. It would also be able to respond to the instance requests as the data generated will have real-time accuracy.

II. LITERATRE SURVEY

Social networking websites allow Customers, Businesses and other organizations to interact with each other and make their relationships and communities online. When the marketing companies join these social channels, their consumers can be interact with them directly through social media [1]. Whatsapp, Facebook and Twitter, a microblogging online social network (OSN)[2], has quickly gained growing which provides people with the opportunity to communicate and share posts and topics. However, the sheer volume, noise, and dynamism of Facebook and Twitter, imposes challenges that hinder the efficacy of observing clusters with high intra-cluster and low inter cluster smilarties. Digital Media Marketing using trend analysis would help digital marketers, firms or freelancers to have a personalize engagement with the customer base and help them to generate a much more insight full marketing campaign rather than just wasting money without any reliable output[3]. CNNs are a derivative of standard Multilayer Perceptron (MLP) neural networks optimized for two-dimensional pattern recognition problems such as Optical Character Recognition (OCR) or face detection[4]. To train a simple CNN with one layer of convolution on top of word vectors obtained from an unsupervised neural language model. These vectors were trained by Mikolov et al.[5] on 100 billion words of Google News, and are publicly available. described a series of experiments with convolutional neural networks built on top of word2vec. Despite little tuning of hyperparameters, a simple CNN with one layer of convolution performs remarkably well. Our results add

to the well-established evidence that unsupervised pre-training of word vectors is an important ingredient in deep learning for NLP[6]. Text classification is the process of classifying documents into predefined categories based on their content. It is the automated assignment of natural language texts to predefined categories. Text classification is the primary requirement of text retrieval systems, which retrieve texts in response to a user query, and text understanding systems, which transform text in some way such as producing summaries, answering questions or extracting data[7]. The proposed text classification model examined online users on social networks have the audience perception of online advertisement.

III. IMPLEMENTATION AND METHODOLOGY

The most critical stage is achieving a successful system and in giving confidence on the new system for the user that it will work efficiently and effectively. The proposed system was developed using C#.NET. The existing system caused long time transmission process but the system developed now has a very good user-friendly tool, which has a menu-based interface, graphical interface for the end user.

After coding and testing, the project is to be installed on the necessary system. The executable file is to be created and loaded in the system. Again the code is tested in the installed system. Installing the developed code in system in the form of executable file is implementation.

Protocol:

Initialization factor:

K ------->System's security

C -------> client [user]

S -------> server (server donated by s)

Sm -------> system generate password

Pw -------> user password

Bo -------> user's biometrics data

SK -------> user's total credential

Factor-Registration:

The server (denoted by S) it is stored all user's credential and kept secret .The client (denoted by C), with an initial password PW, biometrics data and system password, registers on the system by running this interactive protocol with S. An execution of this protocol is denoted by

Factor-Reg

C [PW, BO, SM] <==========>S [SK] -------> {1, 0}

The information in square brackets indicates the secret value(s) known by the corresponding party. The output of this protocol is “1” (if the registration is successful) or “0” (Error message).

Factor-Login-Authentication:

This is another interactive protocol between the client C and the server S, which enables the client to login successfully using PW, BO, SM An execution of this protocol is denoted by

Factor-login-auth

C [PW, BO, SM] <==========>S [SK] **-------> {1, 0}**

The output of this protocol is “1” (if the authentication is successful) or “0” (otherwise).

Method of implementation:

System Implementation is the stage in the project where the theoretical design is turned into a working system. The most critical stage is achieving a successful system and in giving confidence on the new system for the user that it will work efficiently and effectively.

The existing system was long time process. The proposed system was developed using C#.NET. The existing system caused long time transmission process but the system developed now has a very good user-friendly tool, which has a menu-based interface, graphical interface for the end user. After coding and testing, the project is to be installed on the necessary system.

IV. PERFORMANCE ANALYSIS FOR DEEP NEURAL NETWORK AND SUPPORT VECTOR MACHINE

This work has chosen DNN – Deep Neural Network .Neural networks use randomness by design to ensure they effectively learn the function being approximated for the problem. Randomness is used because this class of machine learning algorithm performs better with it than without. The most common form of randomness used in neural networks is the random initialization of the network weights. Although randomness can be used in other areas, here is just a short list:

1. Randomness in Initialization, such as weights.
2. Randomness in Regularization, such as dropout.
3. Randomness in Layers, such as word embedding.
4. Randomness in Optimization, such as stochastic optimization.

A deep neural network is a neural network with a certain level of complexity, a neural network with more than two layers. Deep neural networks use sophisticated mathematical modeling to process data in complex ways. A neural network, in general, is a technology built to simulate the activity of the human brain – specifically, pattern recognition and the passage of input through various layers of simulated neural connections.

Many experts define deep neural networks as networks that have an input layer, an output layer and at least one hidden layer in between. Each layer performs specific types of sorting and ordering in a process that some refer to as "feature hierarchy." One of the key uses of these sophisticated neural networks is dealing with unlabeled or unstructured data. The phrase "deep learning" is also used to describe these deep neural networks, as deep learning represents a specific form of machine learning where technologies using aspects of artificial intelligence seek to classify and order information in ways that go beyond simple input/output protocols.

The data collected from the Telecom Industry Churn dataset. This data info to predict the churning of customer from that particular telecom industry for the current year and make appropriate preparations. Importing the Pandas gives massive functionality to work on data . Along with Pandas importing all the required libraries are even imported is shown in figure 2.

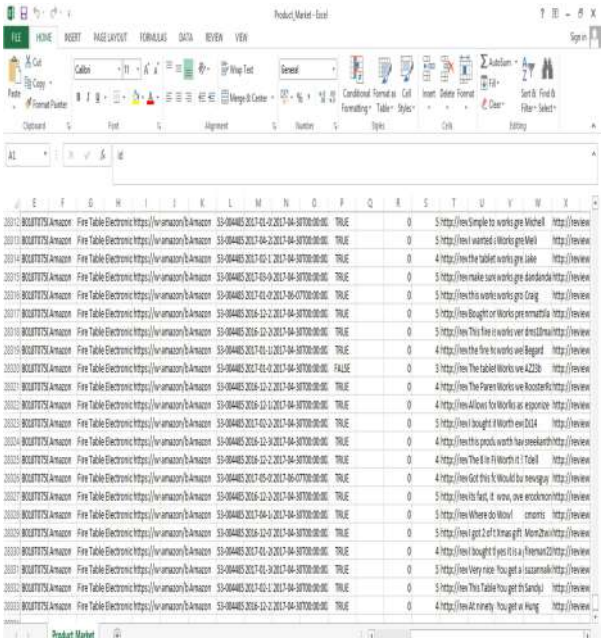

Fig 2 Text Classification of the Dataset

Before running a model, we need to make this data ready for the model. To convert any kind of categorical text data into model-understandable numerical data, to use the Label Encoder class, all we have to do is to label encode the first column. To import the Label Encoder class from the sklearn library, fit and transform the first column of the data, and then replace the existing text data with the new encoded data.

First argument is **Optimizer**, this is the algorithm is use to find optimal set of

weights. This algorithm is Stochastic Gradient descent(SGD). Among several types of SGD algorithm the one which will use is **'Adam'**. If go in deeper detail of SGD, it will find that SGD depends on loss thus our second parameter is **loss**. Since out dependent variable is binary, it will have to use logarithmic loss function called **'binary_crossentropy'**, if our dependent variable has more than 2 categories in output then use **'categorical_crossentropy'**. To improve performance of our neural network based on **accuracy** so add **metrics** as accuracy is shown in figure 3.

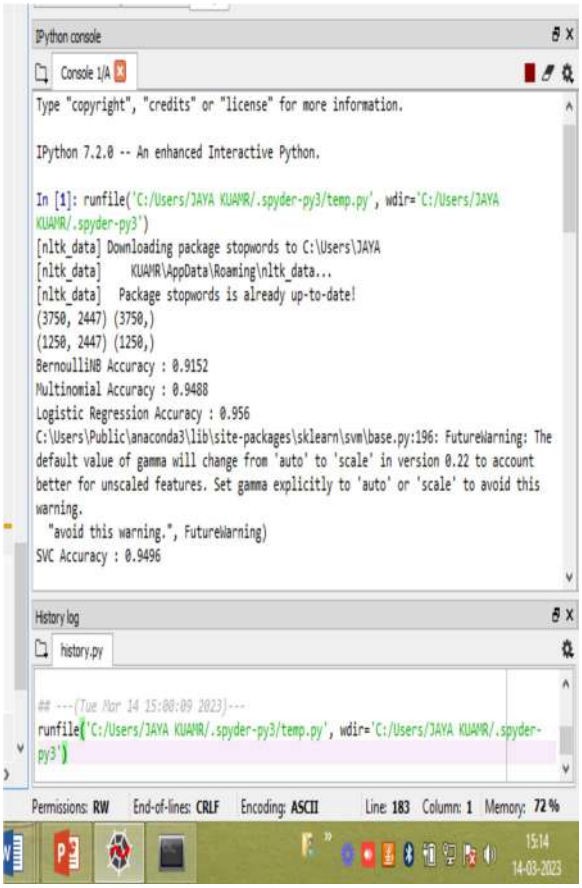

Figure 3 Accuracy using SVM Algorithm

The extracted features are usually plotted against the output to check its relation to the output is shown in Figure 4.

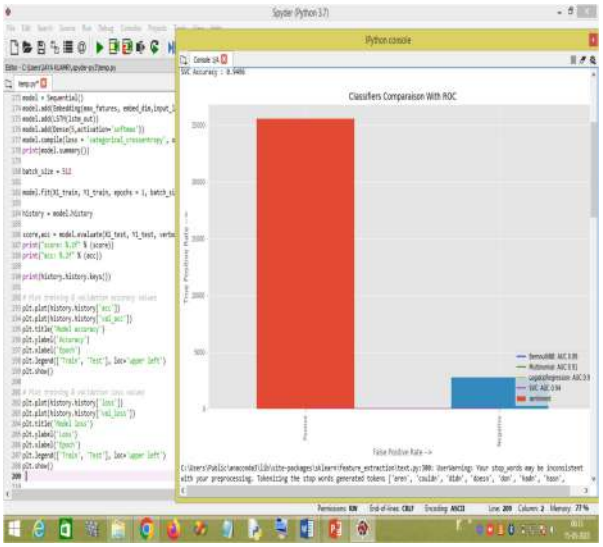

Figure 4 Visualization of the extracted features comparison

V. CONCLUSION AND FUTURE WORK

This paper aim analyzed Digital Media Marketing using trend analysis would help digital marketing. Based on the result analysis, which help to marketer, firms or freelancers to have a personalize engagement with the customer base and help them to generate effective platform. More insight marketing campaign rather than just wasting money without any reliable output. Social Media Marketing relies on Hash-Tags for interaction with customer. To use the hash-tag for profile analysis such that they are classified into various classes. After the

result is generated it would help clients to target specific set of people grouping which would increase their per capital yield over a paid digital marketing campaign. This method will be increase the number of sales and develop a great business relation within the social media community. Some of the security gap due to the presence of malicious behavior in the marketing field through mobile nodes. To overcome such issue and to provide better security for the digital media marketing can be targeted or utilized simultaneously interesting in future which enhances the network security and can provide better transmission on mobile digital marketing in the social media.

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A Deep Learning Method for Masked Human Face Recognition in Criminal Identification

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ABSTRACT

A Deep Learning Method for Masked Human Face Recognition in Criminal Identification is a computer-based biometric authentication technique used to identify a victim. By using deep learning algorithm it is possible to identify the exact victim from a group with masked and unmasked faces. Due to the outbreak of Covid-19, wearing a mask had made the task of face recognition and authentication more challenging. Masked face recognition includes two parts. The first part is concerned with feature extraction and the second part concerned with face recognition from masked faces. There were several factors that affect the ability of models to detect faces including light, occlusion and multi-object detection .This paper provides a new authenticated mechanism to detect the victim using real time face recognition method.

Keywords: *Face Recognition, Authentication, Biometric, Deep Learning, Masked, COVID-19.*

1. INTRODUCTION

The main objective of face recognition is to find a series of data of the same face in a set of training images in a database. It is one of the advanced forms of biometric authentication capable of identifying and verifying a person using masked facial features in an image from a database. An image with a huge number of human faces is very challenging for an accurate detection rate. Face occlusion is a mechanism of partially hiding the human faces through several objects. This paper highlights masked faces, which impact the detection rate. More over low resolution or noisy image too affects the mechanism of face recognition. In addition, we construct a huge set of faces wearing masks so that it helps to efficiently and quickly train the model. Through experiments, our model proved to be 99.76% accurate for real faces wearing masks. A combined accuracy of 99.48% for extreme environments such as too high or lousy contrast and brightness. Hence Face recognition is the process of automatically identifying an individual from captured images and face detection is the process of identifying the face from the captured image or the specified image from the database. The major problem faced by this method is that people often wear face masks incorrectly, either not covering the nose or mouth, which is equivalent to not wearing it at all. The deep learning algorithms detected the covered features on the face to ensure that the correct parts of the face were covered and had amazingly better result. By using this system, once the face is recognized and the exact victim is caught, the information related to the corresponding victim is displayed including age, crimes committed, associated people last spotted.

2. RELATED WORK

A Deep Learning Method for Masked Human Face Recognition in Criminal Identification focuses on real time recognition using deep learning [1]. The masked Face net [2] defines the various techniques used with generative data augmentation and domain constrained ranking [3] and advances in deep learning techniques for face recognition of criminals [4]. The masked recognition method based on DCNN and Graph Convolutional Network [5] helps to predict the victim by comparing several faces. The deep learning framework for light weight face mask identification incorporated the way of wearing mask in the face exactly [6]. The mechanism of unmasking by self restrained triplet loss [7] is used for predicting the accuracy in face recognition of criminals. More over the stage

of occlusion [8] of face images detects the recognition with mask guided- Two Stages GAN [9]. Deep metric learning with dynamic margin sampling loss for face verification too helps to identify the exact face [10] which is a face recognition model for masked faces [11] with Attention mechanism [12]. Due to COVID-19 efficient masked face recognition is encouraged for criminal identification [13] which is implemented with a novel deep mask model [14] and integrated face mask detector [15]. The implementation includes matching of masked and unmasked objects [16]. With the images from the dataset for training and testing, the masked face recognition using deep learning provides efficient system for criminal identification [17].

3. METHODOLOGY

Face detection is a computer vision problem that involves finding the features of a human face from images stored in the database. The proposed work includes two main phases: first phase performs the data collection and dataset preparation, where as the second phase presents a better and advanced Deepmasknet model construction for authentication of masked facial recognition in order to identify criminals. This advanced Deepmasknet model that was proposed can effectively used for the authentication of masked facial recognition. This masked recognition helps to identify the original victim by comparing the trained image in the data set. This too helps to identify and track criminals.

3. ARCHITECTURE

The first step in masked human face recognition for criminal identification is image acquisition where the input image is fed into the system for feature extraction. By using deep learning algorithm, feature extraction task can be performed without any difficulty and the original image is identified Illustration, several crucial steps are typically put in place toward developing the final from the masked face.

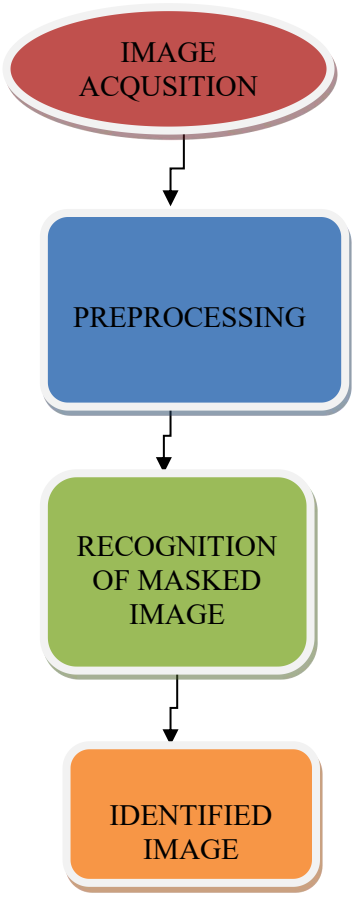

Fig :1 Overview of Proposed Method

The final mechanism is face verification with a classifier in which the matching was done with the original image with the image in the database. If both the images match then the information related to the corresponding image is displayed.

4. MASKED FACE RECOGNITION FRAME WORK

This section illustrates how Masked Face Recognition systems are developed through a set of phases, as depicted in Figure 2. The generic methodology is mainly based on deep learning models that are widely adopted to learn several distinct features of masked faces. It is observed that from this recognition system, as discussed in the following section.

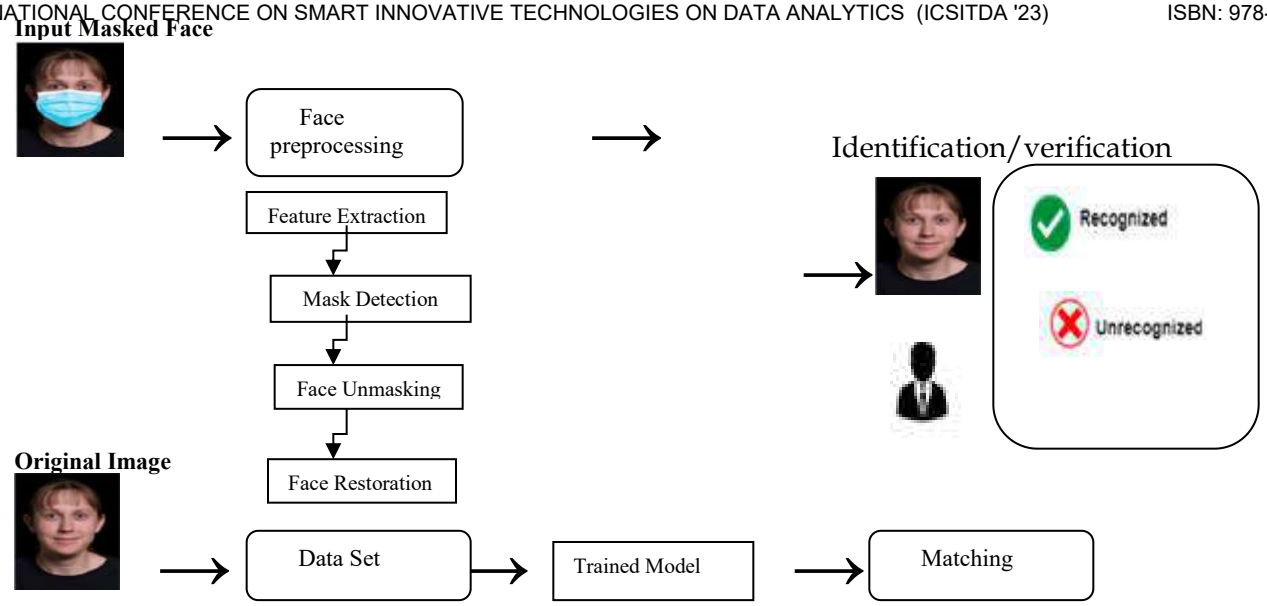

Figure:2 A pictorial representation of the masked face recognition framework

Initially a collection of original masked images with corresponding exact images are prepared. This usually includes splitting them into categorical directories for the purpose of model training, validation, and testing. This is followed on general purpose images and on new collection of masked faces. This feature helps to detect the face masks accuracy. A mechanism of face un- masking is applied in order to restore the masked face and returns the prediction of original face. Finally the predicted face is matched with exact image to decide whether a particular victim is identified. The performance of Face Recognition systems, with or without masks, is largely influenced by the nature of face images used in the training, validation, and testing stages. There are few publicly available datasets that include facial image pairs with and without mask objects to sufficiently train the Masked Face Recognition system in a progressing manner. Among the most popular methods used to synthesize the face masks are MaskTheFace, MaskedFace-Net, deep convolutional neural network (DCNN).Images have also been widely pre-processed using data augmentation, by which many operations could be applied to enrich the amount and variation of images such as image cropping, flipping, rotation, and alignment. Other augmentation processes are also applied to improve the quality of image representation such as image re-scaling, segmentation, noise removal, or smoothing. Moreover, image adjustment can be performed to improve its sharpness. Deep Learning Models have been proposed and attempted to recognize human faces by hand-crafted local or global features, such as LBP SIFT and Gabor. These approaches suffer from the ability to maintain the uncontrolled facial changes that deviate from their initial assumptions, then shallow image representations were introduced, e.g., learning-based dictionary descriptors to improve the distinctiveness and compactness problems of previous methods. Although the accuracy improvements are achieved, these shallow representations still tend to show low robustness against real-world applications and instability against facial appearance variations.

Deep Convolutional Neural Networks

Deep Convolutional Neural Network (DCNN) is one of the most effective neural networks in image classification, recognition, retrieval, and object detection. DCNNs typically consist of cascaded layers to control the degree of shift, scale, and distortion which are input, convolutional, sub sampling, fully connected, and output layers. They can efficiently learn various kinds of intra-class differences from training data, such as illumination, pose, facial expression, and age DCNN-based models have been widely utilized and trained on numerous large-scale face datasets. One of the most popular pretrained architectures that have been successfully used in Face Recognition tasks is Alex Net. Alex Net decreased the training time and minimized the errors, even with

large scale datasets. VGG16 and VGG19 are also very common DCNN-based architectures that have been utilized in various computer vision applications, including face recognition. The VGG-based models typically provide convolution-based features or representations .

Model	Subset	Deep Convolutional Layers	Other layers	Total Layers
AlexNet	-	5	3	8
VGG	VGG16	13	3	16
	VGG19	16	3	19

Table 1. A summary of CNN-based models

Deep Reinforcement Learning

Reinforcement learning learns from the nearby environment The combination of deep learning and reinforcement learning is effectively applied in deep Face Recognition FaceNet helps to maps images to Euclidean space via deep neural networks, which builds face embeddings according to the triplet loss. When the images belong to the same person, the distance between them will be small in the Euclidean space while the distance will be large if those images belong to different people. This feature enables FaceNet to work on different tasks such as face detection, recognition, and clustering.

The pre processing is a mechanism to train a network and the prediction of new data. It includes reading input image, resize the image according to user's wish, and remove the noise so that the image is clear to detect, process segmentation and finally perform smoothing of edges.

FACE DETECTION

Detection is the process of finding a face in an image. Facial recognition can detect and identify individual faces from an image containing one or more criminal's faces. It can detect facial data in both front and side face profiles under different lighting conditions. When the exact match is found, it is considered as the perfect match it displays all the information related to the image.

Feature Extraction

Feature extraction is a crucial step in the face recognition that aims at extracting a set of features to represent and learn the key facial attributes such as eyes, mouth, nose, and texture. With the existence of face occlusions and masks, this process becomes more complicated. In the context of masked face recognition, the feature extraction approaches can be divided into shallow and deep representation methods. Shallow feature extraction is a traditional method that explicitly formulates a set of handcrafted features with low learning or optimization mechanisms. In the non-occluded face recognition tasks, they have achieved a noticeable accuracy and robustness against many face changes such as illumination, affine, rotation, scale, and translation. The performance of shallow features has shown a degradation while dealing with occluded faces, including face masks, which have been largely outperformed by the deep representations obtained by deep learning models. Many methods were created and evaluated to extract features from faces using deep learning. Graph image representations with Deep graph Convolutional Networks (GCN) have also been utilized in the domain of masked face detection, reconstruction, and recognition

MASK DETECTION

Recently, face masks have become one of the common objects that occlude the facial parts, coming in different styles, sizes, textures, and colors. This strengthens the requirement of training the deep learning models to accurately detect the masks. Most of the existing detection methods, usually introduced for object detection, are tuned and investigated in the task of mask detection. Regions with CNN features (R-CNN) holds a global adoption in the domain of object detection, in which a deep ConvNet is utilized to classify object proposals. In the context of occluded faces, R-CNN extracts thousands of facial regions by feeding them to a DCNN network and applying a selective search algorithm, which generates a feature vector for each region. More research efforts have been concentrated on using the segmentation-based deep networks for mask detection. Finally, the classification and regression tasks employ the weighted vectors as input to identify the real facial regions. Local features fusion-based deep networks have also been applied to a nonlinear space for masked face

Face Restoration .After unmasking the face, any missing parts should be estimated and

restored in order to conduct the identity matching process to make the recognition decision. One of the pioneering works in image reconstruction is sparse representation-based classification (SRC). Sparse representation and particle filtering were combined for face restoration. Deep learning methods have addressed such challenges in order to recover the missing part in the facial image. There were Two-Stage generative adversarial network (TSGAN) and proposed an attention model that is based on occluded masks, a set of images of identified subjects is initially fed to the system during the training and validation phase. In the testing phase, a new unseen subject is presented to the system to make a recognition decision. For a set of deep features or descriptors to be effectively learnt, an adequate loss function should be implemented and applied. Deep learning models for matching face identities have widely used the softmax loss-based and triplet loss-based models. Softmax-loss-based models rely on training a multi-class classifier regarding one class for each identity in the training dataset using a softmax function. The triplet loss-based models are characterized in learning the embedding immediately by matching the results of various inputs to minimize the intra-class distance and therefore maximize the inter-class distance. However, the performance of softmax lossbased and triplet loss-based models suffer from the facemask occlusions which can be either by GAN-based methods to unmask faces before feeding them to the face recognition model by extracting features only from the upper part of the face or by training the face recognition network with a combination of masked and unmasked faces. Non-face objects were randomly put on faces. The Masked Face Detection Dataset (MFDD), Real-World Masked Face Recognition Dataset (RMFRD), and Masked Face Recognition Dataset (SMFRD) were used. MFDD includes 22,771 images of masked faces to enable the Masked Face Recognition model to detect the masked faces accurately. RMFRD includes 5200 images of 500 people with masks, and 92,000 images of the same people without masks. This dataset is the largest dataset available for Masked Face Recognition. After this, it resize and crop images using the bounding box as a post-processing step then extracted the main features using FaceNet. The SVM classifier is used to recognize identities. For training, data augmentation was used to generate synthetic masked faces from existing face recognition datasets by aligning faces and masks and detecting pre-defined facial landmarks. FaceNet is used to recognize the person's identity. Domain-specific deep models such as VGGFace, FaceNet, OpenFace, and DeepFace can also be incorporated with robust face completion algorithms to improve the learning capability of Masked Face Recognition systems. With the help of masked faces and unmasked faces, it is possible to identify the criminals. Based on the trained images, this mechanism helps to remove the masks from the face and matching emphasizes the exact identification with domain specific face recognition system.

When the face is first discovered, and then deep features are evaluated based on their conformity with the face via the following equation:

$$\mathbf{MFR=M\ [K\ (D_i\ (E_i));\ K\ (D_j\ (E_j))]}$$

- where **M** indicates the face matching algorithm, which is used to calculate the degree of similarity,
- **K** refers to extracting the feature encoded for identity information,
- **D** is the stage of occlusal condition, expressions, highlights, and phenomena; and
- $\mathbf{E_i}$ and $\mathbf{E_j}$ are two faces in the images.

Figure:3 Sample masked and unmasked faces

The above figure includes few images representing masked and unmasked faces. They were used for spotting exact criminals when employed with DCNN algorithm. After performing all the tasks involved in face recognition with masked faces, the exact victim will be identified and the information related to the criminal will be displayed.

Accuracy:
The accuracy is verified using confusion matrix. One of the most widely used evaluation metrics for recognition and classification problem. It represents the ratio of TP and FP between the correct numbers of Prediction and the total number of predictions which can be defined as follows:
Accuracy = (TP + TN)/(TP + TN +FP + FN)

The precision is represented as

Precision = TP/(TP + FP)

5. CONCLUSION AND FUTURE WORK

A Deep Learning Method for Masked Human Face Recognition in Criminal Identification involves the recognition of Criminals by detecting mechanisms, methods, approaches and algorithms. The mechanisms were presented through deep learning which enhances face recognition system by identifying the face along with the details of the victim. DNN (Deep Learning Neural Network) approach is used to train the data set and to achieve better solution and accuracy. The accuracy was improved rapidly by comparing the same with other techniques in future.

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 ISBN: 978-93-83191-92-5

Comparative Analysis of Hybrid ABC-BAT Algorithm with ABC, PSO, GA, BAT Algorithms in Crowdsourcing Environment

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Abstract:

Artificial bee colony (ABC) algorithm is a population based optimization algorithm, based on a particular intelligent behavior of honeybee swarms. The original population based ABC algorithm has low convergence speed. The bat algorithm is a recently proposed meta-heuristic algorithm. It is based on the echolocation behavior of bats. BA is very good at exploitation how- ever it is generally poor at exploration. This work hybrid the performance of ABC algorithm with that of bat algorithms. In order to overcome premature to improve the convergence speed and optimal accuracy. In this paper proposes a new hybrid ABC BAT algorithm, proposed preprocessing method, used to extract the information from the Crowdsourcing systems. This algorithm use a Random walk phase. The simulation results show that the performance of hybrid ABC BAT algorithm is compared to GA, PSO algorithms. The results showed that the new Hybrid algorithms outperforms the other algorithms. The proposed algorithm had better optimization accuracy, convergence rate, and robustness. The simulation results show that the performance of hybrid ABC-bat algorithm have better performance.

Keywords: Swarm intelligence; ABC, PSO, GA, BAT, Query Optimization, Crowdsourcing

Introduction:

Several modern heuristic algorithms have been developed for solving combinatorial and numeric optimization problems [1]. These algorithms can be categorized into different groups depending on the criteria being considered, such as population based, iterative based, stochastic, deterministic, etc. While an algorithm working with a set of solutions and trying to improve them is called population based, the one using multiple iterations to approach the solution sought is named as iterative algorithm. If an algorithm employs a probabilistic rule for improving a solution then it is called probabilistic or stochastic. Another classification can be made depending on the nature of phenomenon simulated by the algorithm. This type of classification mainly has two important groups of population based algorithms: evolutionary algorithms (EA) and swarm intelligence based algorithms. The most popular EA is Genetic Algorithm (GA). GA attempts to simulate the phenomenon of natural evolution. In natural evolution, each species searches for beneficial adaptations in an ever-changing environment.

Materials and Methods:

Nature has always been an inspiration for researchers. One of the most important meta-heuristic algorithms is the artificial bee colony (ABC) algorithm in literature. Karaboga proposed the ABC algorithm in 2005 [2] by examining intelligent behavior of honey bees. Bees exhibit some intelligent

behavior while they perform their tasks such as foraging, navigation and task selection. The foraging mechanism as one of these tasks is more significant because the ABC algorithm was improved by mimicking food searching behavior of honey bees. In the mechanism of foraging, honey bees are divided into three groups depending on their task; that is, employed, onlooker and scout bees. Employed bees fly on a source and exploit that source, while onlooker bees select a source with respect to the dance performed by the employed bees, and scout bees randomly search a new place by using internal motivation or possible external clues.

In the history, many new nature enthused algorithms have been developed to solve hard problems in optimization. Many versions of ABC and improvements may be found in the literature (E. Gerhardt and H. Gomes,2005; D. Karaboga and B. Basturk,2008; Abraham et al, 2012……..).

Uma et al [3] studied about the problem of discovering interaction pattern in the semantic knowledge. Author enhanced the ABC algorithm using the partial least square mechanism (PLS).The frequent interactions made in the algorithm are used to reduce the execution time. The enhanced ABC algorithm is used for interpretation of human behavior. Priya et al [4] studied about the problem of information retrieval. Authors try to improve the searching efficiency using the Hybrid Genetic algorithm-Particle swarm optimization. The New HGAPSO algorithm helps to improve the search results. The fitness function used in the algorithm gives more sophisticated result.

Soudeh et al [5] focused about constrained optimization problems. To overcome the insufficiencies in ABC algorithm author try to implement a new algorithm efficient constrained Artificial Bee Colony Algorithm. Smart flight operator is used in the scout bee phase. The eABC algorithm is tested on several constrained benchmark problems. EABC algorithm is competitive one. Yunfeng Xu et al [6] developed a simple and proficient artificial bee colony algorithm. The new ABC algorithm modifies the employed and onlooker bee phase. Author tested 12 bench mark functions. To balance the exploration and exploitation of ABC, Author proposed a new ABC algorithm. The NABC algorithm is simpler and easy to implement and it also improve accuracy. Sandeep et al [7] focused the search procedure in ABC Algorithm. ABC is one of the population based algorithm. ABC algorithm have some drawbacks in search procedure. This paper introduces a new search method that is used to balance the convergence capability and diversity. The employed bee phase and onlooker bee phase are improved with the help of memetic algorithm. New method used for fitness calculation and probability calculation. Author proposed improved memetic ABC algorithm that is superiority than other ABC algorithm.

Bat algorithm (BA) was proposed by Yang in 2010 [8]. It is considered a new meta-heuristic algorithm for continuous optimization. BA is based on the fascinating capability of microbats (echolocation) to find their prey and discriminate different types of insects even in complete darkness. BA has demonstrated to outperform some well-known nature-inspired optimization techniques like GA, and PSO algorithms [8]. BA is applied in continuous optimization in the context of engineering design optimization .BA can deal with highly nonlinear problem efficiently and can find the optimal solutions accurately [9].Case studies include pressure vessel design, car side design, spring and beam design, truss systems, tower and tall building design and others.. BA can handle multi objective problems effectively [10].

Many versions of PSO and improvements may be found in the literature, many sparkling new metaheuristic algorithms have most sincerely been advanced (Cui, 2009; Yang, 2010; Yang and Deb, 2010; Yang et al., 2011; Yang et al.., 013).

1. Artificial Bee Colony (ABC)

Artificial Bee Colony (ABC) algorithm was proposed by Karaboga in 2005 for real parameter optimization [2]. It is inspired by the intelligent behavior of honey bees. The colony of artificial bees consists of three groups of bees: employed, onlooker and scout bees. Half of the colony composed of employed bees and the rest consist of the onlooker bees. The number of food sources/nectar sources is equal with the employed bees, which means one nectar source is responsible for one employed bee. The aim of the whole colony is to maximize the nectar amount. The duty of employed bees is to search for food sources (solutions). Later, the nectars amount (solutions, qualities/fitness value) is calculated. Then, the information obtained is shared with the onlooker bees which are waiting in the hive. The onlooker bees decide to exploit a nectar source depending on the information shared by the employed bees. The onlooker bees also determine the source to be abandoned and allocate its employed bee as scout bees. For the scout bees, their task is to find the new valuable food sources. They search the space near the hive randomly [ ]. In ABC algorithm, suppose the solution space of the problem is D-dimensional, where D is the number of parameters to be optimized.

The fitness value of the randomly chosen site is formulated as follows:

$$\mathrm{fit_i} = \frac{1}{(1+\mathrm{obj.fun_i})}$$

The size of employed bees and onlooker bees are both SN, which is equal to the number of food sources. There is only one employed bee for each food source whose first position is randomly generated. In each iteration of ABC algorithm, each employed bee determines a new neighboring food source of its currently associated food source and computes the nectar amount of this new food source by

$$v_{ij} = x_{ij} + \theta(x_{ij} - x_{kj})$$

Where;

$i = 1,2,\ldots,SN$, in range $[0,1]$

1 2 D $j =$, , … ,

$\theta =$ random number , .

If the new food source is better than that of previous one, then this employed bee moves to new food source, otherwise it continues with the old one.

After all employed bees complete the search process; they share the information about their food sources with onlooker bees. An onlooker bee evaluates the nectar information taken from all employed bees and chooses a food source with a probability related to its nectar amount by Equation:

$$p_i = \frac{\mathrm{fit_i}}{\sum_{j=1}^{SN} \mathrm{fit_j}}$$

Where $\mathrm{fit_i}$ is the fitness value of the solution i which is proportional to the nectar amount of the food source in the position i and SN is the number of food sources which is equal to the number of employed bees.

Later, the onlooker bee searches a new solution in the selected food source site, the same way as exploited by employed bees. After all the employed bees exploit a new solution and the onlooker bees are allocated a food source, if a source is found that the fitness hasn't been improved for a predetermined number of cycles (limit parameter), it is abandoned, and the employed bee associated with that source becomes a scout bee. In that position, scout generates randomly a new solution by:

$$x_i^j = x_{min}^j + r(x_{max}^j - x_{min}^j)$$

Where; r is random number in range [0 , 1].
x_{min}^j , x_{max}^j are the lower and upper borders in the j^{th} dimension of the problem space.

2. BAT Algorithm (BA)

Bat Algorithms (BA), which is a new nature inspired algorithm for continuous optimization is proposed by Yang in 2010 [11]. Yang developed the bat algorithm with the following three idealized rules:

a. All bats use echolocation to sense distance, and they also know the difference between food/prey and background barriers in some magical way.
b. Bats fly randomly with velocity v_i at position x_i with a frequency f_{min}, varying wavelength λ and loudness A_0 to search for prey. They can automatically adjust the wavelength (or frequency) of their emitted pulses and adjust the rate of pulse emission $r \in [0,1]$, depending on the proximity of their target.
c. Although the loudness can vary in many ways, we assume that the loudness varies from a large (positive) A_0 to a minimum constant value A_{min}.

First, the initial position x_i, velocity v_i and frequency f_i are initialized for each bat b_i. For each time step t, the movement of the virtual bats is given by updating their velocity and position using Eq. (13), Eq. (14) and Eq. (15) respectively, as follows:

$$f_i = f_{min} + (f_{max} + f_{min})\beta,$$

$$v_i^t = v_i^{t-1} + (x_i^{t-1} + x*)f_i,$$

$$x_i^t = x_i^{t-1} + v_i^t,$$

Where β denotes a randomly generated number within the interval [0, 1]. Recall that x_i^t denotes the value of decision variable j for bat i at time step t .The result of f_i in Eq. (13) is used to control the pace and range of the movement of the bats. The variable $x*$ represents the current global best location (solution) which is located after comparing all the solutions among all the n bats. In order to improve the variability of the possible solutions, Yang [15] has employed random walks. Primarily, one solution is selected among the current best solutions for local search and then the random walk is applied in order

To generate a new solution for each bat;

$$x_{new} = x_{old} + \varepsilon A_t$$

Where, A_t stands for the average loudness of all the bats at time t, and $\varepsilon \in [-1,1]$ is a random number. For each iteration of the algorithm, the loudness A_i and the emission pulse rate r_i are updated, as follows:

$$A_i^{t+1} = \alpha A_i^t$$
$$r_i^{t+1} = r_i^0[1 - \exp(-\gamma t)$$

Where α and γ are constants. At the first step of the algorithm, the emission rate, r_i^0 and the loudness, A_i^0 are often randomly chosen. Generally, $A_i^0 \in [1,2]$ and $r_i^0 \in [0,1]$.

4. Particle Swarm Optimization Algorithm (PSO)

PSO is a heuristic search method which is derived from the behavior of social groups like bird flocks or fish swarms [36]. PSO moves from a set of points to another set of points in a single iteration with likely improvement using a combination of deterministic and probabilistic rules. The PSO has been popular because of its ease of implementation, and the ability to effectively solve highly nonlinear, mixed integer optimization problems that are typical of complex engineering systems. Optimization is achieved by giving each individual in the search space a memory for its previous successes, information about successes of a social group and providing a way to incorporate this knowledge into the movement of the individual [36].

A comparative study is made between these algorithms according to various constraints such as time, convergence speed, number of iterations, and applications. The result obtained from this comparison is tabulated below.

5. Hybrid ABC-BAT Algorithm

The standard ABC algorithm[24] had disadvantages of easily prematurely falling into local optima and slow convergence rate in later stage[10, 13, 14]. So that we are using random walk step in this place. The New Algorithm is named as Hybrid ABC-BAT Algorithm. The initial food sources are produced randomly in the search space due to dissimilar problems. In the employed bee stage, worker bees search for the local optimization value in the neighborhood of food source. Generally, different local food hunt strategies will are utilized for various issues. In our paper, Random walk of BAT algorithm is applied in the place of onlooker bee phase. In the onlooker bee phase, the random selection process will be utilized here to search for local optimization value in the neighborhood of food source and the higher probability solution will be preferred by onlooker bees.

A random walk with direct exploitation is used for the local search that corrects the current best solution. ε denotes path and intensity of random-walk that is known as scaling factor. The process for updating the position of the bats and the velocity is parallel to that of the PSO (Particle Swarm Optimization) algorithm. In this way, the BAT algorithm can be seen as a well-known equilibrium between the standard Particle swarm optimization algorithms. The intensive local search controlled by the loudness and pulse rate. The local search is propelled with the proximity relying upon the rate ri of pulse emission for the i-th bat. When the bat discovered its prey decrease loudness and rising the pulse emission. The loudness can be preferred as any value of expediency. The Hybrid ABC-BAT Algorithm has 3 stages they are initialization of food sources, optimization phase, and Random walk phase.

Procedure of Hybrid ABCBAT:

The input control parameters of ABC are set as:

Colony Size, CS=5, and

Dimension of the problem, D = 2
Limit of scout is calculated as

$$LS = \frac{size\ of\ colony * d}{2} = \frac{5 * 2}{2} = 5$$

Control parameters of BAT is set as:

Pulse rate r_i^t and

Loudness A_i^t

Calculation of the objective function:

$$obj(i) = \left[\min\{(x_{\max}(i))^2 + (x_{\min}(i))^2\}\right] \quad (1)$$

In the above equation (1),

$x_{\max}(i)$ -Maximum of the confidence value

$x_{\min}(i)$ -Minimum of the confidence value

The **Hybrid ABCBAT** consists of four main phases:

Step 1: Initialization of population

First, Three food sources will be initialized the positions of 3 food sources (CS/2) of employed bees, randomly using uniform distribution in the range (50, 500).

$$x_i^j = x_{\min}^j + rand\,[0,1] * (x_{\max}^j - x_{\min}^j) \quad (2)$$

Where $i = 1, 2, \cdots, N$ and

$j = 1, 2, \cdots, D$.

x_i^j - ith employed bee on the dimension j of the D-dimensional space.

N - Number of employed bee.

$x_{\max}^j$ -Upper bound for x_i^j.

$x_{\min}^j$ -Lower bound for x_i^j.

Step 2:Calculation of the fitness function:

$$F(i) = \begin{cases} \dfrac{1}{(1 + obj(i))} & if\,(obj(i) \geq 0) \\ 1 + abs(obj(i)) & if\,(obj(i) < 0) \end{cases} \quad (3)$$

$obj(i)$ Is separate objective functions

Step 3: Employed bee phase (Update new position)

For each employed bee produce new solution (food source position)

$v_{ij} = x_{ij} + \psi_{ij}(x_{ij} - x_{kj})$, (4)

Where, $j = 1,2,\cdots,D$ and $k = 1,2,\cdots,N$.

In the above equation (4)

x_i^j is the i^{th} employed bee,

v_i^j is the new solution for x_i^j,

x_k^j is the neighbor bee of x_i^j in employed bee population,

φ -Randomly selected in the range [-1, 1],

D - is the dimension of the problem and

N denotes the number of employed bee.

In the above equation j and k values are nominated randomly. Best Solution will be memorized.

Step 4: Random Walk Phase

A solution is selected amongst the best solution and random walk is applied in order to increase exploration. Thus a new candidate solution is produced.

$x_{new} = x_{old} + \varepsilon A^t$ (5)

Where Ɛ [-1,1] is a random number that signifies the path and intensity of random walk, while A^t is the average loudness of all the bats at this time step.

Loudness and pulse emission rate must be altered as repetitions continued. When the bat gets closer to its prey the loudness normally decreases and pulse emission rate r increases. By the resulting equations loudness and pulse emission rate are modernized.

$A_i^{t+1} = \alpha A_i^t$

$r_i^{t+1} = r_i^0[1 - e^{(-\gamma t)}]$

Where α and γ are constants and is set to 0.9 in our simulation. Here the initial loudness can typically be [1, 2], while the initial emission rate can be normally [0, 1].

As mentioned above, in this article we propose a new ABC-BAT, called Hybrid ABC-BAT Algorithm. It was obtained by hybridizing the original ABC and BAT using the Random strategies.

HYBRID ABC-BAT Algorithm

The Hybrid ABCBAT pseudo-code is illustrated here,

Step 1: Generate the initial population x_i where $i = 1,2,3,\cdots,N$

Step 2: Estimate the fitness value of the crowd

Step 3: Gen=1

Step 4: $Gen \leq Gen_{\max}$ (Recap)

Step 5: For each employed bee yield new solution (food source position)

$v_{ij} = x_{ij} + \psi_{ij}(x_{ij} - x_{kj})$, Calculate the value f_i

Apply greedy selection process between x_i and v_i

Step 6: Select a solution amongst the best solutions

Step 7: Solution updating using random walk

Apply greedy selection process for the random walk between x_i and v_i

If (rand <A_i) and obj(i)<obj(i*)

Accept new solutions

Increase r_i, reduce A_i

Ranks the bats and find current best x*

end while

Display results.

Step 8: If there is an abandoned solution then replace by with a new randomly formed solution x_i for the scout.

Memorize the best food source position

Step 9: Gen=Gen+1

Until cycle= Maximum cycle number

Step 10: End

As a result, Hybrid ABC BAT from the original ABC and BAT in step 7, where solution is modified using Random walk phase.

Performance Metrics:

Cost: The monetary price of query strategy, represented by cost, is that the overall rewards obtained for executing all crowdsourcing operators in the query plan. The cost of an operator depends on the price given to crowd for each query produced by the operator.

Latency: As crowdsourcing takes time, latency is clearly introduced to enumerate the quickness of question analysis. However, it is non-trivial to calculate and enhance latency.

Accuracy: Crowdsourcing could yield comparatively low-quality results or maybe noise, if there are spammers or cruel workers. Thus, accuracy is occupied as another necessary performance metric to live the standard of crowdsourcing results.

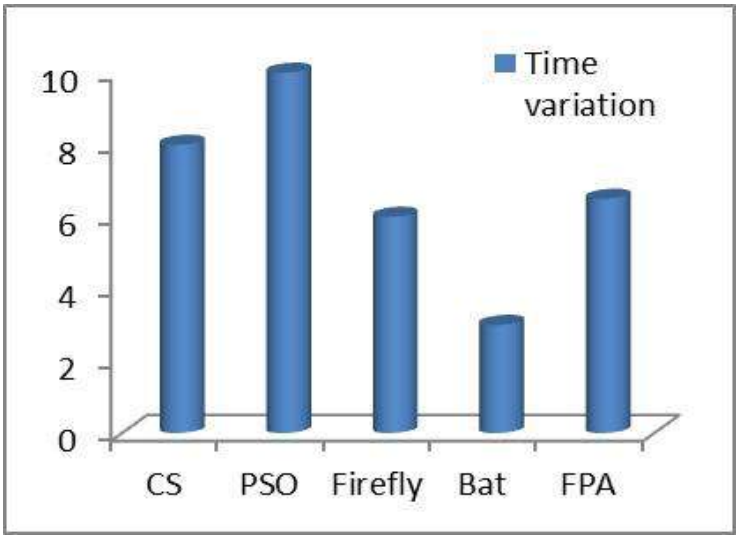
Accuracy= fitness*100

Convergence= (log(fitness new/fitness old))

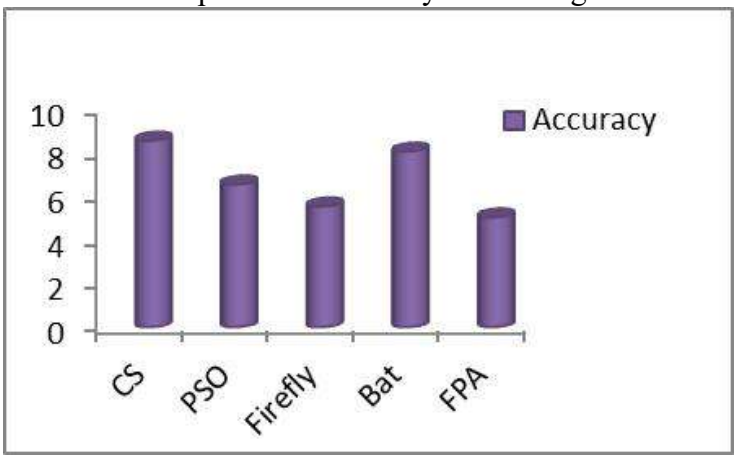
Simulation Analysis:

Algorithms	Time	Convergence	Iterations	Accuracy	Complexity
Cuckoo Search	High (less than PSO)	Faster Convergence compared to PSO	Less iterations	High Accurate	Not Complex
Particle Swarm Optimization (PSO)	Very High	Fast Convergence	Very Less	Accurate	Not Complex
Firefly Algorithm	High	Better Convergence	less	Good	Less complex
Bat Algorithm	Less	Fast Convergence	medium	.High Accurate	Less complex
Flower Pollination Algorithm	High	Slow Convergence	High	Good	complex

Based on the above comparison we made a graphical Representation to compare each algorithm with each Parameter, to identify the suitable algorithm.



From the figure.7 we can understand that Particle swarm optimization, Cuckoo search, Bat algorithm, Firefly Algorithm and Flower Pollination takes different time because there is more number of generations to be considered. So based on the above graph we can say that Bat Algorithm uses moderate time. Next we compared the accuracy of each algorithm



From the figure.8 it is clear that the Flower pollination Algorithm has lower accuracy while all others have better accuracy. Even then when we consider the Cuckoo search have better accuracy with better time.

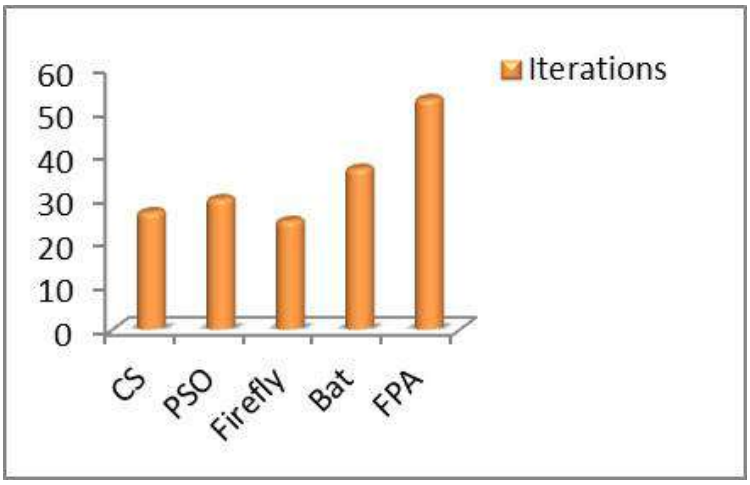
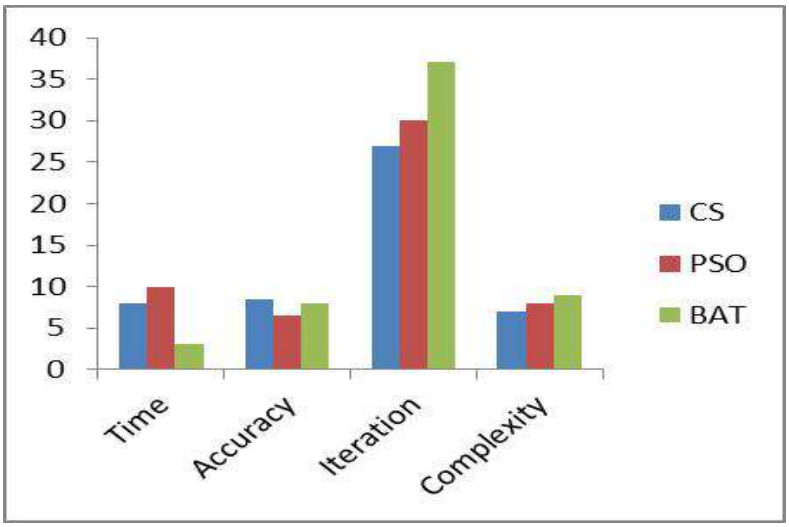


Fig. 6: Number of Iteration.

Now we considered the number of iteration that each Algorithm needed, based on this figure 9 is plotted and the result was shown. From the above graph it is well clear that Flower Pollination algorithm takes more number of iteration than all other algorithms. Whereas the cuckoo search and Firefly Algorithm takes less number of iteration. From the fig. 7 we can also analyze that cuckoo search algorithm has less complex. Based on the above graph and its observation we plotted a graph which compares the three algorithms which was selected.



In the fig. 7, we compared Cuckoo search, bat algorithm and particle swarm optimization according to time, accuracy, number of iteration and complexity of solution. From this it is clear that cuckoo search has better accuracy. Number of iteration and has less complexity of solution. So for to minimize the reactive power loss in IPFC we have choose the best algorithm for the optimization.

CONCLUSION

In this paper, optimization techniques such as Particle Swarm Optimization, Artificial bee colony and various algorithms are analyzed for solving OPF in power system using IPFC was proposed. From the comparative analysis the proposed method is effectively maintained by the OPF in power system by economically maintaining the power balance and real power loss of the system. IPFC controller have the ability to make power balance between multi transmission line and it improves the power quality of the system. The results demonstrate the effectiveness and robustness algorithms to solve OPF problem incorporating IPFC. From the results, the effectiveness of IPFC to improve the power flow in multiple lines is also understood. It is concluded that this algorithm has good convergence characteristics, high computational efficiency and the ability to find the better quality solution. This algorithm can be applied to solve the optimal power flow incorporating other FACTS devices also.

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 ISBN: 978-93-83191-92-5

Cotton Disease Detection Using Machine Learning Technique

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ABSTRACT:

Agriculture is a main source of income for farmers in India. Farmers produce many seasonal local crops based on their location. Cotton is the most produced crop across India. Cotton is a commercial crop, and farmers get good capital from cotton is will increase the income of the farmer. However, one of the basic problems with cotton is that it is easily exposed to many diseases. These diseases need to be identified as early as possible to avoid production loss.The CNN algorithm is used to create the prediction model by leveraging the Tensor Flow's Keras API is model is further used in mobile app development which helps the farmers identify cotton disease and recommend the pesticides which can be used to overcome the disease. The Tensor Flow open-source platform was used to prepare the ML model. e Tensor Flow Tflite model is created, and after that, the model is converted into the Core ML model, which is used in web app to make the disease predication. Google's core API is used to convert the Tensor Flow model into the Core ML model. e label dataset was used to create the model. The python language is used in app development. The model accuracy was around 90%. Currently, boll rot and fungal leaf spot disease are detected in this app. However, the app can be further extended for other cotton diseases too.

1. INTRODUCTION:

In India, the agriculture is done traditionally. The use of technology in agriculture is far distant yet. The innovation in the technology sector, specifically in IT-based sector, is far beyond the limit. In the last decade, the AI, IoT etc., have shown tremendous growth, and it is changing the world. The usage of IoT and AI can also be extended to the agriculture domain for smart e-agriculture. In the field of IoT, the drones are doing very well. In the field of agriculture, drones can be used for multipurpose. The drones are used to spray the pesticide in the crop that helps farmers not to be exposed to any diseases. Additionally, with the help of drones, the damage to crops can be minimized. The drones can also be used for surveillance of the crop from wild animals. In the field of water management, the IoT is plays significant role. The SWAMP and EEWMP projects are an example of water efficient agriculture. A lot of water is saved using these models, which helps in keeping the water level at maximum. These models also help in measuring the soil moisture and then providing the required water to the crop based on the soil moisture of that crop area.

Similarly, the role of AI and ML in agriculture is essential. ML algorithm-based applications or tools are used in different areas of agriculture. AI-based robots are widely used to collect fruits or any other products from the crop field. This saves a lot of workforce, money, and time. In precision agriculture, the AI and IoT helps the farmers to improve the overall harvest quality and accuracy. With the help of sensors, weeds can be targeted and detected and then decide which herbicide to apply to that region. In the region of the supply chain, many AI applications help in the smooth operation.

The major challenge is in the broad adoption of AI applications due to the lack of simple solutions and seamless operation of the tools and applications. This

problem restricts the use of technology in the agriculture domain. The motivation behind this research is to use the AI and technology in the agriculture field because AI and technology have huge potentials to bring revolution in agriculture sector like usage of drones, etc. This research paper is a step towards solving the farmer's problem of doing the farming manually, which takes more time and workforce. The outcome of this research paper will solve the cotton disease detection problem with higher accuracy in less time. This will help in higher production of cotton. In this paper, a mobile app is developed using the ML-based model to detect the cotton plant disease. The mobile application is very simple to use and does not have complex UI/UX. The farmers can easily use the app to detect the cotton plant disease. The app is based on the Tensor Flow ML model, which is embedded in the app, and this predicts the disease. The model is prepared offline using the Tensor Flow open-source Google framework, and then this model is embedded in the project. The app can work offline without an Internet connection in the device. For the model preparation, CNN-based image classification APIs is used.

The use of this application is beneficial for farmers to early detect the disease. This will also help the farmers to get the proactive action if the crop is exposed to the disease, then, based on the app recommendations; the farmers use those pesticides to overcome the disease. Now, with this, the farmers can get the better crop production and post harvesting the crop, and the farmers can also get the good quality crop.

1.2 Objective of the work:

Agriculture is a main source of income for farmers in India. Farmers produce many seasonal local crops based on their location. Cotton is the most produced crop across India. Cotton is a commercial crop, and farmers get good

capital from cotton. is will increase the income of the farmer. However, one of the basic problems with cotton is that it is easily exposed to many diseases. These diseases need to be identified as early as possible to avoid production loss.

2. LITERATURE SURVEY :

[1] . Cultivation of solanaceous vegetables such as eggplant and tomato is severely affected by bacterial wilt in the coastal regions of India. The causal agent Ralstoniapseudosolanacearum is soilborne bacterium, highly diverse, and able to survive in soil for many years without a host. Five bacterial wilt resistant eggplant (Solanum melongena) rootstock lines were evaluated by challenge inoculation and were found to show different levels of wilt incidence.

[2]. The proposed architecture is designed with the latest iOS design pattern, the latest tech stack, and compliance with SDLC. The proposed architecture is based on scalability, high performance, and usability. This proposed architecture will be a blueprint of the actual development of an iOS mobile app. The proposed architecture also supports the usage of ML model in iOS app. The proposed architecture is also supporting the latest machine learning and artificial techniques that are used in identifying the cotton plant disease.

[3]. The primary aim of SWAMP is to auto manage water reserves, distribution, and consumption of various levels, avoid over-irrigation and under-irrigation problems, and auto manage time to maximize production. This research proposed an energy-efficient water management platform (EEWMP), an improved version of SWAMP.

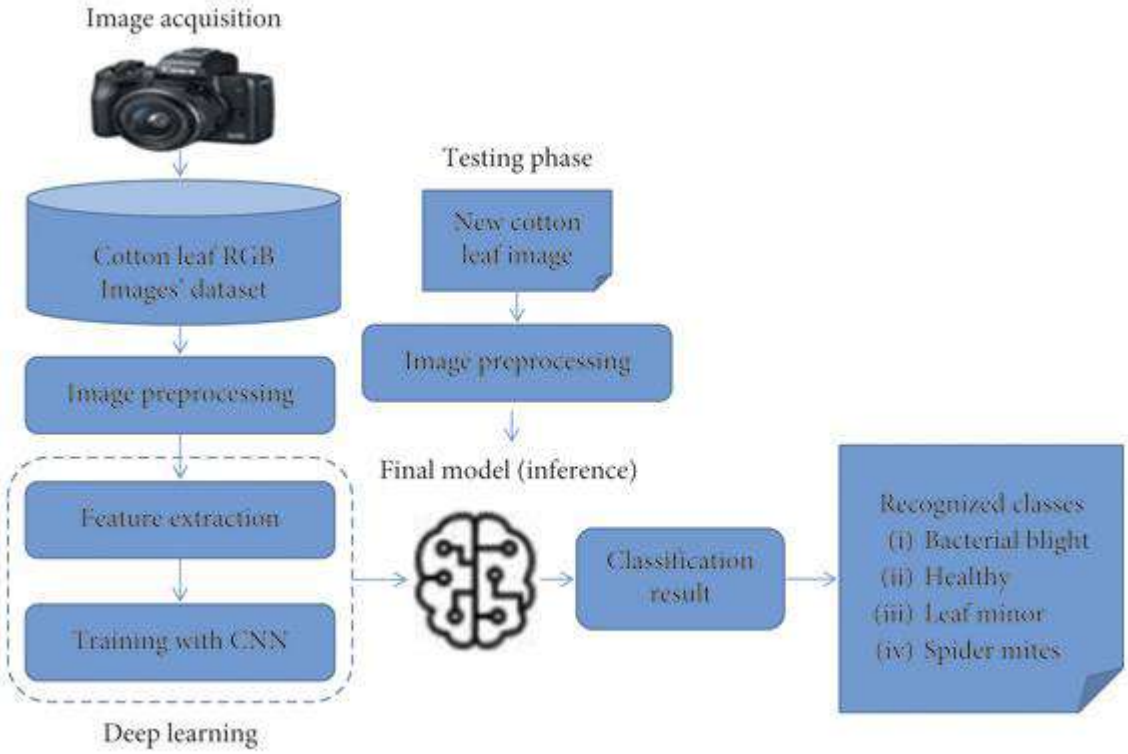
[4]. Digital image processing, along with computer vision techniques, can be applied for automatic gradation of batuan fruits based on the quality of the fruit. It can increase the commercial value of the production.

3. PROBLEM IDENTIFICATION

The cotton plant is susceptible to several disorder (biotic and abiotic constraints) attacks due to temperature fluctuation, diseases, and pests. Indeed, the whole world produced nearly 576 kg per hectare of cotton crops, where only 10% of production loss occurred due to different cotton leaf diseases. The United States of America (USA) is a major exporter of cotton in the world and it obtained 5.1 billion US dollars in 2016, but there are well-known native pests which were the reason for the distraction of cotton farms. And, India has 24 percent of cotton land of the world and got 4.6 billions of dollars in 2016, from which generally 18% of cotton crops' production was lost every year due to different diseases that attacked the cotton plants which had its impacts on losing almost nine hundred thousand of Indian rupees. Presently, in Ethiopia, nearly 12–15% of cotton crop plants are infected due to different diseases. In Ethiopia, performance evaluation of GTP-I showed that these diseases and pests are the main constraints of the world standards in cotton quality and quantity of production. This results in the downfall of the economy of both the farmer and the country.

Detecting these diseases with bare eyes increased the complexity of cotton crops productivity which decreased the accuracy in identification precision. Even an expert would fail to assess and diagnose the diseases with their bare eyes, and this inadequate technique leads to more wastage of cotton crops. Due to these mistaken conclusions, most of the time, certain unnecessary pesticides which badly affect healthy cotton are applied. Leaving the farm for even a short time interval without production will affect overall nation GDP.

4. ARCHITECTURE DIAGRAM



5. DATA SET

The sample leaf images which the researchers have used in this research are both primary as well as secondary types of dataset. Primary data is a type of data collected fresh for the first time. In this study, the primary types were collected from July to August 2019 from Arba Minch, Shele, and Woyto cotton farms where cotton plants are widely planted and there is high infection in SNNPR, whereas secondary data collected in each class were obtained from Melaka-Worker agricultural research center founded in the Afar region and SNNPR. During data collection, 2400 images of data are captured and distributed into four equal classes

such as bacterial blight, healthy, leaf miner, and spider mite used to train with balanced dataset.

Fusarium Wilt

Leaf Curl Disease

Healthy Leaf

Healthy Plant

5.2 METHODOLOGY

A comparative study has been conducted on various frameworks, which can be used for model creation, and this model further can be used in the web project.

CNN: Image Classification Algorithm.

Tensor Flow is a well-known deep learning framework, and Keras is its official high-level API. Tensor Flow compiles different algorithms and models together, enabling us to implement a deep learning neural network for the use in task like image recognition/classification and natural language processing.

Keras was designed with modularity and user-friendliness. Keras make implementing the many powerful but complex functions of the TensorFlow as simple as possible. It is designed to work with the Python language.

The advantage of the TensorFlow framework over the other frameworks used in the literature work is that it has a very simple implementation using the Keras library API's. The TensorFlow framework supports many programming languages, which makes the framework popular. Also, Google developed this framework, so it is maintained with the latest ML algorithms and libraries.

Image Classification

Image classification is supervised learning techniques. It defines the set of target classes and trains a model to recognize them using the labeled images, the label that the network output corresponds to a predefined class. If there is a single class, then it is called image recognition, whereas a multiclass recognition task is called image classification.

Feature Extraction

Features are the elements of the data which will be fed through the network. In some special image recognition, the features are the group of pixels, like edges and points, of an object that the network will analyse for the pattern.

Feature recognition is the process of pulling the relevant features from the input image so that these features can be analysed. The process of extracting features from the image is accomplished with a convolutional layer, and this layer makes the representational part of image. The result of all these calculations is a

feature map. This process is typically performed with more than one filter, which helps preserve the complexity of the image.

Activation Function

After the feature map of the image is created, the values of that represent the image are passed through the activation layer. This layer increases the nonlinearity of the images since they images are already nonlinear. Mostly, rectified linear unit (ReLU) activation function was used.

Pooling Layers

This layer makes the image smaller by taking the information that represents and compresses it. The pooling process makes the network more flexible and more adept at recognizing the images based on the relevant features. This layer in a CNN will abstract away the necessary parts of the image, keeping the part of image, which is more relevant. This helps in overfitting the model where the network learns aspects of the training case too well and fails to generalize to new data.

Flattening

This is the final layer of the CNN, the densely connected layers, which requires the data in the form of a vector to be compressed. The values are compressed into a long vector or column of sequentially ordered numbers.

 ISBN: 978-93-83191-92-5

Machine Learning Workflow

We identified the image classification algorithm which is used in the machine learning workflow to create and train the model. The process is divided into four different phases.

Data Set Preparation

Cotton disease images were collected from an actual cotton crop field under different weather conditions. It adds the variety to the dataset, which is good for better model creation. The images are labeled as per their disease characteristics and placed in the respective folder. The operations and data were prepared manually.

Figure 1 show the structure of the labeled data, which is used in model preparation. Three label classes are used, i.e., healthy, fungal, leaf spot, and boll rot. The number of images in each image class are kept almost same to achieve better model accuracy.

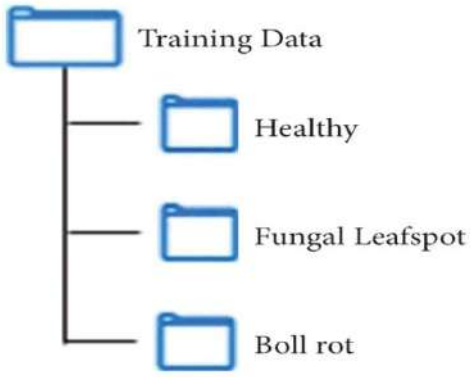


Figure 5.2 Labeled data classes.

 ISBN: 978-93-83191-92-5

Tensor Flow Model Creation

Tensor Flow lite is an open-source machine learning framework to perform on the device. Some key features of the Tensor Flow lite are listed as follows :(i) Optimized for on-device performance: No round trip to server—no latency Internet connectivity not required Reduced model size Low device power consumption Privacy—no personal data leaves the device (ii) Multiplatform support like iOS, Android, Linux, and microcontroller (iii) Multiprogramming language support like Java, Swift, Objective C, C++, and Python (iv)High performance with device hardware

For web development, an image classification type model is prepared. The TensorFlow lite model maker library was used to prepare the Tflite model with custom data set. A custom dataset was used for model creation. The model maker library makes the process simple with a custom dataset to create a new model. It uses the transfer learning technique to reduce the training time and the amount of training data required.

6. RESULT:

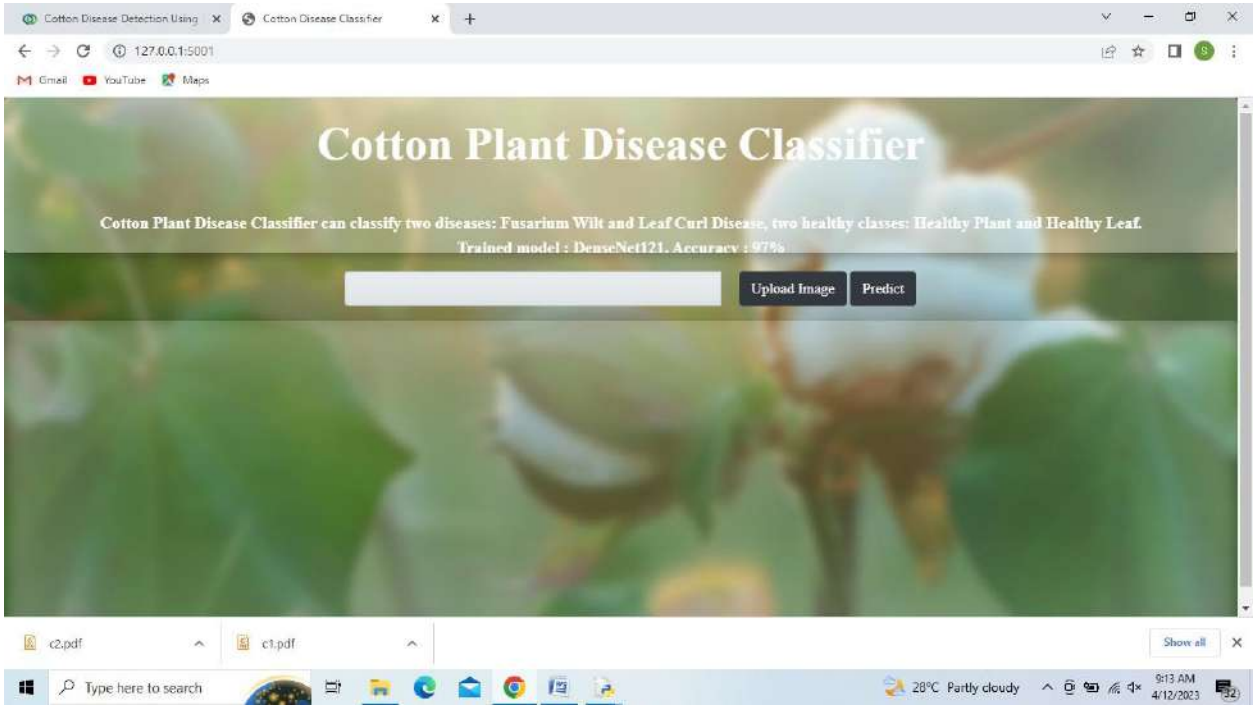


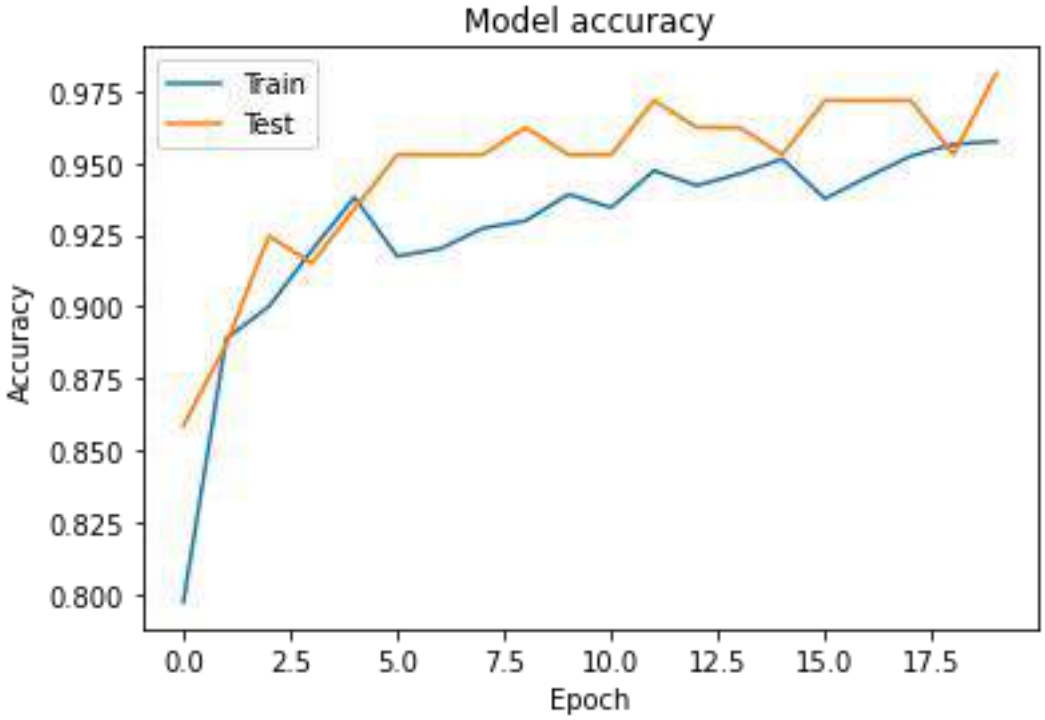
Fig: upload from images

Fig: Healthy plant

Fig: Fusarium Wilt Disease

Fig: Leaf Curl Disease

Model Accuracy Score



7.CONCLUSION:

This deep learning-based model was implemented using Python and Keras package, and Jupyter was used as a development environment. Different experiments have been undergone in this research study to get an efficient model by customizing various parameters such as dataset color, number of epochs, augmentation, and regularization methods. RGB-colored image dataset with augmentation provided 15% best performance for the model. The numbers of epoch and regularization methods are very significant to boost the model performance by 10% and 5.2%, respectively. The proposed prototype has achieved the highest efficiency of 97% for identifying each class of leaf disease and pests in cotton plants. Developments of such automated systems are used to assist the farmers and experts to identify cotton disease and pests by leaf visual symptoms.

Obtained results evidence that the designed system for the farmers are much helpful in order to reduce the complexity, time, and cost of diagnosing the leaves from any diseases.

8.FEATURE ENHANCEMENT:

In the future work,different classifiers can be used to increase the accuracy combining more efficient segmentation and feature extraction techniques with real and clinical-based cases by using large dataset covering different scenarios.

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 ISBN: 978-93-83191-92-5

Stress Detection in IT Professional by Image Processing And Deep Learning

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ABSTRACT:

Stress detection is an important field of research that aims to develop reliable and accurate methods for identifying stress in individuals. Stress is a significant concern in the information technology (IT) industry due to the demanding nature of the job, which can lead to various physical and mental health issues. In recent years, image processing and deep learning techniques have shown promise in detecting stress in individuals. To propose a stress detection method for IT professionals using image processing and deep learning. The proposed method involves capturing facial images of IT professionals during work hours, which are then processed using a convolutional neural network (CNN) to detect stress. The proposed method is evaluated using a dataset of facial images, with results showing high accuracy in stress detection. The proposed system trains the dataset using Convolutional Neural Networks, testing the model using live stream. For every second the program identifies the emotions and facial expressions. As, it changes the stress levels calculated and also finds whether it is High stress or Low stress.

1 INTRODUCTION:

Stress is a prevalent issue in the workplace, particularly in the Information Technology (IT) industry. High levels of stress can negatively impact the productivity and well-being of IT professionals. Therefore, there is a growing interest in developing effective methods to detect and manage stress in this population. One potential approach is to use image processing and deep learning techniques to analyze facial expressions and other physiological signals associated with stress. The approach has several advantages, including its non-invasive nature and ability to provide real-time feedback.

The stress detection project aims to develop a stress detection system for IT professionals using image processing and deep learning. The system will use computer vision algorithms to analyze physiological signals, including facial expressions, associated with stress. OpenCV is an open-source computer vision library that provides powerful tools used for capturing the processing image. Image Processing is used at the initial stage for detection, the employee's image is clicked by the camera which serves as input. In order to get an enhanced image or to extract some useful information from it image processing is used by converting the image into digital form and performing some operations on it. By taking input as an image from video frames and output may be image or characteristics associated with that image. Image processing basically includes the following three steps: Importing the image via image acquisition tools. Analyzing and manipulating the image. Output in which result is altered image or report that is based on image analysis. Convolution Neural Network is a deep learning algorithm that is well-suited for image classification and recognition tasks. The CNN algorithm will be trained on a large dataset of images and physiological signals to accurately classify stress levels. This approach has several advantages, including

the ability to provide real-time feedback and the non-invasive nature of the technology.

Overall, the stress detection project has the potential to provide a valuable tool for IT professionals and their employers to manage stress levels in the workplace, leading to improved productivity, job satisfaction, and overall well-being. The combination of image processing and deep learning algorithms presents a promising solution for stress detection in the IT industry.

1.2 OBJECTIVE OF THE WORK:

The aim of the Stress detection in IT professional by image processing and deep learning is to monitor the emotional status of a person who is working in front of a computer for a longer duration. To Detect and reduce stress and create a much more comfortable workplace for IT employees. This system mainly focuses on managing stress and making the working environment healthy and spontaneous for the employees and to get the best out of them during working hours.

The general objective of the study is to propose a reliable, convenient and accurate detection system. The study has the following specific objectives:

- To predict stress in a person by the symptoms calculated by monitoring.
- To analyze the stress levels in the employee.

2 LITERATURE SURVEY:

[1]. To apply machine learning techniques to analyze stress patterns in working adults and to narrow down the factors that strongly determine the stress levels. Towards this, data from the OSMI mental health survey 2017 responses of working professionals within the tech-industry was considered. Various Machine Learning techniques were applied to train our model after due data cleaning and

preprocessing. The accuracy of the above models was obtained and studied comparatively.

[2]. The proposed system integrates image processing and deep learning to detect stress. We had collected images of each person for over a month. These images were processed in order to extract a feature (eyebrow). The obtained results from image processing with suitable inputs were used to train a linear regression model and test the model with the test data set.

[3]. The authors propose a system that uses computer vision techniques to analyze facial expressions, including features such as eye blinking, eyebrow movement, and mouth opening, to detect stress and anxiety levels. The system extracts these features from videos and analyzes them using machine learning algorithms to classify stress and anxiety levels.

[4]. The authors propose a system that trains the data set using Convolutional Neural Networks, testing the model using live stream and the deploying model using Flask API. The model will find live stress values from the video feed from the web camera of the device. For every second the program identifies the face, eyebrows and lip movements and shape.

3 PROBLEM IDENTIFICATION:

Image Capturing is done automatically so it captures images when any usual activity happens. It will mislead the detection system. If any distortion occurs while capturing the image then the system will give inappropriate results.

Continued capturing of images creates large unusable datasets. Due to the auto captured image datasets detection will get more time consuming or inaccurate.

To select relevant features that can be used to distinguish between stressed and non-stressed individuals. This can be done using statistical analysis or feature engineering techniques. The KNN algorithm requires a training dataset with labeled examples of stressed and non-stressed individuals. This dataset should be representative of the population being studied. The KNN algorithm can be trained to classify new instances of stress based on their similarity to instances in the training set. The number of nearest neighbors to consider (k value) will need to be selected, and the distance metric used to calculate similarity will need to be chosen.

4 ARCHITECTURE DIAGRAM:

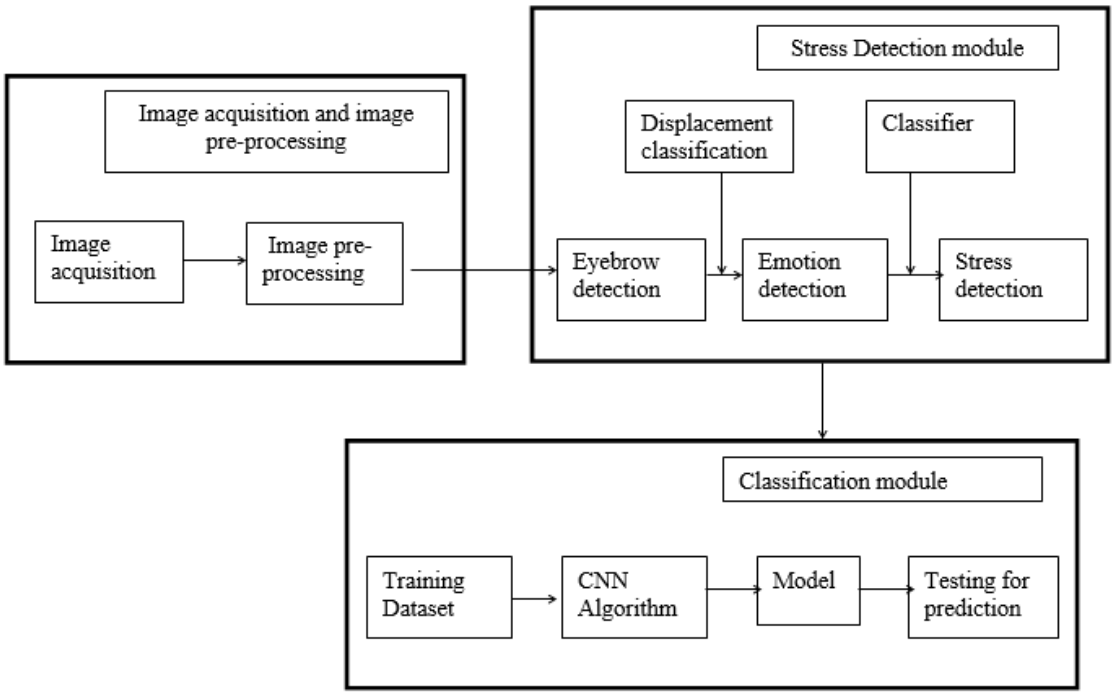

Fig :4.1 – Architecture Diagram

Thus the above Fig:4.1 represents the working process of the stress detection project as the system is divided into three modules: the first module Image acquisition and Image pre-processing. It can be used to capture the input images, reduce the noise and convert to gray scale images. Second module is processed to detect the stress, they have many processes to detect the stress and the stress level. Stress detection module to detect all the facial emotions that are used to classify the stress and getting a prediction about stress and the third module represents the process of algorithm in deep learning. Using the CNN algorithm, to predict the accurate value based on their stress level.

5 METHODOLOGY:

A comparative study of the methodology and the specific procedures or techniques used to identify, select, process, and analyze information about a topic.

1. Image Preprocessing:

The face acquisition module processes the video sequences captured by the camera. The image frames are extracted and the pre-processing of the images for the subsequent analysis in the further modules is done. Pre- processing of the images includes two transformations of the extracted frame. First one being the pixel transformation and the other one is binary transformation of the modified image after pixel transformation of transforming a pixel value. Each output pixel value depends on only the corresponding input pixel value, which helps alter the brightness and contrast of an input image. The face acquisition module processes the images captured by the camera. The image frames are extracted and the

pre-processing of the images for the subsequent analysis in the further modules is done.

2. CNN Algorithm:

A Convolutional Neural Network (CNN or convnet) is a subset of machine learning. It is one of the various types of artificial neural networks which are used for different applications and data types. A CNN is a kind of network architecture for deep learning algorithms and is specifically used for image recognition and tasks that involve the processing of pixel data.

The term Convolution in CNN denotes the mathematical function of convolution which is a special kind of linear operation wherein two functions are multiplied to produce a third function which expresses how the shape of one function is modified by the other. In simple terms, two images which can be represented as matrices are multiplied to give an output that is used to extract features from the image.

A Convolutional Neural Network (CNN) is a deep learning algorithm that can recognize and classify features in images for computer vision. It is a multi-layer neural network designed to analyze visual inputs and perform tasks such as image classification, segmentation and object detection, which can be useful for autonomous vehicles. CNNs can also be used for deep learning applications in healthcare, such as medical imaging. There are two main parts to a CNN:

- A convolution tool that splits the various features of the image for analysis
- A fully connected layer that uses the output of the convolution layer to predict the best description for the image.

CNN architecture is inspired by the organization and functionality of the visual cortex and designed to mimic the connectivity pattern of neurons within the human brain. The neurons within a CNN are split into a three-dimensional structure, with

each set of neurons analyzing a small region or feature of the image. In other words, each group of neurons specializes in identifying one part of the image. CNNs use the predictions from the layers to produce a final output that presents a vector of probability scores to represent the likelihood that a specific feature belongs to a certain class. A CNN is composed of several kinds of layers:

- Convolutional layer - creates a feature map to predict the class probabilities for each feature by applying a filter that scans the whole image, few pixels at a time.
- Pooling layer (down sampling) - scales down the amount of information the convolutional layer generated for each feature and maintains the most essential information (the process of the convolutional and pooling layers usually repeats several times).
- Fully connected input layer - flattens the outputs generated by previous layers to turn them into a single vector that can be used as an input for the next layer.
- Fully connected layer - applies weights over the input generated by the feature analysis to predict an accurate label.
- Fully connected output layer - generates the final probabilities to determine a class for the image.

3. Eyebrow Detection:

Detecting eyebrows can be done through computer vision techniques such as image processing and deep learning. Before detecting eyebrows, you might need to preprocess the image by resizing and adjusting the brightness and contrast to improve the detection accuracy.Eyebrows can be distinguished from other facial features by their shape. You can use edge detection algorithms to extract the edges

of the eyebrows or apply filters Additionally, you can use color-based segmentation techniques to isolate the eyebrows from the rest of the face used to detect the emotions. Once you have extracted the features of the eyebrows, you can use a deep learning algorithm such as a convolution to classify the extracted features as eyebrows or not. To train the model, you can use a dataset of images labeled as having or not having eyebrows.

Several approaches are applied to extract the discriminative features to learn the pattern of the different facial features. We investigate approaches based on the pixel analysis of the images which are normalized to standard scale (200 x 200) pixels. Pixel value analysis is the method of analyzing an input image from the extreme left top, this involves the analysis of every pixel it encounters in every row of the normalized image.

Binary converted image is a digital image that has only two possible values for each pixel. Typically the two colors used for a binary image are black and white. These bi-tonal images have each pixel stored as a single bit of 0 or 1. The bit value 0 corresponds to black and that of 1 corresponds to white. The pixel value analysis of the binary image scans the image from the top left through each row. The position of the row and the column is recorded for the first encountered pixel with the value corresponding to 0 that is the first encountered black pixel is recorded with its coordinates, which is considered as the eyebrow tip co-ordinate of the normalized image. The image converted to binary form is used for the pixel value analysis technique, which produces the (i, j) coordinates of the eyebrow as depicted.

4. Facial landmarks:

The term "facial landmarks" describes identifying and localizing distinctive facial features. Standard reference points include the eyes' outer corners, the nose's

tip, the inside corners of the nostrils and mouth, the terminals of the eyebrow arches, the earlobes, the chin, and so on. Facial points or facial landmarks, such as the eyes' corners or the nose's tip, are more dependable because they are less impacted by facial emotions.

Even though OpenCV based SSD offers the same level of accuracy, MTCNN also finds some facial landmarks such as eye, nose and mouth locations. In particular, extracting the eye locations is very important to align faces. Notice that face alignment increases face recognition model accuracy almost 1% based on the Google FaceNet research.

On the other hand, OpenCV finds eye locations with conventional haarcascade method which underperforms. In other words, we have to depend on legacy haarcascade in OpenCV to align faces even if we adopt modern SSD. The returned object of the detected faces function also stores facial landmarks. I just focus on the eye locations here.

- keypoints = detection["keypoints"]
- left_eye = keypoints["left_eye"]
- right_eye = keypoints["right_eye"]

The algorithms involve performing face verification, recognition, and clustering tasks (grouping similar faces). The best algorithms use face preprocessing coupled with face alignment to improve facial recognition. These algorithms often use multi-task cascaded convolutional networks (MTCNN) to detect faces and localize landmarks. Emotional expressions are detectable through lip, eye, and eyebrow movements. Facial landmark recognition can help identify emotions.

Facial landmarks are specific points on a human face that are used to identify and track features such as the eyes, nose, mouth, and jawline. These points are

typically detected by computer vision algorithms that analyze images or video frames of faces. Examples of facial landmarks include the corners of the eyes, the tip of the nose, the corners of the mouth, and the chin. By tracking these landmarks over time, it is possible to analyze changes in facial expressions and identify patterns of movement that can provide insights into emotional states or other aspects of human behavior.

5. Emotion Detection:

Detecting emotions can also be done through computer vision techniques such as image processing and deep learning. Emotions can be distinguished from facial expressions such as the shape of the mouth, eyebrows, and eyes. You can use facial landmark detection algorithms such as OpenCV to extract the facial to enhance the edges. Once you have extracted the facial features, you can use a deep learning algorithm such as a CNN to classify the extracted features as a specific emotions like sad, happy, angry, surprise, neutral and etc.,. To train the model, you can use a dataset of images or videos labeled with the corresponding emotion.

Emotion detection is the process of identifying and analyzing the emotions expressed by a person through their facial expressions. This is typically done using deep learning algorithms that are trained on large datasets of images, and can be used in a variety of applications like mental health.

Facial expression recognition is one of the most common methods used for emotion detection, and it involves analyzing a person's facial features to identify patterns that correspond to specific emotions such as happiness, sadness, anger, surprise and neutral. Emotion detection is an important area of research because it has the potential to improve human-computer interaction by enabling computers to recognize and respond to human emotions. This can lead to more personalized and

empathetic experiences for users, and can also be used to identify potential mental health issues in individuals who may be struggling with anxiety or depression.

6. Stress Detection:

Stress detection is based on the rigid transformations shown by the eyebrows which are used as the major facial area in the subsequent process of analysis. The previously followed processes used to pre-process the input image for the eyebrow detection is further used in the stress detection methodology, which involves sub-modules of offline displacement calculation, variation of displacement and classifier which helps in stress detection.

The first sub-module offline displacement calculation, calculates the displacement of the eyebrow position using the obtained coordinates in the previous steps, with respect to its mean position. The coordinates in the first image gives the x and y coordinates of the eyebrow as (20, 181) and the next image gives the co- ordinates (21, 202), this sub-module gives the mean displacement of the eyebrow and this way the displacement calculation for each image with respect to first image is calculated.

The second sub-module is calculation of the variance. The eyebrow transformation in every subsequent image over a period of time is estimated by calculating its variability. And the set of images over a period of time that show variance above the threshold is classified by the sub-module as stressed over the particular time interval.

Behavioral measures involve observing a person's behavior to detect signs of stress. This can include changes in speech patterns, facial expressions. Behavioral measures are often used in combination with physiological measures to provide a more comprehensive picture of a person's stress levels. Deep learning-based methods involve training algorithms to detect stress based on

patterns in data. For example, algorithms can be trained to detect stress based on changes in facial expressions or emotion.

7. Deep Learning:

The deep learning module is the final module that consists of the sub-modules of training dataset, CNN algorithm, model and testing the dataset for prediction. The training dataset is prepared using the obtained results in the previous modules.

Deep learning models can be used for a variety of tasks, such as image classification, natural language processing, and time-series analysis. Deep learning and image processing techniques, specifically the use of Convolutional Neural Networks (CNNs), have been explored for stress detection using facial expression analysis. However, the effectiveness of the model depends on the quality and quantity of the training data, as well as the selection of appropriate hyper parameters and optimization algorithms.

The collected data needs to be preprocessed before it can be used for training. This typically involves tasks such as data cleaning, normalization, and feature extraction. The next step is to select appropriate deep learning model architecture for the problem at hand. This involves selecting the number of layers, the types of layers (e.g., convolutional, recurrent, etc.), and the activation functions used in the model. The model is then trained on the preprocessed data using an optimization algorithm. During training, the model adjusts its parameters to minimize the difference between its predictions and the actual labels in the training data. Once the model is trained, it is evaluated on a separate validation dataset to determine its performance. The step is crucial for identifying any issues with the model, such as over fitting or under fitting

CONCLUSION:

Stress Detection in IT profession project is designed to predict stress in the workers to present a video based stress detection through deep learning technique. They processed like a real time face stress detection model. The processed model is an image processing model which has three parts: Emotion recognition, facial expressions and stress level calculation. The emotion recognition model will display the emotion to predict for identify stress. The stress level is calculated with the help of facial expression and emotion. Stress detection using image processing and machine learning is a promising approach that has more accuracy and efficiently detects stress in individuals.

FUTURE ENHANCEMENT:

In the future, IOT technology can be used to detect stress levels. Stress detection systems could provide real-time feedback and intervention to individuals when high levels of stress are detected. They could include recommendations for stress management techniques or alerts to take a break or seek assistance from a colleague or supervisor. IoT-based stress detection with workplace systems and developing real-time feedback and intervention mechanisms. IOT-based stress detection has the potential to be an important tool for identifying and addressing stress-related issues in the workplace, leading to improved health and well-being for individuals and increased productivity for organizations. Overall, these enhancements could help to improve the accuracy, effectiveness, and usability of stress detection systems in IT professionals, ultimately leading to better health and well-being in the workplace.

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