ST. ANNE'S COLLEGE OF ENGINEERING AND TECHNOLOGY
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ANGUCHETTYPALAYAM, PANRUTI – 607 106.

ACADEMIC YEAR 2023-2024

INDEX

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CONSOLIDATED REPORT

1.3.2 Percentage of students undertaking project work/field work/internships (Data for the latest completed academic year)

S. No	Department	Year of Study	Name	Project	Mini Project	Internship	Field Work
1	B.E CSE	IV	AGALYA A	✓		✓	
2	B.E CSE	IV	AKASH A	✓		✓	
3	B.E CSE	IV	ANBARASAN S	✓			
4	B.E CSE	IV	ANGELMARINA M	✓			
5	B.E CSE	IV	ANITHA M	✓			
6	B.E CSE	IV	AVEENASH S	✓			
7	B.E CSE	IV	CHANDHIYA S	✓		✓	
8	B.E CSE	IV	CHANDRU V	✓			
9	B.E CSE	IV	DINESHBALAJI M	✓		✓	
10	B.E CSE	IV	HARIPRIYA A	✓			
11	B.E CSE	IV	JASMINE MEDONA A	✓		✓	
12	B.E CSE	IV	JAYASRI V	✓		✓	
13	B.E CSE	IV	KARTHICK K	✓		✓	
14	B.E CSE	IV	KEERTHIKA S	✓			
15	B.E CSE	IV	LEELAVATHI P	✓			
16	B.E CSE	IV	LOGESHWARAN D	✓		✓	
17	B.E CSE	IV	MARIYAASHA J	✓		✓	
18	B.E CSE	IV	NATARAJAN P	✓		✓	
19	B.E CSE	IV	NITHIN SHIYAM K	✓			
20	B.E CSE	IV	PADMAVATHY T	✓			
21	B.E CSE	IV	PONKISHORE T	✓		✓	

22	B.E CSE	IV	PRAVEENKUMAR V	✓			
23	B.E CSE	IV	SIVARANJANI L	✓			
24	B.E CSE	IV	SIVARANJINI R	✓		✓	
25	B.E CSE	IV	SUBASHINI M	✓		✓	
26	B.E CSE	IV	SUBASRI G	✓		✓	
27	B.E CSE	IV	SUBASRI S	✓		✓	
28	B.E CSE	IV	THINAGARAN P	✓		✓	
29	B.E CSE	IV	UDHAYAMOORTHY R	✓			
30	B.E CSE	IV	VISHNU PRIYA P	✓		✓	
31	B.E CSE	IV	JEFFREY PRASANNA RAJ J	✓			
32	B.E ECE	IV	AKASH R	✓			
33	B.E ECE	IV	ANILKUMAR A	✓			
34	B.E ECE	IV	LEELA G	✓			✓
35	B.E ECE	IV	NIVETHA U	✓			
36	B.E ECE	IV	RAJASRI S	✓			
37	B.E ECE	IV	SHANMUGAPRIYA N	✓			✓
38	B.E ECE	IV	SHEKINA JEBASTINA Y	✓			✓
39	B.E ECE	IV	SRIHARI S	✓			
40	B.E ECE	IV	SRIMATHI K	✓			
41	B.E ECE	IV	UMAMAGESHWARAN D	✓			
42	B.E ECE	IV	VANJINATHAN G	✓			
43	B.E ECE	IV	VASANTHAN V	✓			
44	B.E ECE	IV	VASANTHAKUMAR M	✓			
45	B.E ECE	IV	AJITH M	✓			
46	B.E ECE	IV	AJITHKUMAR V	✓			
47	B.E ECE	IV	CHANDRU D	✓			

48	B.E ECE	IV	KAYALVIZHI M	✓			
49	B.E ECE	IV	LINGESHWARAN R	✓			
50	B.E EEE	IV	ANTONY GEORGE S R	✓			
51	B.E EEE	IV	ARAVINDAN A	✓			
52	B.E EEE	IV	ASLIN JOSEPH S	✓			
53	B.E EEE	IV	BHARANI S	✓			
54	B.E EEE	IV	DHIVAGAR M	✓			
55	B.E EEE	IV	IYYAPPAN I	✓			
56	B.E EEE	IV	MOHANRAJ S	✓			
57	B.E EEE	IV	MONIKA R	✓			
58	B.E EEE	IV	MUTHU KUMAR M	✓			
59	B.E EEE	IV	PRAVEEN RAJ R	✓			✓
60	B.E EEE	IV	RAGUL R[11-09-2002]	✓			
61	B.E EEE	IV	RAGUL R [16-01-2003]	✓			
62	B.E EEE	IV	SANJAI D	✓			
63	B.E EEE	IV	SARAVANAN K	✓			
64	B.E EEE	IV	SASIDHAR A	✓			
65	B.E EEE	IV	SUBASHCHANDRABOSE S	✓			
66	B.E EEE	IV	VIGNESH V	✓			
67	B.E EEE	IV	VIVEKANANDHAN V	✓			
68	B.E EEE	IV	ABINESH A	✓			
69	B.E EEE	IV	ARAVIND R	✓			
70	B.E EEE	IV	CHANDRU C	✓			
71	B.E EEE	IV	GIRIDHARAN S	✓			
72	B.E EEE	IV	GNANAMOORTHY R	✓			✓
73	B.E EEE	IV	GURUMOORTHI P	✓			

74	B.E EEE	IV	KIRUBANITHI T	✓			
75	B.E EEE	IV	RISHIDHARAN T	✓			
76	B.E EEE	IV	SAM ROSARIO A	✓			
77	B.E EEE	IV	SEDHU S	✓			
78	B.E EEE	IV	TAMIZHMANI T	✓			
79	B.E EEE	IV	VALLARASU S	✓			
80	B.E EEE	IV	VASANTHAKUMAR S	✓			✓
81	B.E EEE	IV	RAJESWARI A	✓			
82	B.E MECH	IV	ALWIN BRUNIX J	✓			
83	B.E MECH	IV	ARAVINDHAN S	✓			
84	B.E MECH	IV	BALAJI R	✓			
85	B.E MECH	IV	GUGAN S	✓			
86	B.E MECH	IV	GURUDEVAN S	✓			
87	B.E MECH	IV	JAYAPRADHA P	✓			
88	B.E MECH	IV	MOHANARAJ S	✓			
89	B.E MECH	IV	MUTHUKUMARAN K	✓			
90	B.E MECH	IV	NAGARAJ N	✓			
91	B.E MECH	IV	NARESH D	✓			
92	B.E MECH	IV	PRASANTH S	✓			
93	B.E MECH	IV	SARATHI K	✓			
94	B.E MECH	IV	SARATHI S	✓			
95	B.E MECH	IV	SATHISH K	✓			
96	B.E MECH	IV	THIVAN T	✓			
97	B.E MECH	IV	VIKRAM K	✓			
98	B.E MECH	IV	ANBUMANI L	✓			
99	B.E MECH	IV	DINESH S	✓			

100	B.E MECH	IV	PRAVEEN RAJ U	✓			
101	B.E MECH	IV	RAGHUL R	✓			
102	B.E MECH	IV	RAJA S	✓			
103	B.E MECH	IV	SANTHOSH S	✓			
104	B.E MECH	IV	THIRUNAVUKARASAN J	✓			
105	B.E ECE	III	KARTHIKEYAN U			✓	
106	B.E ECE	III	PRIYADHARSHAN E			✓	
107	B.E ECE	III	RAGUL R			✓	
108	B.E ECE	III	BALAGURU P			✓	✓
109	B.E ECE	III	VISWANATH N			✓	✓
110	B.E ECE	III	MOHAN J				✓
111	B.E ECE	III	SELVAKUMAR S				✓
112	B.E ECE	III	RAJMOHAN P				✓
113	B.E ECE	III	MANGALESHWAR R				✓

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PROJECT WORK

AUTOMATIC CONVERSION
2D IMAGE TO 3D MODEL

A PROJECT REPORT

Submitted By

AKASH. A	**422120104004**
DINESHBALAJI. M	**422120104011**
NITHIN SHIYAM. K	**422120104024**

in partial fulfilment for the award of the degree

of

BACHELOR OF ENGINEERING

in

COMPUTER SCIENCE AND ENGINEERING

ST. ANNE'S COLLEGE OF ENGINEERING AND TECHNOLOGY

ANGUCHETTYPALAYAM, PANRUTI

ANNA UNIVERSITY: CHENNAI 600 025

MAY 2024

BONAFIDE CERTIFICATE

Certified that this project report "**AUTOMATIC CONVERSION OF 2D IMAGE INTO 3D MODEL**" is the Bonafide work of **AKASH. A (422120104004), DINESHBALAJI.M (422120104011), NITHIN SHIYAM. K (422120104024),** who carried out the project work under my supervision.

SIGNATURE	**SIGNATURE**
Mr. K. RAMESH, M.E.,	**Sr. A. PUNITHA JILT, M.Tech.,**
HEAD OF THE DEPARTMENT,	**SUPERVISOR,**
Assistant Professor,	Assistant Professor,
Department of Computer Science and Engineering,	Department of Computer Science and Engineering,
St. Anne's College of Engineering and Technology, Panruti.	St. Anne's College of Engineering and Technology, Panruti.

Submitted for the project viva-voce held on 08/05/2024

INTERNAL EXAMINER

EXTERNAL EXAMINER

ABSTRACT

Diffusion models have emerged as the best approach for the generative modelling of 2D images. Part of their success is due to the possibility of training them on millions if not billions of images with a stable learning objective. However, extending these models to 3D remains difficult for two reasons. First, finding a large quantity of 3D training data is much more complex than for 2D images. Second, while it is conceptually trivial to extend the models to operate on 3D rather than 2D grids, the associated cubic growth in memory and compute complexity makes this infeasible. We address the first challenge by introducing a new diffusion setup that can be trained, end-to-end, with only posed 2D images for supervision; and the second challenge by proposing an image formation model that decouples model memory from spatial memory. We evaluate our method on real-world data, using the CO3D dataset which has not been used to train 3D generative models before. We show that our diffusion models are scalable, train robustly, and are competitive in terms of sample quality and fidelity to existing approaches for 3D generative modelling.

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

CS8691 ARTIFICIAL INTELLIGENCE L T P C
3 0 0 3

OBJECTIVES:

- To understand the various characteristics of Intelligent agents
- To learn the different search strategies in AI
- To learn to represent knowledge in solving AI problems
- To understand the different ways of designing software agents
- To know about the various applications of AI.

UNIT I INTRODUCTION 9

Introduction–Definition - Future of Artificial Intelligence – Characteristics of Intelligent Agents– Typical Intelligent Agents – Problem Solving Approach to Typical AI problems.

UNIT II PROBLEM SOLVING METHODS 9

Problem solving Methods - Search Strategies- Uninformed - Informed - Heuristics - Local Search Algorithms and Optimization Problems - Searching with Partial Observations – Constraint Satisfaction Problems – Constraint Propagation - Backtracking Search - Game Playing – Optimal Decisions in Games – Alpha - Beta Pruning - Stochastic Games

UNIT III KNOWLEDGE REPRESENTATION 9

First Order Predicate Logic – Prolog Programming – Unification – Forward Chaining-Backward Chaining – Resolution – Knowledge Representation - Ontological Engineering-Categories and Objects – Events - Mental Events and Mental Objects - Reasoning Systems for Categories - Reasoning with Default Information

UNIT IV SOFTWARE AGENTS 9

Architecture for Intelligent Agents – Agent communication – Negotiation and Bargaining – Argumentation among Agents – Trust and Reputation in Multi-agent systems.

UNIT V APPLICATIONS 9

AI applications – Language Models – Information Retrieval- Information Extraction – Natural Language Processing - Machine Translation – Speech Recognition – Robot – Hardware – Perception – Planning – Moving

TOTAL :45 PERIODS

OUTCOMES:

Upon completion of the course, the students will be able to:

 Use appropriate search algorithms for any AI problem

 Represent a problem using first order and predicate logic

 Provide the apt agent strategy to solve a given problem

 Design software agents to solve a problem

 Design applications for NLP that use Artificial Intelligence.

TEXT BOOKS:

1 S. Russell and P. Norvig, "Artificial Intelligence: A Modern Approach", Prentice Hall, Third Edition, 2009.

2 I. Bratko, "Prolog: Programming for Artificial Intelligence", Fourth edition, Addison-Wesley Educational Publishers Inc., 2011.

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4. Gerhard Weiss, "Multi Agent Systems", Second Edition, MIT Press, 2013.

5. David L. Poole and Alan K. Mackworth, "Artificial Intelligence: Foundations of Computational Agents", Cambridge University Press, 2010.

SENSORY DETECTOR OF HAZARDOUS GASES IN POULTRY FARM

A PROJECT REPORT

Submitted by

S. AVEENASH	**422120104008**
D.LOGESHWARAN	**422120104021**
T.PONKISHORE	**422120104026**

In partial fulfillment for the award of the degree

of

BACHELOR OF ENGINEERING

in

COMPUTER SCIENCE AND ENGINEERING

ST. ANNE'S COLLEGE OF ENGINEERING AND TECHNOLOGY, ANGUCHETTYPALAYAM, PANRUTI 607 106.

ANNA UNIVERSITY :: CHENNAI 600 025

MAY 2024

ANNA UNIVERSITY :: CHENNAI 600 025

BONAFIDE CERTIFICATE

Certified that this project report **"SENSORY DETECTOR OF HAZARDOUS GASES IN POULTRY FARM"** is the bonafide work of **S. AVEENASH (422120104008), D.LOGESHWARAN (422120104021), T.PONKISHORE (422120104026)** who carried out the project work under my supervision.

SIGNATURE

Mr. K. RAMESH, M.E.,

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ASSISTANT PROFESSOR,

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Mr. K. RAMESH, M.E.,

SUPERVISOR,

ASSISTANT PROFESSOR,

Department of Computer Science and Engineering,

St. Anne's College of Engineering and Technology, Panruti.

Submitted for the project viva - voce held on....08/05/2024.....

INTERNAL EXAMINER

EXTERNAL EXAMINER

ABSTRACT

The poultry farming industry faces significant challenges in maintaining optimal environmental conditions for both the welfare of the poultry and the health of farm workers. Among these challenges, the monitoring and detection of hazardous gases such as ammonia, carbon dioxide, and hydrogen sulfide are of utmost importance due to their potential adverse effects on both animal and human health. In this project, we propose the development of a sensory detector for hazardous gases in poultry farms using AI and Google Colab. The project aims to leverage AI algorithms to enable real-time monitoring and detection of hazardous gases in poultry farm environments. Through the integration of advanced gas sensors with machine learning models, the sensory detector will be capable of accurately identifying and quantifying hazardous gas concentrations, thereby facilitating timely interventions to mitigate health risks. The main project content encompasses several key components, including a comprehensive literature review of existing methods and technologies for gas monitoring in agricultural settings, the design and implementation of the sensory detector using Google Colab and AI frameworks such as Sensor Flow, and rigorous testing and evaluation of the detector's effectiveness in simulated poultry farm environments. The effectiveness of the developed sensory detector will be assessed based on criteria such as accuracy, reliability, sensitivity, and specificity in detecting hazardous gases. Furthermore, considerations for scalability, ease of deployment, and integration with existing farm management systems will be addressed to ensure practical utility and widespread adoption of the detector in real-world poultry farming operations. Through this project, we aim to contribute to the advancement of agricultural technology by providing poultry farmers with a robust and user-friendly tool for gas monitoring, thereby enhancing animal welfare, protecting human health, and promoting sustainable farming practices.

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

CS8691 ARTIFICIAL INTELLIGENCE L T P C
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TOTAL :45 PERIODS

OUTCOMES:

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4. Gerhard Weiss, "Multi Agent Systems", Second Edition, MIT Press, 2013.

5. David L. Poole and Alan K. Mackworth, "Artificial Intelligence: Foundations of Computational Agents", Cambridge University Press, 2010.

A DEFENSIVE APPROACH TO RANSOMWARE WITH RANGAN AND HASH CONCEAL

A PROJECT REPORT

Submitted by

S. ANBARASAN	**422120104005**
V. CHANDRU	**422120104010**
K. KARTHICK	**422120104016**

In partial fulfillment for the award of the degree

of

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ANNA UNIVERSITY :: CHENNAI 600 025

MAY 2024

ANNA UNIVERSITY :: CHENNAI 600 025

BONAFIDE CERTIFICATE

Certified that this project report **"A DEFENSIVE APPROACH TO RANSOMWARE WITH RANGAN AND HASH CONCEAL"** is the bonafide work of **S. ANBARASAN (422120104005), V. CHANDRU (422120104010), K. KARTHICK (422120104016)** who carried out the project work under my supervision.

SIGNATURE

Mr. K. RAMESH, M.E.,

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Submitted for the project viva - voce held on..02/05/2024

INTERNAL EXAMINER

EXTERNAL EXAMINER

ABSTRACT

Ransomware is a type of malware that locks a victim's data or device and threatens to keep it locked or worse unless the victim pays a ransom to the attacker. Ransomware often evades antivirus tools, encrypts files, and renders the target computer and its data unusable. The current approaches to detect such ransomware include monitoring processes, system calls, and file activities on the target system and analysing the data collected. Monitoring multiple processes has a very high overhead; newer ransomware may interfere with the monitoring and corrupt the collected data. To address this concern, this project adopted an open design approach to enhance the robustness of the proposed method. The proposed method detect ransomware and protects critical files from existing ransomware by applying a hiding strategy that poses a challenge to attackers in finding the target files. This project developed a proactive defence strategy against ransomware threats, leveraging "RanGAN" for early detection and "Hash Conceal" for data protection. RanGAN (Ransomware Generative Adversarial Network) employs advanced machine learning techniques to detect ransomware behaviour patterns in real-time, while Hash Conceal secures critical data from malicious encryption. Together, these technologies form a robust defence, ensuring rapid threat identification and minimizing data loss. This strategy aims to fortify cybersecurity against the evolving ransomware landscape, providing a resilient shield for critical assets. This proactive approach not only bolsters an organization's resilience to ransomware but also reduces the potential impact on critical data and operations. By leveraging RanGAN for early threat detection and Hash Conceal for data protection, organizations can enhance their cybersecurity posture and safeguard against the evolving ransomware threat landscape.

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

CS8792 CRYPTOGRAPHY AND NETWORK SECURITY **L T P C**
3 0 0 3

OBJECTIVES:

- To understand Cryptography Theories, Algorithms and Systems.
- To understand necessary Approaches and Techniques to build protection mechanisms in order to secure computer networks.

UNIT I INTRODUCTION 9

Security trends - Legal, Ethical and Professional Aspects of Security, Need for Security at Multiple levels, Security Policies - Model of network security – Security attacks, services and mechanisms – OSI security architecture – Classical encryption techniques: substitution techniques, transposition techniques, steganography- Foundations of modern cryptography: perfect security – information theory – product cryptosystem – cryptanalysis.

UNIT II SYMMETRIC KEY CRYPTOGRAPHY 9

MATHEMATICS OF SYMMETRIC KEY CRYPTOGRAPHY: Algebraic structures - arithmetic-Euclid‟s algorithm- Congruence and matrices - Groups, Rings, Fields- Finite fields- SYMMETRIC KEY CIPHERS**:** SDES – Block cipher Principles of DES – Strength of DES – Differential and linear cryptanalysis - Block cipher design principles – Block cipher mode of operation – Evaluation criteria for AES – Advanced Encryption Standard - RC4 .

UNIT III PUBLIC KEY CRYPTOGRAPHY 9

MATHEMATICS OF ASYMMETRIC KEY CRYPTOGRAPHY: Primes – Primality Testing Factorization – Euler's totient function, Fermat's and Euler's Theorem - Chinese Remainder Theorem – Exponentiation and logarithm - ASYMMETRIC KEY CIPHERS: RSA cryptosystem – Key distribution – Key management – Diffie Hellman key exchange - ElGamal cryptosystem – Elliptic curve arithmetic-Elliptic curve cryptography.

UNIT IV MESSAGE AUTHENTICATION AND INTEGRITY 9

Authentication requirement – Authentication function – MAC – Hash function – Security of hash function and MAC – SHA –Digital signature and authentication protocols – DSS- Entity Authentication: Biometrics, Passwords, Challenge Response protocols- Authentication applications - Kerberos, X.509

UNIT V SECURITY PRACTICE AND SYSTEM SECURITY 9

Electronic Mail security – PGP, S/MIME – IP security – Web Security - SYSTEM SECURITY: Intruders – Malicious software – viruses – Firewalls.

TOTAL 45 PERIODS

OUTCOMES:

At the end of the course, the student should be able to:

 Understand the fundamentals of networks security, security architecture, threats and vulnerabilities

 Apply the different cryptographic operations of symmetric cryptographic algorithms

 Apply the different cryptographic operations of public key cryptography

 Apply the various Authentication schemes to simulate different applications.

 Understand various Security practices and System security standards

TEXT BOOK:

1. William Stallings, Cryptography and Network Security: Principles and Practice, PHI 3rd Edition, 2006.

REFERENCES:

1. C K Shyamala, N Harini and Dr. T R Padmanabhan: Cryptography and Network Security, Wiley India Pvt.Ltd

2. BehrouzA.Foruzan, Cryptography and Network Security, Tata McGraw Hill 2007.

3. Charlie Kaufman, Radia Perlman, and Mike Speciner, Network Security: PRIVATE Communication in a PUBLIC World, Prentice Hall, ISBN 0-13-046019-2

GAURDIAN VAULT BUILDING A SECURE BACKUP SOFTWARE

A PROJECT REPORT

A Submitted By

ANGEL MARINA.M **422120104006**

JASMINE MEDONA.A **422120104014**

in partial for the fulfillment award of the degree

of

BACHELOR OF ENGINEERING

in

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MAY -2024

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BONAFIDE CERTIFICATE

Certified that this project report **"GUARDIAN VAULT BUILDING A SECURE BACKUP SOFTWARE "** is the bonafide work of **ANGEL MARINA.M(422120104006),JASMINE MEDONA.A (422120104014)**, who carried out the project work under my supervision.

SIGNATURE

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Submitted for the project viva - voce held on 08/05/2024.

INTERNAL EXAMINER

EXTERNAL EXAMINER

ABSTRACT

Guardian Vault is a secure backup software system designed to protect sensitive data such as API keys, secrets, wallets, and private keys from unauthorized access and data breaches. Traditional storage methods, such as plain text in environment files or databases, are no longer sufficient to ensure data security. Guardian Vault encrypts data and enforces access control policies to safeguard sensitive information, ensuring its confidentiality and integrity. The project utilizes a component-based architecture, with the React JavaScript library serving as the foundation for building user interfaces. React's declarative and component-based approach simplifies UI development, making it easier to manage and maintain code. The system also leverages a virtual DOM to improve performance, reducing the number of DOM manipulations needed to update the UI. Guardian Vault supports both cloud-based and on-premise deployments, providing flexibility for different deployment scenarios. It seamlessly integrates with popular cloud infrastructures and native technologies such as HarshiCorp Vault, allowing organizations to leverage their existing investments in security tools. The system's user-friendly interface and robust security features make it an ideal solution for organizations seeking to enhance the security of their sensitive data. Guardian Vault offers a secure, encrypted storage solution for organizations looking to protect their sensitive data from unauthorized access and data breaches. With its comprehensive security features and flexible deployment options, Guardian Vault is a valuable asset in today's data-driven world.

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

CS8792 CRYPTOGRAPHY AND NETWORK SECURITY **L T P C**
3 0 0 3

OBJECTIVES:

- To understand Cryptography Theories, Algorithms and Systems.
- To understand necessary Approaches and Techniques to build protection mechanisms in order to secure computer networks.

UNIT I INTRODUCTION 9

Security trends - Legal, Ethical and Professional Aspects of Security, Need for Security at Multiple levels, Security Policies - Model of network security – Security attacks, services and mechanisms – OSI security architecture – Classical encryption techniques: substitution techniques, transposition techniques, steganography- Foundations of modern cryptography: perfect security – information theory – product cryptosystem – cryptanalysis.

UNIT II SYMMETRIC KEY CRYPTOGRAPHY 9

MATHEMATICS OF SYMMETRIC KEY CRYPTOGRAPHY: Algebraic structures - arithmetic-Euclid‟s algorithm- Congruence and matrices - Groups, Rings, Fields- Finite fields- SYMMETRIC KEY CIPHERS**:** SDES – Block cipher Principles of DES – Strength of DES – Differential and linear cryptanalysis - Block cipher design principles – Block cipher mode of operation – Evaluation criteria for AES – Advanced Encryption Standard - RC4 .

UNIT III PUBLIC KEY CRYPTOGRAPHY 9

MATHEMATICS OF ASYMMETRIC KEY CRYPTOGRAPHY: Primes – Primality Testing Factorization – Euler's totient function, Fermat's and Euler's Theorem - Chinese Remainder Theorem – Exponentiation and logarithm - ASYMMETRIC KEY CIPHERS: RSA cryptosystem – Key distribution – Key management – Diffie Hellman key exchange - ElGamal cryptosystem – Elliptic curve arithmetic-Elliptic curve cryptography.

UNIT IV MESSAGE AUTHENTICATION AND INTEGRITY 9

Authentication requirement – Authentication function – MAC – Hash function – Security of hash function and MAC – SHA –Digital signature and authentication protocols – DSS- Entity Authentication: Biometrics, Passwords, Challenge Response protocols- Authentication applications - Kerberos, X.509

UNIT V SECURITY PRACTICE AND SYSTEM SECURITY 9

Electronic Mail security – PGP, S/MIME – IP security – Web Security - SYSTEM SECURITY: Intruders – Malicious software – viruses – Firewalls.

TOTAL 45 PERIODS

OUTCOMES:

At the end of the course, the student should be able to:

 Understand the fundamentals of networks security, security architecture, threats and vulnerabilities

 Apply the different cryptographic operations of symmetric cryptographic algorithms

 Apply the different cryptographic operations of public key cryptography

 Apply the various Authentication schemes to simulate different applications.

 Understand various Security practices and System security standards

TEXT BOOK:

1. William Stallings, Cryptography and Network Security: Principles and Practice, PHI 3rd Edition, 2006.

REFERENCES:

1. C K Shyamala, N Harini and Dr. T R Padmanabhan: Cryptography and Network Security, Wiley India Pvt.Ltd

2. BehrouzA.Foruzan, Cryptography and Network Security, Tata McGraw Hill 2007.

3. Charlie Kaufman, Radia Perlman, and Mike Speciner, Network Security: PRIVATE Communication in a PUBLIC World, Prentice Hall, ISBN 0-13-046019-2

DETECTION OF PHISHING WEBSITES USING MACHINE LEARNING

A PROJECT RPORT

Submitted by

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P. THINAGARAN 422120104034

In partial fulfillment for the award of the degree

of

BACHELOR OF ENGINEERING

in

COMPUTER SCIENCE AND ENGINEERING

ST. ANNE'S COLLEGE OF ENGINEERING AND TECHNOLOGY, ANGUCHETTYPALAYAM, PANRUTI 607 106.

ANNA UNIVERSITY :: CHENNAI 600.025

MAY 2024

ANNA UNIVERSITY :: CHENNAI 600 025

BONAFIDE CERTIFICATE

Certified that this project report **"DETECTION OF PHISHING WEBSITES USING MACHINE LEARNING"** is the bonafide work of **PRAVEENKUMAR V (422120104027), THINAGARAN P (422120104034)** who carried out the project work under my supervision.

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INTERNAL EXAMINER

EXTERNAL EXAMINER

ABSTRACT

Phishing is a widespread tactic used to trick gullible people into disclosing their personal information by using bogus websites. Phishing website URLs are designed to steal personal data, including user names, passwords, and online financial activities. Phishers employ websites that resemble those genuine websites both aesthetically and linguistically. Utilizing anti-phishing methods to identify phishing is necessary to stop the rapid advancement of phishing techniques as a result of advancing technology. A strong tool for thwarting phishing assaults is machine learning. Attackers frequently use phishing because it is simpler to fool a victim into clicking a malicious link that looks authentic than to try to get past a computer's security measures. The malicious links within the message body are intended to appear to go to the spoofed company utilising that company's logos and other genuine information. In the method that is being presented, machine learning is used to create a revolutionary approach for detecting phishing websites. Gradient Boosting Classifier is the model we utilised in our suggested strategy to identify phishing websites based on aspects of URL significance. By extracting and comparing different characteristics between legitimate and phishing URLs, the suggested method uses gradient boosting classifier to identify phishing URLs. The studies' findings demonstrate that the suggested approach successfully identifies legitimate websites from bogus ones in real time.

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

CS8603 DISTRIBUTED SYSTEMS L T P C
3 0 0 3

OBJECTIVES:

- To understand the foundations of distributed systems.
- To learn issues related to clock Synchronization and the need for global state in distributed
- To learn distributed mutual exclusion and deadlock detection algorithms.
- To understand the significance of agreement, fault tolerance and recovery
- To learn the characteristics of peer-to-peer and distributed shared memory systems.

UNIT I INTRODUCTION 9

Introduction: Definition –Relation to computer system components –Motivation –Relation to parallel systems – Message-passing systems versus shared memory systems –Primitives for distributed communication –Synchronous versus asynchronous executions –Design issues and challenges. **A model of distributed computations:** A distributed program –A model of distributed executions –Models of communication networks –Global state – Cuts –Past and future cones of an event –Models of process communications. **Logical Time**: A framework for a system of logical clocks –Scalar time –Vector time – Physical clock synchronization: NTP.

UNIT II MESSAGE ORDERING & SNAPSHOTS 9

Message ordering and group communication: Message ordering paradigms –Asynchronous execution with synchronous communication –Synchronous program order on an asynchronous system –Group communication – Causal order (CO) - Total order. **Global state and snapshot recording algorithms:** Introduction –System model and definitions –Snapshot algorithms for FIFO channels

UNIT III DISTRIBUTED MUTEX & DEADLOCK 9

Distributed mutual exclusion algorithms: Introduction – Preliminaries – Lamport's algorithm –Ricart-Agrawala algorithm – Maekawa's algorithm – Suzuki–Kasami's broadcast algorithm. **Deadlock detection in distributed systems:** Introduction – System model – Preliminaries – Models of deadlocks – Knapp's classification – Algorithms for the single resource model, the AND model and the OR model.

UNIT IV RECOVERY & CONSENSUS 9

Checkpointing and rollback recovery: Introduction – Background and definitions – Issues in failure recovery – Checkpoint-based recovery – Log-based rollback recovery – Coordinated checkpointing algorithm – Algorithm for asynchronous checkpointing and recovery. **Consensus and agreement algorithms:** Problem definition – Overview of results – Agreement in a failure –free system – Agreement in synchronous systems with failures.

UNIT V P2P & DISTRIBUTED SHARED MEMORY 9

Peer-to-peer computing and overlay graphs: Introduction – Data indexing and overlays – Chord– Content addressable networks – Tapestry. **Distributed shared memory:** Abstraction and advantages – Memory consistency models –Shared memory Mutual Exclusion.

TOTAL: 45 PERIODS

OUTCOMES:

At the end of this course, the students will be able to:

- Elucidate the foundations and issues of distributed systems
- Understand the various synchronization issues and global state for distributed systems.
- Understand the Mutual Exclusion and Deadlock detection algorithms in distributed systems
- Describe the agreement protocols and fault tolerance mechanisms in distributed systems.
- Describe the features of peer-to-peer and distributed shared memory systems

TEXT BOOKS:

1. Kshemkalyani, Ajay D., and Mukesh Singhal. Distributed computing: principles, algorithms, and systems. Cambridge University Press, 2011.
2. George Coulouris, Jean Dollimore and Tim Kindberg, “Distributed Systems Concepts and Design”, Fifth Edition, Pearson Education, 2012.

REFERENCES:

1. Pradeep K Sinha, "Distributed Operating Systems: Concepts and Design", Prentice Hall of India, 2007.
2. Mukesh Singhal and Niranjan G. Shivaratri. Advanced concepts in operating systems. McGraw-Hill, Inc., 1994.
3. Tanenbaum A.S., Van Steen M., “Distributed Systems: Principles and Paradigms”, Pearson Education, 2007.
4. Liu M.L., “Distributed Computing, Principles and Applications”, Pearson Education, 2004

JUDICIAL EVIDENCE INTIGRITY AND SECURITY SYSTEM FOR PROOF OF FAIR JUDGEMENT

A PROJECT REPORT

Submitted by

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In partial fulfillment for the award of the degree

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BACHELOR OF ENGINEERING

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ANNA UNIVERSITY: :CHENNAI 600 025

MAY 2024

BONAFIDE CERTIFICATE

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INTERNAL EXAMINER

8/5/24

EXTERNAL EXAMINER

ABSTRACT

Digital evidence is defined as information and data of value to an investigation that is stored on, received, or transmitted by an electronic device. In criminal investigations, civil lawsuits, and regulatory compliance, digital evidence such as electronic documents, recordings, and transaction records forms the basis for decision-making. However, factors like data alteration, unauthorised access, or flaws in centralised storage can threaten the security and integrity of digital evidence. Therefore, a secure storage model is needed to improve the investigation process and safeguard any sensitive information collected. To address the lack of an automated mechanism for protected evidence and maintaining integrity, a model was developed targeting the various security and forensic aspects during the investigation lifecycle. An efficient forensics architecture is proposed that establishes the Chain of Custody in block-chain technology and tamper detection using Deep Learning Models, where participating stakeholders create a private network to exchange and agree on different investigation activities before being stored on the block-chain ledger. Utilizing fuzzy hash functions enables forensic investigators to successfully deal with permissible alteration of digital evidence by standardizing the forensics processes, Database Chain of Custody architecture enforcing a standard approach and improves the quality of the finished result. The proposed architectural solution delivers robust information integrity, prevention, and protection mechanism to permanently and immutably store the evidence (chain of custody) in a private permissioned encrypted block-chain ledger. The proposed DB-CoC architecture provides complete data provenance, traceability, and assurance for performing different operations as well as trust between the chain of custody events while collecting, storing, analysing, and showing the digital evidence.

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

CS8492 DATABASE MANAGEMENT SYSTEMS L T P C
3 0 0 3

OBJECTIVES

- To learn the fundamentals of data models and to represent a database system using ER diagrams.
- To study SQL and relational database design.
- To understand the internal storage structures using different file and indexing techniques which will help in physical DB design.
- To understand the fundamental concepts of transaction processing- concurrency control techniques and recovery procedures.
- To have an introductory knowledge about the Storage and Query processing Techniques

UNIT I RELATIONAL DATABASES 10

Purpose of Database System – Views of data – Data Models – Database System Architecture – Introduction to relational databases – Relational Model – Keys – Relational Algebra – SQL fundamentals – Advanced SQL features – Embedded SQL– Dynamic SQL

UNIT II DATABASE DESIGN 8

Entity-Relationship model – E-R Diagrams – Enhanced-ER Model – ER-to-Relational Mapping – Functional Dependencies – Non-loss Decomposition – First, Second, Third Normal Forms, Dependency Preservation – Boyce/Codd Normal Form – Multi-valued Dependencies and Fourth Normal Form – Join Dependencies and Fifth Normal Form

UNIT III TRANSACTIONS 9

Transaction Concepts – ACID Properties – Schedules – Serializability – Concurrency Control – Need for Concurrency – Locking Protocols – Two Phase Locking – Deadlock – Transaction Recovery - Save Points – Isolation Levels – SQL Facilities for Concurrency and Recovery.

UNIT IV IMPLEMENTATION TECHNIQUES 9

RAID – File Organization – Organization of Records in Files – Indexing and Hashing –Ordered Indices – B+ tree Index Files – B tree Index Files – Static Hashing – Dynamic Hashing – Query Processing Overview – Algorithms for SELECT and JOIN operations – Query optimization using Heuristics and Cost Estimation.

UNIT V ADVANCED TOPICS 9

Distributed Databases: Architecture, Data Storage, Transaction Processing – Object-based Databases: Object Database Concepts, Object-Relational features, ODMG Object Model, ODL, OQL - XML Databases: XML Hierarchical Model, DTD, XML Schema, XQuery – Information Retrieval: IR Concepts, Retrieval Models, Queries in IR systems.

TOTAL: 45 PERIODS

OUTCOMES:

Upon completion of the course, the students will be able to:

- Classify the modern and futuristic database applications based on size and complexity
- Map ER model to Relational model to perform database design effectively
- Write queries using normalization criteria and optimize queries
- Compare and contrast various indexing strategies in different database systems
- Appraise how advanced databases differ from traditional databases.

TEXT BOOKS:

1. Abraham Silberschatz, Henry F. Korth, S. Sudharshan, “Database System Concepts”, Sixth Edition, Tata McGraw Hill, 2011. 2. Ramez Elmasri, Shamkant B. Navathe, “Fundamentals of Database Systems”, Sixth Edition,
Pearson Education, 2011.

REFERENCES:

1. C.J.Date, A.Kannan, S.Swamynathan, “An Introduction to Database Systems”, Eighth Edition,
Pearson Education, 2006.
2. Raghu Ramakrishnan, ―Database Management Systems‖, Fourth Edition, McGraw-Hill College Publications, 2015.
3. G.K.Gupta,"Database Management Systems”, Tata McGraw Hill, 2011.

AMLBOT: AN AI POWERED TRANSACTIONAL NETWORK AND BEHAVIOUR ANALYSIS TO DETECT AND PREVENT MONEY LAUNDERING ACTIVITIES

A PROJECT REPORT

Submitted by

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In partial fulfillment for the award of the degree

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BACHELOR OF ENGINEERING

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MAY 2024

ANNA UNIVERSITY:: CHENNAI 600 025

BONAFIDE CERTIFICATE

Certified that this project report "**AMLBOT: AN AI POWERED TRANSACTIONAL NETWORK AND BEHAVIOUR ANALYSIS TO DETECT AND PREVENT MONEY LAUNDERING ACTIVITIES**" is the bonafide certification project work of **A.HARIPRIYA(422120104012), V.JAYASRI(422120104015), M.SUBASHINI (422120104030)** who carried out the project work under my supervision.

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INTERNAL EXAMINER

EXTERNAL EXAMINER

ABSTRACT

Money laundering is the process of disguising the proceeds of illegal activities as legitimate funds. Money laundering is a significant problem that poses serious threats to the integrity of the financial system, as it enables criminals to profit from illegal activities and finance further criminal endeavours. Money laundering is also linked to other crimes, such as drug trafficking, terrorism financing, and corruption. To combat money laundering, governments and financial institutions have implemented various measures, such as Know Your Customer (KYC) regulations, Anti-Money Laundering (AML) laws, and the use of financial intelligence units. The existing money laundering system is complex, involving multiple agencies and regulations. This complexity makes it difficult to detect and prevent money laundering activities. This project aims to prevent and detect money laundering activities by identifying suspicious transactions and monitoring the movement of funds through the financial system. In this project, we propose a transactional network and behaviour analysis system that utilizes Long Short-Term Memory (LSTM) to detect and prevent money laundering activities. The proposed system uses historical financial data in a time-series format to train the LSTM network and identify patterns and trends that are associated with money laundering activities. By analysing the data in a time-series format, LSTM can identify unusual patterns of transactions and flag them for further investigation. The transactional network and behaviour analysis system can also predict future trends in financial data, allowing for the detection and prevention of potential money laundering activities before they occur. The system provides a more efficient and accurate method for identifying potential money laundering activities, ultimately leading to a more effective and efficient anti-money laundering system.

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

CS8451 DESIGN AND ANALYSIS OF ALGORITHMS L T P C
3 0 0 3

OBJECTIVES:

- To understand and apply the algorithm analysis techniques.
- To critically analyze the efficiency of alternative algorithmic solutions for the same problem
- To understand different algorithm design techniques.
- To understand the limitations of Algorithmic power.

UNIT I INTRODUCTION 9

Notion of an Algorithm – Fundamentals of Algorithmic Problem Solving – Important Problem Types– Fundamentals of the Analysis of Algorithmic Efficiency –Asymptotic Notations and their properties. Analysis Framework – Empirical analysis - Mathematical analysis for Recursive and Non-recursive algorithms - Visualization

UNIT II BRUTE FORCE AND DIVIDE-AND-CONQUER 9

Brute Force – Computing an – String Matching - Closest-Pair and Convex-Hull Problems - Exhaustive Search - Travelling Salesman Problem - Knapsack Problem - Assignment problem. Divide and Conquer Methodology – Binary Search – Merge sort – Quick sort – Heap Sort - Multiplication of Large Integers – Closest-Pair and Convex - Hull Problems.

UNIT III DYNAMIC PROGRAMMING AND GREEDY TECHNIQUE 9

Dynamic programming **–** Principle of optimality **-** Coin changing problem**,** Computing a Binomial Coefficient – Floyd's algorithm – Multi stage graph - Optimal Binary Search Trees – Knapsack Problem and Memory functions. Greedy Technique – Container loading problem - Prim's algorithm and Kruskal's Algorithm – 0/1 Knapsack problem, Optimal Merge pattern - Huffman Trees.

UNIT IV ITERATIVE IMPROVEMENT 9

The Simplex Method - The Maximum-Flow Problem – Maximum Matching in Bipartite Graphs, Stable marriage Problem.

UNIT V COPING WITH THE LIMITATIONS OF ALGORITHM POWER 9

Lower - Bound Arguments - P, NP NP- Complete and NP Hard Problems. Backtracking – n-Queen problem - Hamiltonian Circuit Problem – Subset Sum Problem. Branch and Bound – LIFO Search and FIFO search - Assignment problem – Knapsack Problem – Travelling Salesman Problem - Approximation Algorithms for NP-Hard Problems – Travelling Salesman problem – Knapsack problem.

TOTAL: 45 PERIODS

OUTCOMES:

At the end of the course, the students should be able to:

- Design algorithms for various computing problems.
- Analyze the time and space complexity of algorithms.
- Critically analyze the different algorithm design techniques for a given problem.
- Modify existing algorithms to improve efficiency.

TEXT BOOKS:

1. Anany Levitin, “Introduction to the Design and Analysis of Algorithms”, Third Edition, Pearson Education, 2012.
2. Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, Computer Algorithms/ C++, Second
Edition, Universities Press, 2007.

REFERENCES:

1. Thomas H.Cormen, Charles E.Leiserson, Ronald L. Rivest and Clifford Stein, “Introduction to Algorithms”, Third Edition, PHI Learning Private Limited, 2012.
2. Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman, “Data Structures and Algorithms”, Pearson Education, Reprint 2006.
3. Harsh Bhasin, “Algorithms Design and Analysis”, Oxford university press, 2016.
4. S. Sridhar, “Design and Analysis of Algorithms”, Oxford university press, 2014.
5. http://nptel.ac.in/

SIGN UP WALLET A BLOCK CHAIN BASED PERSONALLY IDENTIFIABLE INFORMATION (PII) MASKING USING LOOKUP SUBSTITUTION

A PROJECT REPORT

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MAY - 2024

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BONAFIDE CERTIFICATE

Certified that this project report titled **"SIGN UP WALLET A BLOCK CHAIN BASED PERSONALLY IDENTIFIABLE INFORMATION (PII) MASKING USING LOOKUP SUBSTITUTION"** is the bonafide work of **SIVARANJINI.R (422120104029), PADMAVATHY.T(422120104025),ANITHA.M (422120104007),** who carried out the project work under my supervision.

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INTERNAL EXAMINER

EXTERNAL EXAMINER

ABSTRACT

Digital identity is a user's online identification, similar to a physical identification card such as a passport or driver's license. A digital identity contains characteristics or attributes of the user. As we access apps and websites, organizations are dominantly using centralized and federated identity management systems (e.g. signing in with a Google or Facebook account) by default. The centralized system puts data at risk of large scale hacks and breaches while the federated model enables companies to track user data without their knowledge. Existing identity management systems either use a centralized authentication server or rely on identity providers to authenticate users for gaining access to various services. These systems have failed to safeguard user data privacy and do not encourage the portability of identity data. A trustworthy and reliable system is needed so that individuals can interact and network digitally and securely. These problems are motivated the development of the Sign Up Wallet a blockchain and machine learning based Self-Sovereign Identity model to manage digital identities. In this proposed system users store their digital identity in a Sign Up Wallet with cryptographic keys. When registering with a trusted service provider, a Unique Personal Identifier (UPI) Code is submitted for direct credential verification. Logistic Regression is used for predicting whether a website is trusted or not. If the service provider is untrusted, a masked credential is generated using a Lookup Substitution Algorithm, preserving privacy during verification. This masked credential is then provided to the service provider, allowing verification without exposing the raw data and maintaining user security.

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CS8591 COMPUTER NETWORKS L T P C
3 0 0 3

OBJECTIVES:
- To understand the protocol layering and physical level communication.
- To analyze the performance of a network.
- To understand the various components required to build different networks.
- To learn the functions of network layer and the various routing protocols.
- To familiarize the functions and protocols of the Transport layer.

UNIT I INTRODUCTION AND PHYSICAL LAYER 9
Networks – Network Types – Protocol Layering – TCP/IP Protocol suite – OSI Model – Physical Layer: Performance – Transmission media – Switching – Circuit-switched Networks – Packet Switching.

UNIT II DATA-LINK LAYER & MEDIA ACCESS 9
Introduction – Link-Layer Addressing – DLC Services – Data-Link Layer Protocols – HDLC – PPP - Media Access Control - Wired LANs: Ethernet - Wireless LANs – Introduction – IEEE 802.11, Bluetooth – Connecting Devices.

UNIT III NETWORK LAYER 9
Network Layer Services – Packet switching – Performance – IPV4 Addresses – Forwarding of IP Packets - Network Layer Protocols: IP, ICMP v4 – Unicast Routing Algorithms Protocols – Multicasting Basics – IPV6 Addressing – IPV6 Protocol.

UNIT IV TRANSPORT LAYER 9
Introduction – Transport Layer Protocols – Services – Port Numbers – User Datagram Protocol – Transmission Control Protocol – SCTP.

UNIT V APPLICATION LAYER 9
WWW and HTTP – FTP – Email –Telnet –SSH – DNS – SNMP.

TOTAL : 45 PERIODS

OUTCOMES:
On Completion of the course, the students should be able to:
- Understand the basic layers and its functions in computer networks.
- Evaluate the performance of a network.
- Understand the basics of how data flows from one node to another.
- Analyze and design routing algorithms.
- Design protocols for various functions in the network.
- Understand the working of various application layer protocols.

TEXT BOOK:
1. Behrouz A. Forouzan, Data Communications and Networking, Fifth Edition TMH, 2013.

REFERENCES

1. Larry L. Peterson, Bruce S. Davie, Computer Networks: A Systems Approach, Fifth Edition, Morgan Kaufmann Publishers Inc., 2012.
2. William Stallings, Data and Computer Communications, Tenth Edition, Pearson Education, 2013.
3. Nader F. Mir, Computer and Communication Networks, Second Edition, Prentice Hall, 2014.
4. Ying-Dar Lin, Ren-Hung Hwang and Fred Baker, Computer Networks: An Open Source Approach, McGraw Hill Publisher, 2011.
5. James F. Kurose, Keith W. Ross, Computer Networking, A Top-Down Approach Featuring the Internet, Sixth Edition, Pearson Education, 2013.

TRUST - CENTRIC PRIVACY - PRESERVING BLOCKCHAIN BASED DIGITAL CERTIFICATE LOCKER

A PROJECT REPORT

Submitted by

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MAY2024

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Certified that this project report **"TRUST - CENTRIC PRIVACY - PRESERVING BLOCKCHAIN BASED DIGITAL CERTIFICATE LOCKER"** is the bonafide work of **J. MARIYA ASHA (422120104022), S. SUBASRI (422120104032), P. VISHNUPRIYA (422120104037)** who carried out the project work under my supervision.

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Submitted for the project viva-voce held on 08.05.2024.

INTERNAL EXAMINER

EXTERNAL EXAMINER

ABSTRACT

Millions of students complete their education each year and go on to do higher studies or a corporate job. In this case student credentials are verified through a lengthy document verification process. This results in significant overhead as documents are transferred between institutions for verification. It is a costly, lengthy, and time-consuming procedure as university authorities invest millions of dollars in maintaining the entire process each year. The employer also takes plenty of time to verify the authenticity of the applicant's and applicant's certificate. People frequently lie about their degrees and qualifications by counterfeiting certificates. A fake certificate generated by skilful scammers is always tough to identify and address as the original one. Therefore, there is a crucial need to upgrade the certification and verification process. Blockchain has recently emerged as a potential alternative to manual student verification process. This project introduced a Blockchain-based decentralized Student Verification platform that offers an easy way to issue, check, and verify educational certificates.The student's identity and document are both verified by matching the hashes already present in the Blockchain.Also, in the proposed method the documents are linked to the student to add another layer of verification. The implementation of this proposed platform can be used to issue, receive and verify the student and their certificates.This system will help students as well as institutions to maintain security and transparency at the same time.

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

CS8492 DATABASE MANAGEMENT SYSTEMS L T P C
3 0 0 3

OBJECTIVES

- To learn the fundamentals of data models and to represent a database system using ER diagrams.
- To study SQL and relational database design.
- To understand the internal storage structures using different file and indexing techniques which will help in physical DB design.
- To understand the fundamental concepts of transaction processing- concurrency control techniques and recovery procedures.
- To have an introductory knowledge about the Storage and Query processing Techniques

UNIT I RELATIONAL DATABASES 10

Purpose of Database System – Views of data – Data Models – Database System Architecture – Introduction to relational databases – Relational Model – Keys – Relational Algebra – SQL fundamentals – Advanced SQL features – Embedded SQL– Dynamic SQL

UNIT II DATABASE DESIGN 8

Entity-Relationship model – E-R Diagrams – Enhanced-ER Model – ER-to-Relational Mapping –Functional Dependencies – Non-loss Decomposition – First, Second, Third Normal Forms, Dependency Preservation – Boyce/Codd Normal Form – Multi-valued Dependencies and Fourth Normal Form – Join Dependencies and Fifth Normal Form

UNIT III TRANSACTIONS 9

Transaction Concepts – ACID Properties – Schedules – Serializability – Concurrency Control – Need for Concurrency – Locking Protocols – Two Phase Locking – Deadlock – Transaction Recovery - Save Points – Isolation Levels – SQL Facilities for Concurrency and Recovery.

UNIT IV IMPLEMENTATION TECHNIQUES 9

RAID – File Organization – Organization of Records in Files – Indexing and Hashing –Ordered Indices – B+ tree Index Files – B tree Index Files – Static Hashing – Dynamic Hashing – Query Processing Overview – Algorithms for SELECT and JOIN operations – Query optimization using Heuristics and Cost Estimation.

UNIT V ADVANCED TOPICS 8

Databases: Object Database Concepts, Object-Relational features, ODMG Object Model, ODL, OQL - XML Databases: XML Hierarchical Model, DTD, XML Schema, XQuery – Information Retrieval: IR Concepts, Retrieval Models, Queries in IR systems.

TOTAL: 45 PERIODS

OUTCOMES:

Upon completion of the course, the students will be able to:

- Classify the modern and futuristic database applications based on size and complexity
- Map ER model to Relational model to perform database design effectively
- Write queries using normalization criteria and optimize queries
- Compare and contrast various indexing strategies in different database systems
- Appraise how advanced databases differ from traditional databases.

TEXT BOOKS:

1. Abraham Silberschatz, Henry F. Korth, S. Sudharshan, "Database System Concepts", Sixth Edition, Tata McGraw Hill, 2011.

2. Ramez Elmasri, Shamkant B. Navathe, "Fundamentals of Database Systems", Sixth Edition, Pearson Education, 2011.

REFERENCES:

1. C.J.Date, A.Kannan, S.Swamynathan, "An Introduction to Database Systems", Eighth Edition, Pearson Education, 2006.

2. Raghu Ramakrishnan, ―Database Management Systems‖, Fourth Edition, McGraw-Hill College Publications, 2015.

3. G.K.Gupta,"Database Management Systems", Tata McGraw Hill, 2011.

VIRTUALHR: AI-DRIVEN AUTOMATION FOR EFFICIENT AND UNBAISED CANDIDATE RECRUITMENT IN SOFTWARE ENGINEERING ROLES

A PROJECT REPORT

Submitted by

A.AGALYA	**422120104002**
S.KEERTHIKA	**422120104019**
G.SUBASRI	**422120104031**

In partial fulfillment for the award of the degree

Of

BACHELOR OF ENGINEERING

in

COMPUTER SCIENCE AND ENGINEERING

ST. ANNE'S COLLEGE OF ENGINEERING AND TECHNOLOGY, ANGUCHETTYPALAYAM, PANRUTI 607 106.

ANNA UNIVERSITY:: CHENNAI 600 025

MAY 2024

ANNA UNIVERSITY:: CHENNAI 600 025

BONAFIDE CERTIFICATE

Certified that this project report **"VIRTUALHR:AI-DRIVEN AUTOMATION FOR EFFICIENT AND UNBIASED CANDIDATE RECRUITMENT IN SOFTWARE ENGINEERING ROLES"** is the bonafide work of **A.AGALYA (422120104002), S.KEERTHIKA (422120104019), G.SUBASRI (422120104031)** who carried out the project work under my supervision.

V. 2/5/24

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8/5/24

INTERNAL EXAMINER

8/5/24

EXTERNAL EXAMINER

ABSTRACT

Recruitment is an integral part of any HR professional's role and critical for helping an organisation build a thriving workforce ready to support business growth. The entire recruitment process is sometimes relatively complex, especially if an HR professional is hiring for multiple roles at once. It's common for HR professionals to face several challenges during the hiring process. To overcome this challenge this project is to develop an AI-driven recruiting platform that aims to make the hiring process more efficient and unbiased. By leveraging artificial intelligence and machine learning, Virtual HR automates various aspects of the recruitment process, such as candidate sourcing, screening, and engagement. The proposed framework employs an automatic resume analysis system tailored to match candidate profiles with suitable job postings, providing valuable recommendations to employers using content based filtering. The subsequent automated virtual interview process involves three distinct stages: an aptitude test, a programming skill test, and a video calling interview facilitated by Virtual HR. It uses natural language processing (NLP) to understand, interpret, and respond to user voice inputs in a conversational manner and Attention Mechanism for behavioural prediction during visual interview. The proposed system allows candidates to encounter common interview questions and quantifies how they share their attention (gaze and head rotations) to engage with multiple interviewers based on their conversational role (speaking or listening). The results of these analyses are then provided to HR, who utilizes the insights to make informed and data-driven decisions during the final selection process. The integration of advanced technologies not only expedites the recruitment workflow but also introduces a modern, data-driven dimension to candidate evaluation. The proposed work is focused on software engineering job search and resume upgrades.

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

CS8691 ARTIFICIAL INTELLIGENCE L T P C
3 0 0 3

OBJECTIVES:

- To understand the various characteristics of Intelligent agents
- To learn the different search strategies in AI
- To learn to represent knowledge in solving AI problems
- To understand the different ways of designing software agents
- To know about the various applications of AI.

UNIT I INTRODUCTION 9

Introduction–Definition - Future of Artificial Intelligence – Characteristics of Intelligent Agents– Typical Intelligent Agents – Problem Solving Approach to Typical AI problems.

UNIT II PROBLEM SOLVING METHODS 9

Problem solving Methods - Search Strategies- Uninformed - Informed - Heuristics - Local Search Algorithms and Optimization Problems - Searching with Partial Observations – Constraint Satisfaction Problems – Constraint Propagation - Backtracking Search - Game Playing – Optimal Decisions in Games – Alpha - Beta Pruning - Stochastic Games

UNIT III KNOWLEDGE REPRESENTATION 9

First Order Predicate Logic – Prolog Programming – Unification – Forward Chaining-Backward Chaining – Resolution – Knowledge Representation - Ontological Engineering-Categories and Objects – Events - Mental Events and Mental Objects - Reasoning Systems for Categories - Reasoning with Default Information

UNIT IV SOFTWARE AGENTS 9

Architecture for Intelligent Agents – Agent communication – Negotiation and Bargaining – Argumentation among Agents – Trust and Reputation in Multi-agent systems.

UNIT V APPLICATIONS 9

AI applications – Language Models – Information Retrieval- Information Extraction – Natural Language Processing - Machine Translation – Speech Recognition – Robot – Hardware – Perception – Planning – Moving

TOTAL :45 PERIODS

OUTCOMES:

Upon completion of the course, the students will be able to:

- Use appropriate search algorithms for any AI problem
- Represent a problem using first order and predicate logic
- Provide the apt agent strategy to solve a given problem
- Design software agents to solve a problem
- Design applications for NLP that use Artificial Intelligence.

TEXT BOOKS:

1 S. Russell and P. Norvig, "Artificial Intelligence: A Modern Approach", Prentice Hall, Third Edition, 2009.

2 I. Bratko, "Prolog: Programming for Artificial Intelligence", Fourth edition, Addison-Wesley Educational Publishers Inc., 2011.

REFERENCES:

1. M. Tim Jones, "Artificial Intelligence: A Systems Approach(Computer Science)", Jones and Bartlett Publishers, Inc.; First Edition, 2008

2. Nils J. Nilsson, "The Quest for Artificial Intelligence", Cambridge University Press, 2009.

3. William F. Clocksin and Christopher S. Mellish," Programming in Prolog: Using the ISO Standard", Fifth Edition, Springer, 2003.

4. Gerhard Weiss, "Multi Agent Systems", Second Edition, MIT Press, 2013.

5. David L. Poole and Alan K. Mackworth, "Artificial Intelligence: Foundations of Computational Agents", Cambridge University Press, 2010.

IMAGE VACCINATOR AN IMAGE TAMPER RESILIENT USING INVERTIBLE NEURAL NETWORK

A PROJECT REPORT

Submitted By

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UDHAYAMOORTHY.R	**422120104035**
JEFFERY PRASANNA RAJ.J	**422120104303**

in partial for the fulfillment award of the degree

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BACHELOR OF ENGINEERING

in

COMPUTER SCIENCE AND ENGINEERING

ST. ANNE'S COLLEGE OF ENGINEERING AND TECHNOLOGY

ANGUCHETTYPALAYAM, PANRUTI - 607106

ANNA UNIVERSITY :: CHENNAI-600025

MAY - 2024

ANNA UNIVERSITY :: CHENNAI-600025

BONAFIDE CERTIFICATE

Certified that this project report **"IMAGE VACCINATOR AN IMAGE TAMPER RESILIENT USING INVERTIBLE NEURAL NETWORK"** is the bonafide work of **NATARAJAN.P(422120104023), UDHAYAMOORTHY.R (422120104035), JEFFERY PRASANNA RAJ.J(422120104023),"** who carried out the project work under my supervision.

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INTERNAL EXAMINER

EXTERNAL EXAMINER

ABSTRACT

Digital images are susceptible to a range of vulnerabilities and threats that can compromise security and privacy in online social networking sites. Image tampering attacks involve the unauthorized or deceptive alteration of digital images, often for the purpose of misrepresenting their content or context. Once the images are manipulated, it is hard for current techniques to reproduce the original contents. To address these challenges and combat image tampering, research on image tamper localization has garnered extensive attention. Image Processing and Machine Learning techniques have bolstered image forgery detection, primarily focusing on noise-level manipulation detection. Furthermore, these techniques are often less effective on compressed or low-resolution images and lack self-recovery capabilities, making it challenging to reproduce original content once images have been manipulated. In this context, this project introduces an enhanced scheme known as Image Immunizer for image tampering resistance and lossless auto – recovery using Vaccinator and Invertible Neural Network a Deep Leaning Approach. Multitask learning is used to train the network, encompassing four key modules: apply vaccine to the uploaded image, ensuring consistency between the immunized and original images, classifying tampered pixels, and encouraging image self-recovery to closely resemble the original image. During the forward pass, both the original image and its corresponding edge map undergo transformation, resulting in the creation of an immunized version. Upon receiving an attacked image, a localizer identifies tampered areas by predicting a tamper mask. In the backward pass with Run-Length Encoding, hidden perturbations are transformed into information, facilitating the recovery of the original, lossless image and its edge map, ensuring image integrity and authenticity. This proposed technique achieves promising results in real-world tests where experiments show accurate tamper localization as well as high-fidelity content recovery.

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

CS8494 SOFTWARE ENGINEERING L T P C
3 0 0 3

OBJECTIVES:

- To understand the phases in a software project
- To understand fundamental concepts of requirements engineering and Analysis Modeling.
- To understand the various software design methodologies
- To learn various testing and maintenance measures

UNIT I SOFTWARE PROCESS AND AGILE DEVELOPMENT 9

Introduction to Software Engineering, Software Process, Perspective and Specialized Process Models –Introduction to Agility-Agile process-Extreme programming-XP Process.
Software Requirements: Functional and Non-Functional, User requirements, System requirements, Software Requirements Document – Requirement Engineering Process: Feasibility Studies, Requirements elicitation and analysis, requirements validation, requirements management- Classical analysis: Structured system Analysis, Petri Nets- Data Dictionary.

UNIT III SOFTWARE DESIGN 9

Design process – Design Concepts-Design Model– Design Heuristic – Architectural Design - Architectural styles, Architectural Design, Architectural Mapping using Data Flow- User Interface Design: Interface analysis, Interface Design –Component level Design: Designing Class based components, traditional Components.

UNIT IV TESTING AND MAINTENANCE 9

Software testing fundamentals-Internal and external views of Testing-white box testing - basis path testing-control structure testing-black box testing- Regression Testing – Unit Testing – Integration Testing – Validation Testing – System Testing And Debugging –Software Implementation Techniques: Coding practices-Refactoring-Maintenance and Reengineering-BPR model-Reengineering process model-Reverse and Forward Engineering.

UNIT V PROJECT MANAGEMENT 9

Software Project Management: Estimation – LOC, FP Based Estimation, Make/Buy Decision COCOMO I & II Model – Project Scheduling – Scheduling, Earned Value Analysis Planning – Project Plan, Planning Process, RFP Risk Management – Identification, Projection - Risk Management-Risk Identification-RMMM Plan-CASE TOOLS

TOTAL :45 PERIODS

OUTCOMES:

On Completion of the course, the students should be able to:

- Identify the key activities in managing a software project.
- Compare different process models.
- Concepts of requirements engineering and Analysis Modeling.
- Apply systematic procedure for software design and deployment.
- Compare and contrast the various testing and maintenance.
- Manage project schedule, estimate project cost and effort required.

TEXT BOOKS:

1. Roger S. Pressman, “Software Engineering – A Practitioner‟s Approach”, Seventh Edition, Mc Graw-Hill International Edition, 2010.
2. Ian Sommerville, “Software Engineering”, 9th Edition, Pearson Education Asia, 2011.

REFERENCES:

1. Rajib Mall, “Fundamentals of Software Engineering”, Third Edition, PHI Learning PrivateLimited, 2009.
2. Pankaj Jalote, “Software Engineering, A Precise Approach”, Wiley India, 2010.
3. Kelkar S.A., “Software Engineering”, Prentice Hall of India Pvt Ltd, 2007.
4. Stephen R.Schach, “Software Engineering”, Tata McGraw-Hill Publishing Company Limited,2007.
5. http://nptel.ac.in/.

DESIGN AND AUTOMATION OF A DUAL- AXIS SOLAR AND CLEANING SYSTEM

A PROJECT REPORT

Submitted by

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in partial fulfilment for the award of the degreeof

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in

ELECTRICAL AND ELECTRONICS ENGINEERING

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ANNA UNIVERSITY: CHENNAI 600 025

MAY 2024

ANNA UNIVERSITY: CHENNAI 600 025

BONAFIDE CERTIFICATE

Certified that this project report **"DESIGN AND AUTOMATION OF A DUAL- AXIS SOLAR AND CLEANING SYSTEM"** is the bona fide work of **"GURUMOORTHI.P ,SEDHU.S ,TAMIZHMANI.T"** who carried out the project work under my supervision.

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Submitted for the university examination held on 10.05.24

INTERNAL EXAMINER

EXTERNAL EXAMINER

ABSTRACT

The Automatic Solar Panel Tracking and Cleaning System using Arduino is designed to improve the efficiency of solar panels by tracking the sun's position and automatically cleaning the panels. The system utilizes light sensors to track the sun's movement throughout the day, ensuring that the solar panels are always perpendicular to the sun's rays for maximum energy absorption. Additionally, a cleaning mechanism is implemented to remove dust and dirt from the panels, further enhancing their efficiency. The Arduino microcontroller is used to control the tracking and cleaning operations, making the system cost-effective and easy to implement. Overall, this system aims to increase the output of solar panels and promote the use of renewable energy sources.

EE8691	EMBEDDED SYSTEMS	L	T	P	C
		3	0	0	3

OBJECTIVES:

To impart knowledge on the following Topics

- Building Blocks of Embedded System
- Various Embedded Development Strategies
- Bus Communication in processors, Input/output interfacing.
- Various processor scheduling algorithms.
- Basics of Real time operating system and example tutorials to discuss on one real time operating system tool.

UNIT I INTRODUCTION TO EMBEDDED SYSTEMS 9

Introduction to Embedded Systems –Structural units in Embedded processor , selection of processor & memory devices- DMA – Memory management methods- Timer and Counting devices, Watchdog Timer, Real Time Clock, In circuit emulator, Target Hardware Debugging.

UNIT II EMBEDDED NETWORKING 9

Embedded Networking: Introduction, I/O Device Ports & Buses– Serial Bus communication protocols RS232 standard – RS422 – RS 485 - CAN Bus -Serial Peripheral Interface (SPI) – Inter Integrated Circuits (I^2C) –need for device drivers.

UNIT III EMBEDDED FIRMWARE DEVELOPMENT ENVIRONMENT 9

Embedded Product Development Life Cycle- objectives, different phases of EDLC, Modelling of EDLC; issues in Hardware-software Co-design, Data Flow Graph, state machine model, Sequential Program Model, concurrent Model, object oriented Model.

UNIT IV RTOS BASED EMBEDDED SYSTEM DESIGN 9

Introduction to basic concepts of RTOS- Task, process & threads, interrupt routines in RTOS, Multiprocessing and Multitasking, Preemptive and non-preemptive scheduling, Task communication shared memory, message passing-, Inter process Communication – synchronization between processes-semaphores, Mailbox, pipes, priority inversion, priority inheritance.

UNIT V EMBEDDED SYSTEM APPLICATION AND DEVELOPMENT 9

Case Study of Washing Machine- Automotive Application- Smart card System Application-ATM machine –Digital camera

TOTAL : 45 PERIODS

OUTCOMES:

- Ability to understand and analyze Embedded systems.
- Ability to suggest an embedded system for a given application.
- Ability to operate various Embedded Development Strategies
- Ability to study about the bus Communication in processors.
- Ability to acquire knowledge on various processor scheduling algorithms.
- Ability to understand basics of Real time operating system.

TEXT BOOKS:

1. Peckol, "Embedded system Design", John Wiley & Sons,2010
2. Lyla B Das," Embedded Systems-An Integrated Approach", Pearson, 2013
3. Shibu. K.V, "Introduction to Embedded Systems", 2e, Mc graw Hill, 2017.

REFERENCES

1. Raj Kamal, 'Embedded System-Architecture, Programming, Design', Mc Graw Hill, 2013.
2. C.R.Sarma, "Embedded Systems Engineering", University Press (India) Pvt. Ltd, 2013.
3. Tammy Noergaard, "Embedded Systems Architecture", Elsevier, 2006.
4. Han-Way Huang, "Embedded system Design Using C8051", Cengage Learning, 2009.
5. Rajib Mall "Real-Time systems Theory and Practice" Pearson Education, 2007.

EE8703 RENEWABLE ENERGY SYSTEMS L T P C
3 0 0 3

OBJECTIVES:

To impart knowledge on the following Topics

- Awareness about renewable Energy Sources and technologies.
- Adequate inputs on a variety of issues in harnessing renewable Energy.
- Recognize current and possible future role of renewable energy sources.

UNIT I RENEWABLE ENERGY (RE) SOURCES 9

Environmental consequences of fossil fuel use, Importance of renewable sources of energy, Sustainable Design and development, Types of RE sources, Limitations of RE sources, Present Indian and international energy scenario of conventional and RE sources.

UNIT II WIND ENERGY 9

Power in the Wind – Types of Wind Power Plants(WPPs)–Components of WPPs-Working of WPPs- Siting of WPPs-Grid integration issues of WPPs.

UNIT III SOLAR PV AND THERMAL SYSTEMS 9

Solar Radiation, Radiation Measurement, Solar Thermal Power Plant, Central Receiver Power Plants, Solar Ponds.- Thermal Energy storage system with PCM- Solar Photovoltaic systems : Basic Principle of SPV conversion – Types of PV Systems- Types of Solar Cells, Photovoltaic cell concepts: Cell, module, array ,PV Module I-V Characteristics, Efficiency & Quality of the Cell, series and parallel connections, maximum power point tracking, Applications.

UNIT IV BIOMASS ENERGY 9

Introduction-Bio mass resources –Energy from Bio mass: conversion processes-Biomass Cogeneration-Environmental Benefits. Geothermal Energy: Basics, Direct Use, Geothermal Electricity. Mini/micro hydro power: Classification of hydropower schemes, Classification of water turbine, Turbine theory, Essential components of hydroelectric system.

UNIT V OTHER ENERGY SOURCES 9

Tidal Energy: Energy from the tides, Barrage and Non Barrage Tidal power systems. Wave Energy: Energy from waves, wave power devices. Ocean Thermal Energy Conversion (OTEC)- Hydrogen Production and Storage- Fuel cell : Principle of working- various types - construction and applications. Energy Storage System- Hybrid Energy Systems.

TOTAL : 45 PERIODS

OUTCOMES:

- Ability to create awareness about renewable Energy Sources and technologies.
- Ability to get adequate inputs on a variety of issues in harnessing renewable Energy.
- Ability to recognize current and possible future role of renewable energy sources.
- Ability to explain the various renewable energy resources and technologies and their applications.
- Ability to understand basics about biomass energy.
- Ability to acquire knowledge about solar energy.

TEXT BOOKS:

1. Joshua Earnest, Tore Wizeliu, 'Wind Power Plants and Project Development', PHI Learning Pvt.Ltd, New Delhi, 2011.
2. D.P.Kothari, K.C Singal, Rakesh Ranjan "Renewable Energy Sources and Emerging Technologies", PHI Learning Pvt.Ltd, New Delhi, 2013.
3. Scott Grinnell, "Renewable Energy & Sustainable Design", CENGAGE Learning, USA, 2016.

OPTIMAL NETWORK RECONFIGURATION FOR LOSS MINIMZATION OF DISTRIBUTION SYSTEM USING CHEETAH OPTIMIZER

PROJECT REPORT

Submitted by

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MAY 2024

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BONAFIDE CERTIFICATE

Certified that this project report **"OPTIMAL NETWORK RECONFIGURATION FOR LOSS MINIMIZATION OF DISTRIBUTION SYSTEM USING CHEETAH OPTIMIZER"** is the bonafide work of **"IYYAPPAN. I, MOHANRAJ. S, SARAVANAN. K, SASIDHAR. A"** who carried out the project work under my supervision.

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Submitted for the university examination held on 10.5.24

10/5/24
INTERNAL EXAMINER

10/5/24
EXTERNAL EXAMINER

ABSTRACT

A distribution system's network reconfiguration (NR) is the process of changing the status of the switches to change the topology of the feeders. Using optimal NR at various network load levels, an economical way for improving the voltage profile and reducing power loss in distribution systems. A new metaheuristic cheetah optimizer based on the corporate rank hierarchy is used to solve the optimization problem in order to find the optimal radial distribution network. The proposed method is evaluated at three different load levels on a standard IEEE 33-bus test system, and the simulation results are compared to those of other optimization methods, demonstrating that the proposed method improves the system voltage profile while minimizing losses and power costs, establishing that this technique is effective in finding the best result.

EE8402 TRANSMISSION AND DISTRIBUTION L T P C
3 0 0 3

OBJECTIVES:

- To study the structure of electric power system and to develop expressions for the computation of transmission line parameters.
- To obtain the equivalent circuits for the transmission lines based on distance and to determine voltage regulation and efficiency.
- To understand the mechanical design of transmission lines and to analyze the voltage distribution in insulator strings to improve the efficiency.
- To study the types, construction of cables and methods to improve the efficiency.
- To study about distribution systems, types of substations, methods of grounding, EHVAC, HVDC and FACTS.

UNIT I TRANSMISSION LINE PARAMETERS 9

Structure of Power System - Parameters of single and three phase transmission lines with single and double circuits -Resistance, inductance and capacitance of solid, stranded and bundled conductors, Symmetrical and unsymmetrical spacing and transposition - application of self and mutual GMD; skin and proximity effects -Typical configurations, conductor types and electrical parameters of EHV lines.

UNIT II MODELLING AND PERFORMANCE OF TRANSMISSION LINES 9

Performance of Transmission lines - short line, medium line and long line - equivalent circuits, phasor diagram, attenuation constant, phase constant, surge impedance - transmission efficiency and voltage regulation, real and reactive power flow in lines - Power Circle diagrams - Formation of Corona – Critical Voltages – Effect on Line Performance.

UNIT III MECHANICAL DESIGN OF LINES 9

Mechanical design of OH lines – Line Supports –Types of towers – Stress and Sag Calculation – Effects of Wind and Ice loading. Insulators: Types, voltage distribution in insulator string, improvement of string efficiency, testing of insulators.

UNIT IV UNDER GROUND CABLES 9

Underground cables - Types of cables – Construction of single core and 3 core cables - Insulation Resistance – Potential Gradient - Capacitance of Single-core and 3 core cables - Grading of cables - Power factor and heating of cables – DC cables.

UNIT V DISTRIBUTION SYSTEMS 9

Distribution Systems – General Aspects – Kelvin's Law – AC and DC distributions - Techniques of Voltage Control and Power factor improvement – Distribution Loss –Types of Substations -Methods of Grounding – Trends in Transmission and Distribution: EHVAC, HVDC and FACTS (Qualitative treatment only).

TOTAL : 45 PERIODS

OUTCOMES:

- To understand the importance and the functioning of transmission line parameters..
- To understand the concepts of Lines and Insulators.
- To acquire knowledge on the performance of Transmission lines.
- To understand the importance of distribution of the electric power in power system.
- To acquire knowledge on Underground Cables
- To become familiar with the function of different components used in Transmission and Distribution levels of power system and modelling of these components.

TEXT BOOKS:

1. D.P.Kothari, I.J. Nagarath, 'Power System Engineering', Mc Graw-Hill Publishing Company limited, New Delhi, Second Edition, 2008.
2. C.L.Wadhwa, 'Electrical Power Systems', New Academic Science Ltd, 2009.
3. S.N. Singh, 'Electric Power Generation, Transmission and Distribution', Prentice Hall of India Pvt. Ltd, New Delhi, Second Edition, 2011.

REFERENCES

1. B.R.Gupta, 'Power System Analysis and Design' S. Chand, New Delhi, Fifth Edition,

DESIGN OF A WIRELESS ELECTRIC VEHICLE CHARGING SYSTEMS USING INTERLEAVED BOOST CONVERTERS

A PROJECT REPORT

Submitted by

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in

ELECTRICAL AND ELECTRONICS ENGINEERING

ST. ANNE'S COLLEGE OF ENGINEERING AND TECHNOLOGY

ANNA UNIVERSITY :: CHENNAI 600 025

MAY 2024

ANNA UNIVERSITY : CHENNAI 600 025

BONAFIDE CERTIFICATE

Certified that this project report "**DESIGN OF A WIRELESS ELECTRIC VEHICLE CHARGING SYSTEMS USING INTERLEAVED BOOST CONVERTERS**" is the bonafide work of "**S. R. ANTONY GEORGE, R. RAGUL, T. KIRUBANIDHI, S. VALLARASU**" who carried out the project work under my supervision.

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Submitted for the university examination held on 10.5.24

INTERNAL EXAMINER

EXTERNAL EXAMINER

ABSTRACT

Electric Vehicles (EVs) provide solutions for the conservation of conventional energy resources, pollution reduction for a safe environment, and zero-emission vehicles. EV charging can be done in two ways, either wired or wireless. Wired charging has barriers like high cost, limited consumer knowledge, limited driving range, etc., when compared to wireless charging. Moreover, wireless charging can provide automated charging, which is more safe and convenient. A wireless EV charging system employing an Interleaved Boost Converter (IBC) as the DC-AC converter is discussed along with its performance analysis. A performance comparison of conventional Boost Converter (BC) with IBC is done, which shows that the structure of the IBC reduces current ripples and losses, thus improving the overall system efficiency. The simulation results are presented to prove the effectiveness of IBC in the application of Electric Vehicle Wireless Charging Systems (EVWCSs).

EE8601 SOLID STATE DRIVES

L	T	P	C
3	0	0	3

OBJECTIVES:

To impart knowledge on the following Topics

- Steady state operation and transient dynamics of a motor load system.
- Analyze the operation of the converter/chopper fed dc drive, both qualitatively and quantitatively.
- Operation and performance of AC motor drives.
- Analyze and design the current and speed controllers for a closed loop solid state DC motor drive.

UNIT I DRIVE CHARACTERISTICS 9

Electric drive – Equations governing motor load dynamics – steady state stability – multi quadrant Dynamics: acceleration, deceleration, starting & stopping – typical load torque characteristics – Selection of motor.

UNIT II CONVERTER / CHOPPER FED DC MOTOR DRIVE 9

Steady state analysis of the single and three phase converter fed separately excited DC motor drive– continuous conduction – Time ratio and current limit control – 4 quadrant operation of converter / chopper fed drive-Applications.

UNIT III INDUCTION MOTOR DRIVES 9

Stator voltage control–V/f control– Rotor Resistance control-qualitative treatment of slip power recovery drives-closed loop control— vector control- Applications.

UNIT IV SYNCHRONOUS MOTOR DRIVES 9

V/f control and self-control of synchronous motor: Margin angle control and power factor control-Three phase voltage/current source fed synchronous motor- Applications.

UNIT V DESIGN OF CONTROLLERS FOR DRIVES 9

Transfer function for DC motor / load and converter – closed loop control with Current and speed feedback–armature voltage control and field weakening mode – Design of controllers; current controller and speed controller- converter selection and characteristics.

TOTAL : 45 PERIODS

OUTCOMES:

- Ability to understand and suggest a converter for solid state drive.
- Ability to select suitability drive for the given application.
- Ability to study about the steady state operation and transient dynamics of a motor load system.
- Ability to analyze the operation of the converter/chopper fed dc drive.
- Ability to analyze the operation and performance of AC motor drives.
- Ability to analyze and design the current and speed controllers for a closed loop solid state DC motor drive.

TEXT BOOKS:

1. Gopal K.Dubey, Fundamentals of Electrical Drives, Narosa Publishing House, 1992.
2. Bimal K.Bose. Modern Power Electronics and AC Drives, Pearson Education, 2002.
3. R.Krishnan, Electric Motor & Drives: Modeling, Analysis and Control, Pearson, 2001.

REFERENCES

1. Vedam Subramanyam, " Electric Drives Concepts and Applications ", 2e, McGraw Hill, 2016

OPTIMAL GENERATION COST AND EMISSION CONTROL FOR THE POWER SYSTEM USING POLITICAL OPTIMIZER ALGORITHM

A PROJECT REPORT

Submitted by

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RISHIDHARAN T	422120105310

in partial fulfillment for the award of the degree

of

BACHELOR OF ENGINEERING

in

ELECTRICAL AND ELECTRONICS ENGINEERING

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ANNA UNIVERSITY: CHENNAI 600 025

May 2024

ANNA UNIVERSITY: CHENNAI 600 025

BONAFIDE CERTIFICATE

Certified that this project report "**OPTIMAL GENERATION COST AND EMISSION CONTROL FOR THE POWER SYSTEM USING POLITICAL OPTIMIZER ALGORITHM**" is the bonofide work of "**SUBASHCHANDRABOSE. S, ARAVIND. R, GIRIDHARAN. S, RISHIDHARAN. T**" who carried out the project work under my supervision.

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INTERNAL EXAMINER

EXTERNAL EXAMINER

ABSTRACT

The cost of generating electrical energy from different sources tend to differ from one power plant to another depending on the energy source used and amount of emissions produced by each individual power plant. As a result of different operation cost, the economic dispatch considering emissions techniques are normally applied in order to optimize the power systems aiming at reducing the operation cost and pollutant emissions.

The expansion in electrical generation contributes to large extent an increase of greenhouse gases emissions which are causing global warming, ozone layer depletion and air pollution.

Fuels are the major source of electric energy generation, 42% of total global electricity generation is from coal which is the primary fuel globally. As a result of high dependability on fuel for electric generation, the electric energy is too expensive due to high expenses incurred by generation companies on emissions fees and purchase of fuels.

In this project, the mitigation of the discussed situation was done through the implementation of developed political optimizer algorithm in economic dispatch considering emissions. The results of the developed method were compared to others reported in literature and found to be promising in terms of electric generation cost and emissions reduction.

EE8702	POWER SYSTEM OPERATION AND CONTROL	L	T	P	C
		3	0	0	3

OBJECTIVES:

To impart knowledge on the following topics

- Significance of power system operation and control.
- Real power-frequency interaction and design of power-frequency controller.
- Reactive power-voltage interaction and the control actions to be implemented for maintaining the voltage profile against varying system load.
- Economic operation of power system.
- SCADA and its application for real time operation and control of power systems

UNIT I PRELIMINARIES ON POWER SYSTEM OPERATION AND CONTROL 9

Power scenario in Indian grid – National and Regional load dispatching centers – requirements of good power system - necessity of voltage and frequency regulation - real power vs frequency and reactive power vs voltage control loops - system load variation, load curves and basic concepts of load dispatching - load forecasting - Basics of speed governing mechanisms and modeling - speed load characteristics - regulation of two generators in parallel.

UNIT II REAL POWER - FREQUENCY CONTROL 9

Load Frequency Control (LFC) of single area system-static and dynamic analysis of uncontrolled and controlled cases - LFC of two area system - tie line modeling - block diagram representation of two area system - static and dynamic analysis - tie line with frequency bias control – state variability model - integration of economic dispatch control with LFC.

UNIT III REACTIVE POWER – VOLTAGE CONTROL 9

Generation and absorption of reactive power - basics of reactive power control – Automatic Voltage Regulator (AVR) – brushless AC excitation system – block diagram representation of AVR loop - static and dynamic analysis – stability compensation – voltage drop in transmission line - methods of reactive power injection - tap changing transformer, SVC (TCR + TSC) and STATCOM for voltage control.

UNIT IV ECONOMIC OPERATION OF POWER SYSTEM 9

Statement of economic dispatch problem - input and output characteristics of thermal plant - incremental cost curve - optimal operation of thermal units without and with transmission losses (no derivation of transmission loss coefficients) - base point and participation factors method - statement of unit commitment (UC) problem - constraints on UC problem - solution of UC problem using priority list – special aspects of short term and long term hydrothermal problems.

UNIT V COMPUTER CONTROL OF POWER SYSTEMS 9

Need of computer control of power systems-concept of energy control centers and functions – PMU - system monitoring, data acquisition and controls - System hardware configurations - SCADA and EMS functions - state estimation problem – measurements and errors - weighted least square estimation - various operating states - state transition diagram.

TOTAL : 45 PERIODS

OUTCOMES:

- Ability to understand the day-to-day operation of electric power system.
- Ability to analyze the control actions to be implemented on the system to meet the minute-to-minute variation of system demand.
- Ability to understand the significance of power system operation and control.
- Ability to acquire knowledge on real power-frequency interaction.
- Ability to understand the reactive power-voltage interaction.
- Ability to design SCADA and its application for real time operation.

MICROGRID SYSTEM WITH DEMAND RESPONSE PROGRAM USING GROSSHOPPER OPTIMIZATION ALGORITHM FOR ECONOMICAL OPERATION

A PROJECT REPORT

Submitted by

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MAY 2024

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BONAFIDE CERTIFICATE

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INTERNAL EXAMINER

EXTERNAL EXAMINER

ABSTRACT

A Microgrid system's load demand often fluctuates hourly. The Microgrid involves distributed generations like fuel cells, Microturbines, Wind Turbines, Photovoltaic Cells and Storage Systems etc. Utilities establish different prices at various times based on the fluctuation of the load demand curve, this is referred to as electricity price based on time-of-use (TOU).This models examine the utility and elasticity of various customers, taking into account their different behaviors during both peak and valley periods. The primary goal is to find the optimal operation of DG's in microgrid using Gross Hopper Optimization Algorithm and to formulate the problem as a non- Linear constraints objectives optimization problems to minimize the total operating cost . The overall contribution of this project is manifold which involves the techno-economic impacts of grid participation, electricity pricing and renewables. Here many cost factors taken into account include fuel costs, fined pollution costs, operating and maintenance costs, depreciation costs, etc. This project shows optimal schedule of PV, FC, MT and WT in microgrid for a day in grid connected mode. The total cost of DGs in microgrid and power costto the grip for the proposed method for a day is 1141.41566 $ and -94.43061 $ respectively.

EE8702 POWER SYSTEM OPERATION AND CONTROL

L	T	P	C
3	0	0	3

OBJECTIVES:

To impart knowledge on the following topics

- Significance of power system operation and control.
- Real power-frequency interaction and design of power-frequency controller.
- Reactive power-voltage interaction and the control actions to be implemented for maintaining the voltage profile against varying system load.
- Economic operation of power system.
- SCADA and its application for real time operation and control of power systems

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Power scenario in Indian grid – National and Regional load dispatching centers – requirements of good power system - necessity of voltage and frequency regulation - real power vs frequency and reactive power vs voltage control loops - system load variation, load curves and basic concepts of load dispatching - load forecasting - Basics of speed governing mechanisms and modeling - speed load characteristics - regulation of two generators in parallel.

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Load Frequency Control (LFC) of single area system-static and dynamic analysis of uncontrolled and controlled cases - LFC of two area system - tie line modeling - block diagram representation of two area system - static and dynamic analysis - tie line with frequency bias control – state variability model - integration of economic dispatch control with LFC.

UNIT III REACTIVE POWER – VOLTAGE CONTROL 9

Generation and absorption of reactive power - basics of reactive power control – Automatic Voltage Regulator (AVR) – brushless AC excitation system – block diagram representation of AVR loop - static and dynamic analysis – stability compensation – voltage drop in transmission line - methods of reactive power injection - tap changing transformer, SVC (TCR + TSC) and STATCOM for voltage control.

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Statement of economic dispatch problem - input and output characteristics of thermal plant - incremental cost curve - optimal operation of thermal units without and with transmission losses (no derivation of transmission loss coefficients) - base point and participation factors method - statement of unit commitment (UC) problem - constraints on UC problem - solution of UC problem using priority list – special aspects of short term and long term hydrothermal problems.

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Need of computer control of power systems-concept of energy control centers and functions – PMU - system monitoring, data acquisition and controls - System hardware configurations - SCADA and EMS functions - state estimation problem – measurements and errors - weighted least square estimation - various operating states - state transition diagram.

TOTAL : 45 PERIODS

OUTCOMES:

- Ability to understand the day-to-day operation of electric power system.
- Ability to analyze the control actions to be implemented on the system to meet the minute-to-minute variation of system demand.
- Ability to understand the significance of power system operation and control.
- Ability to acquire knowledge on real power-frequency interaction.
- Ability to understand the reactive power-voltage interaction.
- Ability to design SCADA and its application for real time operation.

OPTIMAL LOAD FORECASTING OF REGIONAL DISTRIBUTION NETWORK USING GWO ALGORITHM

A PROJECT REPORT

Submitted by

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in partial fulfillment for the award of the degree

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ANNA UNIVERSITY: CHENNAI 600 025

MAY 2024

ANNA UNIVERSITY: CHENNAI 600 025

BONAFIDE CERTIFICATE

Certified that this project report **"OPTIMAL LOAD FORECASTING OF REGIONAL DISTRIBUTION NETWORK USING GWO ALGORITHM"** is the bonafide work of **" DHIVAGAR. M, RAGUL .R , VIGNESH. V"** who carried out the project work under my supervision.

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INTERNAL EXAMINER

EXTERNAL EXAMINER

ABSTRACT

Load forecasting is an important component for power system energy management system. Precise load forecasting helps the electric utility to make unit commitment decisions, reduce spinning reserve capacity and schedule device maintenance plan properly. Besides playing a key role in reducing the generation cost, it is also essential to the reliability of power systems. Load forecasting plays an important role in power system planning, operation and control. Planning and operational applications of load forecasting requires a certain 'lead time' also called forecasting intervals. We present in this project a method for forecasting long-term electric load based on dragonfly algorithm. The proposed dragonfly algorithm is implemented on real time data of 110/22 kv substation at Panruti from 2021 to 2023. Electricity demand predictions have been made for next 10 years from 2024 to 2033. The proposed grey wolf algorithm is found to be highly accurate with a Mean Absolute Percentage Error (MAPE) is 6.36. The proposed dragonfly algorithm has a computation time of approximately 10 seconds.

EE8702 POWER SYSTEM OPERATION AND CONTROL L T P C
3 0 0 3

OBJECTIVES:

To impart knowledge on the following topics

- Significance of power system operation and control.
- Real power-frequency interaction and design of power-frequency controller.
- Reactive power-voltage interaction and the control actions to be implemented for maintaining the voltage profile against varying system load.
- Economic operation of power system.
- SCADA and its application for real time operation and control of power systems

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TOTAL : 45 PERIODS

OUTCOMES:

- Ability to understand the day-to-day operation of electric power system.
- Ability to analyze the control actions to be implemented on the system to meet the minute-to-minute variation of system demand.
- Ability to understand the significance of power system operation and control.
- Ability to acquire knowledge on real power-frequency interaction.
- Ability to understand the reactive power-voltage interaction.
- Ability to design SCADA and its application for real time operation.

IMPROVED SINGLE STAGE TRANSFORMERLESS BUCK-BOOST INVERTER FOR ELECTRIC VEHICLE CHARGER

A PROJECT REPORT

Submitted by

SANJAI. D	422120105015
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MAY 2024

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Certified that this project report **"IMPROVED SINGLE STAGE TRANSFORMERLESS BUCK-BOOST INVERTER FOR ELECTRIC VEHICLE CHARGER"** is the bonafide work of **"D. SANJAI, V. VIVEKANANDHAN, R. GNANAMOORTHY, A. SAM ROZARIO"** who carried out the project work under my supervision.

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Submitted for the university examination held on 10.5.24

K. Sriram 10/5/24

INTERNAL EXAMINER

EXTERNAL EXAMINER

ABSTRACT

As electric vehicles (EV) continue to gain market traction, more research is being conducted in the control of the power conditioning system. The design and implementation of a single-stage transformerless buck–boost converter for electric vehicle (EV) charger is done in this work. Being different from conventional H-bridge inverters, the proposed converter operates like buck–boost dc/dc converters instead of buck dc/dc converters. As a consequence, the advantages of a buck–boost dc/dc converter, i.e., the arbitrary relationships between its input voltage and output voltage, are still applicable to the proposed electric vehicle (EV) charger. Specifically, it remains in normal operation even when the peak ac output voltage is higher than the dc-link voltage. Simulation results are finally presented to illustrate its effectiveness.

EE8552	POWER ELECTRONICS	L	T	P	C
		3	0	0	3

OBJECTIVES:

To impart knowledge on the following Topics

- Different types of power semiconductor devices and their switching
- Operation, characteristics and performance parameters of controlled rectifiers
- Operation, switching techniques and basics topologies of DC-DC switching regulators.
- Different modulation techniques of pulse width modulated inverters and to understand harmonic reduction methods.
- Operation of AC voltage controller and various configurations.

UNIT I POWER SEMI-CONDUCTOR DEVICES 9

Study of switching devices, SCR, TRIAC, GTO, BJT, MOSFET, IGBT and IGCT- Static characteristics: SCR, MOSFET and IGBT - Triggering and commutation circuit for SCR- Introduction to Driver and snubber circuits.

UNIT II PHASE-CONTROLLED CONVERTERS 9

2-pulse, 3-pulse and 6-pulseconverters– performance parameters –Effect of source inductance— Firing Schemes for converter–Dual converters, Applications-light dimmer, Excitation system, Solar PV systems.

UNIT III DC TO DC CONVERTERS 9

Step-down and step-up chopper-control strategy– Introduction to types of choppers-A, B, C, D and E -Switched mode regulators- Buck, Boost, Buck- Boost regulator, Introduction to Resonant Converters, Applications-Battery operated vehicles.

UNIT IV INVERTERS 9

Single phase and three phase voltage source inverters (both120^0 mode and 180^0 mode)– Voltage& harmonic control--PWM techniques: Multiple PWM, Sinusoidal PWM, modified sinusoidal PWM – Introduction to space vector modulation –Current source inverter, Applications-Induction heating, UPS.

UNIT V AC TO AC CONVERTERS 9

Single phase and Three phase AC voltage controllers–Control strategy- Power Factor Control – Multistage sequence control -single phase and three phase cyclo converters – Introduction to Matrix converters, Applications –welding .

TOTAL : 45 PERIODS

OUTCOMES:

- Ability to analyse AC-AC and DC-DC and DC-AC converters.
- Ability to choose the converters for real time applications.

TEXT BOOKS:

1. M.H. Rashid, 'Power Electronics: Circuits, Devices and Applications', Pearson Education, Third Edition, New Delhi, 2004.
2. P.S.Bimbra "Power Electronics" Khanna Publishers, third Edition, 2003.
3. Ashfaq Ahmed 'Power Electronics for Technology', Pearson Education, Indian reprint, 2003.

REFERENCES

1. Joseph Vithayathil,' Power Electronics, Principles and Applications', McGraw Hill Series, 6th Reprint, 2013.
2. Philip T. Krein, "Elements of Power Electronics" Oxford University Press, 2004 Edition.
3. L. Umanand, "Power Electronics Essentials and Applications", Wiley, 2010.
4. Ned Mohan Tore. M. Undel and, William. P. Robbins, 'Power Electronics: Converters, Applications and Design', John Wiley and sons, third edition, 2003.
5. S.Rama Reddy, 'Fundamentals of Power Electronics', Narosa Publications, 2014.
6. M.D. Singh and K.B. Khanchandani, "Power Electronics," Mc Graw Hill India, 2013.
7. JP Agarwal," Power Electronic Systems: Theory and Design" 1e, Pearson Education, 2002.

DRAGONFLY OPTIMIZATION ALGORITHM BASED ALLOCATION AND SIZING OF ECONOMIC FACTS DEVICES UNDER CONTINGENCY CONDITION

A PROJECT REPORT

Submitted by

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ANNA UNIVERSITY: CHENNAI 600 025

MAY 2024

ANNA UNIVERSITY: CHENNAI 600 025

BONAFIDE CERTIFICATE

Certified that this project report **"DRAGONFLY OPTIMIZATION ALGORITHM BASED ALLOCATION AND SIZING OF ECONOMIC FACTS DEVICES UNDER CONTINGENCY CONDITION"** is the bonafide work of **"M. MUTHUKUMAR, R. PRAVEENRAJ, P. CHANDRU, S. VASANTHAKUMAR"** who carried out the project work under my supervision.

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INTERNAL EXAMINER

EXTERNAL EXAMINER

ABSTRACT

This project proposes an application of dragonfly algorithm for Economic flexible AC transmission system devices placement/sizing in power system network. The identification of overloaded lines is based on computation of severity index. The objective of the proposed approach is to alleviate the transmission line overload by placing the FACTS device on optimal location subjected to the power balance, voltage and generator limit constraints. In the dragonfly algorithm, the objective function of a given optimization problem is based on static and dynamic swam behaviour of dragonflies. The effectiveness of the methods is demonstrated for all possible line contingencies in IEEE 30 bus system. However, dragonfly algorithm-based generation approach removes the line overloads with minimum losses when compared to other approaches.

EE8702	POWER SYSTEM OPERATION AND CONTROL	L	T	P	C
		3	0	0	3

OBJECTIVES:

To impart knowledge on the following topics

- Significance of power system operation and control.
- Real power-frequency interaction and design of power-frequency controller.
- Reactive power-voltage interaction and the control actions to be implemented for maintaining the voltage profile against varying system load.
- Economic operation of power system.
- SCADA and its application for real time operation and control of power systems

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UNIT II REAL POWER - FREQUENCY CONTROL 9

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TOTAL : 45 PERIODS

OUTCOMES:

- Ability to understand the day-to-day operation of electric power system.
- Ability to analyze the control actions to be implemented on the system to meet the minute-to-minute variation of system demand.
- Ability to understand the significance of power system operation and control.
- Ability to acquire knowledge on real power-frequency interaction.
- Ability to understand the reactive power-voltage interaction.
- Ability to design SCADA and its application for real time operation.

OPTIMIZATION OF DG ALLOCATION IN DISTRIBUTION NETWORK BY ANTLION ALGORITHM

A PROJECT REPORT

Submitted
by

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2. ASLIN JOSEPH.S (422120105004)
3. ABINASH.A (422120105301)

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in

ELECTRICAL AND ELECTRONICS ENGINEERING

ST. ANNE'S COLLEGE OF ENGINEERING AND TECHNOLOGY

ANNA UNIVERSITY: CHENNAI 600 025

MAY 2024

ANNA UNIVERSITY: CHENNAI 600 025

BONAFIDE CERTIFICATE

Certified that this project report "OPTIMIZATION OF DG ALLOCATION IN DISTRIBUTION NETWORK BY ANTLION ALGORITHM" is the bonafide work of **"ARAVINDAN. A, ASLIN JOSEPH. S, ABINASH. A"** who carried out the project work under my supervision.

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Submitted for the university examination held on 10.05.2024

10/5/24

INTERNAL EXAMINER

10/5/24

EXTERNAL EXAMINER

ABSTRACT

This project presents a performance enhancement of a radial distribution system using simultaneous reconfiguration, optimal placement of Distributed Generation using Ant lion optimizer and PV array using antlion optimisation algorithm. The purpose of this paper is to reduce real power loss, improved voltage profile increased load balance. Here result proved that simultaneous reconfiguration along with optimal placement of capacitor and PV array is more efficient than Single objective optimization. Also the results obtained from differential evolution algorithm are more efficient than other method. The test system considered here is IEEE 33 bus system. This proposed approach was implemented in MATLAB software. The modified the differential evolution algorithm has been applied here successfully to minimize real power loss because it does not barrier factors or cross over rates because the objectives and constraints are dealt separately .The main advantages of this algorithm is continuous guiding search along with changing objective function because power from distributed generation is continuously varying so this can be applied for real time applications with modifications. This algorithm here is tested for a standard 33 bus radial distribution system for loss minimization and test result here shows that this algorithm is efficient and suitable for real time applications.

EE8501 POWER SYSTEM ANALYSIS L T P C
3 0 0 3

OBJECTIVES:

- To model the power system under steady state operating condition
- To understand and apply iterative techniques for power flow analysis
- To model and carry out short circuit studies on power system
- To model and analyze stability problems in power system

UNIT I POWER SYSTEM 9

Need for system planning and operational studies - Power scenario in India - Power system components – Representation - Single line diagram - per unit quantities - p.u. impedance diagram - p.u. reactance diagram - Network graph, Bus incidence matrix, Primitive parameters, Bus admittance matrix from primitive parameters - Representation of off-nominal transformer - Formation of bus admittance matrix of large power network.

UNIT II POWER FLOW ANALYSIS 9

Bus classification - Formulation of Power Flow problem in polar coordinates - Power flow solution using Gauss Seidel method - Handling of Voltage controlled buses - Power Flow Solution by Newton Raphson method.

UNIT III SYMMETRICAL FAULT ANALYSIS 9

Assumptions in short circuit analysis - Symmetrical short circuit analysis using Thevenin's theorem - Bus Impedance matrix building algorithm (without mutual coupling) - Symmetrical fault analysis through bus impedance matrix - Post fault bus voltages - Fault level - Current limiting reactors.

UNIT IV UNSYMMETRICAL FAULT ANALYSIS 9

Symmetrical components - Sequence impedances - Sequence networks - Analysis of unsymmetrical faults at generator terminals: LG, LL and LLG - unsymmetrical fault occurring at any point in a power system - computation of post fault currents in symmetrical component and phasor domains.

UNIT V STABILITY ANALYSIS 9

Classification of power system stability – Rotor angle stability - Swing equation - Swing curve - Power-Angle equation - Equal area criterion - Critical clearing angle and time - Classical step-by-step solution of the swing equation – modified Euler method.

TOTAL : 45 PERIODS

OUTCOMES:

- Ability to model the power system under steady state operating condition
- Ability to understand and apply iterative techniques for power flow analysis
- Ability to model and carry out short circuit studies on power system
- Ability to model and analyze stability problems in power system

AI BASED AUTO MICRO IRRIGATION SYSTEM

A PROJECT REPORT

Submitted by

ANILKUMAR A	**422120106002**
SRIHARI S	**422120106008**
CHANDRU D	**422120106303**

in partial fulfilment for the award of the degree of

BACHELOR OF ENGINEERING

in

ELECTRONICS AND COMMUNICATION ENGINEERING

ST. ANNE'S COLLEGE OF ENGINEERING AND TECHNOLOGY

ANGUCHETTYPALAYAM, PANRUTI-607 106

ANNA UNIVERSITY: CHENNAI 600 025

MAY 2024

ANNA UNIVERSITY: CHENNAI 600 025

BONAFIDE CERTIFICATE

Certified that this project report **"AI BASED AUTO MICRO IRRIGATION SYSTEM"** is the bonafide work of **"A. ANILKUMAR (422120106002), S.SRIHARI (422120106008), D. CHANDRU (422120106303)"** who carried out the project work under my supervision.

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8/5/24

INTERNAL EXAMINER

8/5/24

EXTERNAL EXAMINER

ABSTRACT

The aim of our project is to develop an auto micro irrigation system. We have chosen sugarcane as the crop and by using the soil sensor module the amount of water required water is provided to the plant with the help of turning ON and OFF the water pump. The project also consists of a soil NPK sensor connected to raspberry Pi Pico board and LCD display to detect the levels of nitrogen, phosphorus, and potassium in soil and check whether the root and plant are healthy. If it's not healthy it notify the farmer by scanning the QR code using augumented vision app. This device helps farmers to improve crop fertility and increase productivity by providing real-time data on soil nutrient content. The sensor is inserted into the soil and contains a probe that measures the nutrient content. Our project also utilizes Artificial Intelligence (AI) for the analysis of temperature, humidity, soil moisture & NPK and helps to find the plant growing level by the collected data. The real-timeplant health data with Digital Twin (DT) with Augmented Vision for the screening of plant growth disease, suggesting that this symptom could be used as screening tool to help identify plants with potential high-risk cases who could be recommendedto treat immediately. For faster action in agriculture in a land, it generates a scan able Augmented Vision (AV) code print. By screening with this the owner can identify the immediate treatment neededpriority lands in order, i.e. RED leaf as immediate next for the orange leaf DT imagesplant lands and then can check for the green leaf DT images plants. Such that owner can save the life of the disease affecting lands in a sequence treatment order one by one.

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

EC8791 EMBEDDED AND REAL TIME SYSTEMS L T P C 3 0 0 3

OBJECTIVES:

The student should be made to:

- Understand the concepts of embedded system design and analysis
- Learn the architecture and programming of ARM processor
- Be exposed to the basic concepts of embedded programming
- Learn the real time operating systems

UNIT I INTRODUCTION TO EMBEDDEDSYSTEM DESIGN 9

Complex systems and micro processors– Embedded system design process –Design example: Model train controller- Design methodologies- Design flows - Requirement Analysis – Specifications-System analysis and architecture design – Quality Assurance techniques - Designing with computing platforms – consumer electronics architecture – platform-level performance analysis.

UNIT II ARM PROCESSOR AND PERIPHERALS 9

ARM Architecture Versions – ARM Architecture – Instruction Set – Stacks and Subroutines – Features of the LPC 214X Family – Peripherals – The Timer Unit – Pulse Width Modulation Unit – UART – Block Diagram of ARM9 and ARM Cortex M3 MCU.

UNIT III EMBEDDED PROGRAMMING 9

Components for embedded programs- Models of programs- Assembly, linking and loading – compilation techniques- Program level performance analysis – Software performance optimization – Program level energy and power analysis and optimization – Analysis and optimization of program size- Program validation and testing.

UNIT IV REAL TIME SYSTEMS 9

Structure of a Real Time System — Estimating program run times – Task Assignment and Scheduling – Fault Tolerance Techniques – Reliability, Evaluation – Clock Synchronisation.

UNIT V PROCESSES AND OPERATING SYSTEMS 9

Introduction – Multiple tasks and multiple processes – Multirate systems- Preemptive realtime operating systems- Priority based scheduling- Interprocess communication mechanisms – Evaluating operating system performance- power optimization strategies for processes – Example Real time operating systems-POSIX-Windows CE. - Distributed embedded systems – MPSoCs and shared memory multiprocessors. – Design Example - Audio player, Engine control unit – Video accelerator.

TOTAL: 45 PERIODS

OUTCOMES:

At the end of the course, the student should be able to:

- Describe the architecture and programming of ARM processor
- Outline the concepts of embedded systems
- Explain the basic concepts of real time operating system design
- Model real-time applications using embedded-system concepts

TEXT BOOKS:

1. Marilyn Wolf, "Computers as Components - Principles of Embedded Computing System Design", Third Edition "Morgan Kaufmann Publisher (An imprint from Elsevier), 2012. (UNIT I, II, III, V)

2. Jane W.S.Liu," Real Time Systems", Pearson Education, Third Indian Reprint, 2003.(UNIT IV)

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7. Sriram V Iyer, Pankaj Gupta, "Embedded Real Time Systems Programming", Tata Mc Graw Hill, 2004.

AI-DRIVEN ALARMS FOR ENHANCED INDUSTRIAL SECURITY

A PROJECT REPORT

Submitted by

LEELA. G	**422120106003**
SHANMUGAPRIYA. N	**422120106006**
SHEKINA JEBASTINA. Y	**422120106007**

in partial fulfilment for the award of the degree

of

BACHELOR OF ENGINEERING

in

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ST. ANNE'S COLLEGE OF ENGINEERING AND TECHNOLOGY

ANGUCHETTYPALAYAM, PANRUTI – 607 106

ANNA UNIVERSITY: CHENNAI 600 025

MAY 2024

ANNA UNIVERSITY: CHENNAI 600 025

BONAFIDE CERTIFICATE

Certified that this project report **"AI-DRIVEN ALARMS FOR INDUSTRIAL SECURITY"** is the bonafide work of **"G. LEELA (422120106003), N. SHANMUGAPRIYA (422120106006), Y. SHEKINA JEBASTINA (422120106007)"** who carried out the project work under my supervision.

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Submitted for the ANNA UNIVERSITY examination held on 8.05.2024

INTERNAL EXAMINER

EXTERNAL EXAMINER

ABSTRACT

This project illustrates a precarious industrial environment monitoring and control for this monitoring information concerning safety and security. The proposed system uses a combination sensor network node with a system architecture and concept implementation, which are described mainly for an industrial safety monitoring scenario. The information is gathered by the deployed sensor network with focus on four main conditions: gas leakage and oil. This Project also enables an easy to use user interface and the accessibility of data through standards-based web server technologies. It is the most effective and most economical means of equipment safety monitoring. The Raspberry Pi Pico W serves as the central control unit, running the software application responsible for collecting sensor data, processing it, and controlling the connected devices. It communicates with the Gas sensor (MQ135) to detect the presence of harmful gases in the environment. If the gas concentration exceeds a predefined threshold, indicating potential danger, the Buzzer is triggered to emit an audible alarm, alerting the residents

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

EC8791 EMBEDDED AND REAL TIME SYSTEMS L T P C 3 0 0 3

OBJECTIVES:

The student should be made to:

- Understand the concepts of embedded system design and analysis
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- Be exposed to the basic concepts of embedded programming
- Learn the real time operating systems

UNIT I INTRODUCTION TO EMBEDDEDSYSTEM DESIGN 9

Complex systems and micro processors– Embedded system design process –Design example: Model train controller- Design methodologies- Design flows - Requirement Analysis – Specifications-System analysis and architecture design – Quality Assurance techniques - Designing with computing platforms – consumer electronics architecture – platform-level performance analysis.

UNIT II ARM PROCESSOR AND PERIPHERALS 9

ARM Architecture Versions – ARM Architecture – Instruction Set – Stacks and Subroutines – Features of the LPC 214X Family – Peripherals – The Timer Unit – Pulse Width Modulation Unit – UART – Block Diagram of ARM9 and ARM Cortex M3 MCU.

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Components for embedded programs- Models of programs- Assembly, linking and loading – compilation techniques- Program level performance analysis – Software performance optimization – Program level energy and power analysis and optimization – Analysis and optimization of program size- Program validation and testing.

UNIT IV REAL TIME SYSTEMS 9

Structure of a Real Time System — Estimating program run times – Task Assignment and Scheduling – Fault Tolerance Techniques – Reliability, Evaluation – Clock Synchronisation.

UNIT V PROCESSES AND OPERATING SYSTEMS 9

Introduction – Multiple tasks and multiple processes – Multirate systems- Preemptive realtime operating systems- Priority based scheduling- Interprocess communication mechanisms – Evaluating operating system performance- power optimization strategies for processes – Example Real time operating systems-POSIX-Windows CE. - Distributed embedded systems – MPSoCs and shared memory multiprocessors. – Design Example - Audio player, Engine control unit – Video accelerator.

TOTAL: 45 PERIODS

OUTCOMES:

At the end of the course, the student should be able to:

- Describe the architecture and programming of ARM processor
- Outline the concepts of embedded systems
- Explain the basic concepts of real time operating system design
- Model real-time applications using embedded-system concepts

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AI ENABLED HUMAN TRACKING SYSTEM USING DRONE TECHNOLOGY

A PROJECT REPORT

Submitted by

LINGESHWARAN .R	**422120106305**
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VANJINATHAN.G	**422120106011**
VASANTHA KUMAR.M	**422120106013**

in partial fulfillment for the award of the degree of

BACHELOR OF ENGINEERING

in

ELECTRONICS AND COMMUNICATION ENGINEERING

ST. ANNE'S COLLEGE OF ENGINEERING AND TECHNOLOGY

ANNA UNIVERSITY: CHENNAI 600 025

MAY 2024

ANNA UNIVERSITY: CHENNAI 600 025

BONAFIDE CERTIFICATE

Certified that this project report "**AI ENABLED HUMAN TRACKING SYSTEM USING DRONE TECHNOLOGY**" is the bonafide work of "**LINGESHWARAN.R (422120106305), AJITH.M (422120106301) VANJINATHAN.G (422120106011),, VASANTHA KUMAR.M (422120106013)**" who carried out the project work under my supervision".

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Panruti – 607106

Submitted for the ANNA UNIVERSITY examination held on 08/05/24

INTERNAL EXAMINER

EXTERNAL EXAMINER

ABSTRACT

Human detection is a feature of AI that is nowadays quite successfully executed and utilized. People's detection is usually based on the difference in texture. This innovative project aims to enhance surveillance capabilities, search and rescue operations, security monitoring, and various other applications where real-time human movement detection is crucial in times like disasters and forest fires . These are the only features that make them stand out from the background. AI-enabled drone in automatic detection of human movements focuses on the development and implementation of a system that utilizes artificial intelligence (AI) algorithms to enable a drone to autonomously detect and track human movements. The drone with detecting and alerting with voice message to the Rescue Team at remote end with required all details about the drowning people make sense for faster rescue and save as the highest accuracy. The camera detection of the rescue Drone had a proper in that the range of the active camera and the speed of the video with Wi-Fi to the control room also optimal for the detection to work properly

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ANGUCHETTYPALAYAM, PANRUTI – 607 106.

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

EC8791 EMBEDDED AND REAL TIME SYSTEMS L T P C 3 0 0 3

OBJECTIVES:

The student should be made to:

- Understand the concepts of embedded system design and analysis
- Learn the architecture and programming of ARM processor
- Be exposed to the basic concepts of embedded programming
- Learn the real time operating systems

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TOTAL: 45 PERIODS

OUTCOMES:

At the end of the course, the student should be able to:

- Describe the architecture and programming of ARM processor
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ROBOVAC

A PROJECT REPORT

Submitted by

AKASH .R (422119106001)

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VASANTHAN .V (422119106012)

AJITHKUMAR .V (422119106301)

In partial fulfillment for the award of the degree

of

BACHELOR OF ENGINEERING

in

ELECTRONICS AND COMMUNICATION ENGINEERING

ST. ANNE'S COLLEGE OF ENGINEERING AND TECHNOLOGY

ANNA UNIVERSITY: CHENNAI 600 025

MAY 2024

ANNA UNIVERSITY: CHENNAI 600 025

BONAFIDE CERTIFICATE

Certified that this project report **"ROBOVAC"** is the bonafide work of **"D. UMAMAGESHWARAN (422120106010), V. VASANTHAN (422120106012), V. AJITHKUMAR (422120106301), A. AKASH (422120106001),"** who carried out the project work under my supervision.

7/5/2024

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Anguchettypalayam

Panruti – 607106

Submitted for the ANNA UNIVERSITY examination held on 8.5.2024

8/5/24

INTERNAL EXAMINER

8/5/24

EXTERNAL EXAMINE

ABSTRACT

Nowadays, it becomes very difficult to do efficient dust cleaning beneath roofs in industries, marriage halls, cinema theatres, and college auditoriums to maintain clean and healthy environments. Hence there is a necessity to develop technology for autonomous dust cleaning in industrial, commercial, and educational spaces to ensure a clean, healthy environment under roofs.

The automatic floor cleaning robot using Raspberry pi is an innovative solution for efficient and autonomous floor cleaning. In this robotic system the Raspberry microcontroller is used to control wireless communication, sensor integration, and motor control, allowing for precise navigation and effective cleaning performance by integrating various sensors such as ultrasonic sensor. The robot can perceive its environment and navigate through obstacles while avoiding collisions. Additionally, the use of actuators and motors controlled by the Raspberry pi enables the robot to perform cleaning tasks with precision. Overall, the automatic floor cleaning robot utilizing Raspberry pi offers a promising solution for enhancing efficiency and convenience in floor maintenance.

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

EC8791 EMBEDDED AND REAL TIME SYSTEMS L T P C 3 0 0 3

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TOTAL: 45 PERIODS

OUTCOMES:

At the end of the course, the student should be able to:

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7. Sriram V Iyer, Pankaj Gupta, "Embedded Real Time Systems Programming", Tata Mc Graw Hill, 2004.

COGNITIVE SMART STREET LIGHTING SOLUTION

A PROJECT REPORT

Submitted by

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K.SRIMATHI	**422120106009**
M.KAYALVIZHI	**422120106304**

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ANNA UNIVERSITY: CHENNAI 600 025

MAY 2024

ANNA UNIVERSITY: CHENNAI 600 025

BONAFIDE CERTIFICATE

Certified that this project report "COGNITIVE SMART STREET LIGHTING SOLUTION" is the bonafide work of "S. RAJASRI (422120106005), U. NIVETHA (422120106004),M. KAYALVIZHI (422120106304), K.SRIMATHI" (422120106009) who carried outthe project work under my supervision.

SIGNATURE 7/5/2024

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HEAD OF THE DEPARTMENT

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Submitted for the ANNA UNIVERSITY examination held on 8.05.2024

INTERNAL EXAMINER

8/5/24

EXTERNAL EXAMINER

ABSTRACT

The IOT (Internet of things) is a blooming technology that mainly finding the faulty street light automatically is become a vital milestone by using this technology. The primary goal of the project is to provide control and identification of the damaged street light automatically. The lighting system which targets the energy and automatic operation on economical affordable for the streets and immediate information response about the street light fault. In general, the damage of the street light is observed by getting the complaints from the colony (street) people. Whereas in this proposed work using LDR sensors these lights working status is easily captured without any manual interaction. So that it reduces manual efforts and the delay to fix problems.

So, to reduce such problem we come with the solution where in automatic detection of street lights issues, whether the street light is working or not will be found at night time and it should send the notification to the authorized person if there is a problem in particular street light and also the location are automatically ON/OFF using IOT. In this system, it checks whether the street lights automatically, Based on the condition of the wheather.

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

EC8652 WIRELESS COMMUNICATION L T P C 3 0 0 3

OBJECTIVES:

- To study the characteristic of wireless channel
- To understand the design of a cellular system
- To study the various digital signaling techniques and multipath mitigation techniques
- To understand the concepts of multiple antenna techniques 68

UNIT I- WIRELESS CHANNELS 9

Large scale path loss – Path loss models: Free Space and Two-Ray models -Link Budget design – Small scale fading- Parameters of mobile multipath channels – Time dispersion parameters- Coherence bandwidth – Doppler spread & Coherence time, fading due to Multipath time delay spread – flat fading – frequency selective fading – Fading due to Doppler spread – fast fading – slow fading.

UNIT II-CELLULARARCHITECTUR 9

Multiple Access techniques - FDMA, TDMA, CDMA – Capacity calculations–Cellular concept- Frequency reuse - channel assignment- hand off- interference & system capacitytrunking & grade of service – Coverage and capacity improvement.

UNIT III- DIGITAL SIGNALING FOR FADING CHANNELS 9

Structure of a wireless communication link, Principles of Offset-QPSK, p/4-DQPSK, Minimum Shift Keying, Gaussian Minimum Shift Keying, Error performance in fading channels, OFDM principle – Cyclic prefix, Windowing, PAPR.

UNIT IV- MULTIPATH MITIGATION TECHNIQUES 9

Equalisation – Adaptive equalization, Linear and Non-Linear equalization, Zero forcing and LMS Algorithms. Diversity – Micro and Macro diversity, Diversity combining techniques, Error probability in fading channels with diversity reception, Rake receiver.

UNIT V -MULTIPLE ANTENNA TECHNIQUES 9

MIMO systems – spatial multiplexing -System model -Pre-coding - Beam forming - transmitter diversity, receiver diversity- Channel state information-capacity in fading and non-fading channels.

TOTAL: 45 PERIODS

OUTCOMES:

The student should be able to:

- Characterize a wireless channel and evolve the system design specifications
- Design a cellular system based on resource availability and traffic demands
- Identify suitable signaling and multipath mitigation techniques for the wireless channel and system under consideration.

TEXT BOOKS:

1. Rappaport,T.S., —Wireless communications‖, Pearson Education, Second Edition, 2010.(UNIT I, II, IV)

2. Andreas.F. Molisch, —Wireless Communications‖, John Wiley – India, 2006. (UNIT III,V)

REFERENCES:

1. Wireless Communication –Andrea Goldsmith, Cambridge University Press, 2011

2. Van Nee, R. and Ramji Prasad, —OFDM for wireless multimedia communications, Artech House, 2000 3. David Tse and Pramod Viswanath, —Fundamentals of Wireless Communication, Cambridge University Press, 2005.

4. Upena Dalal, —Wireless Communication‖, Oxford University Press, 2009.

OPTIMIZATION OF MACHINING PARAMETERS ON SS304 MATERIAL USING ORTHOGONAL ARRAY METHOD

A PROJECT REPORT

Submitted by

BALAJI R	(422120114003)
JAYAPRADHA P	(422120114006)
SATHISH K	(422120114015)
RAJA S	(422120114312)

in partial fulfillment for the award of the degree

of

BACHELOR OF ENGINEERING

in

MECHANICAL ENGINEERING

ST. ANNE'S COLLEGE OF ENGINEERING AND TECHNOLOGY

PANRUTI-607 106

ANNA UNIVERSITY: CHENNAI 600 025

MAY 2024

ANNA UNIVERSITY: CHENNAI 600 025

BONAFIDE CERTIFICATE

Certified that this project report **"OPTIMIZATION OF MACHINING PARAMETERS ON SS304 MATERIAL USING ORTHOGONAL ARRAY METHOD"** is the bonafide work of **"BALAJI.R (422120114003), JAYAPRADHA.P (422120114006), SATHISH.K (422120114015) and RAJA.S (422120114312)"** who carried out the project under my supervision.

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Submitted for project viva-voce examination held on 09-05-2024-F.N

INTERNAL EXAMINER

EXTERNAL EXAMINER

ABSTRACT

In this paper, Taguchi techniques are applied to find out the surface roughness, metal removal rate, machinability in lathe operation of SS304. L9 orthogonal array, S/N ratios and ANOVA are used to study the performance characteristics of cutting speed, feed rate and depth of cut as lathe parameter with tool flank wear width as response variable. The result of the analysis show that the selected machining parameters affect significantly the tool flank wear with of Tungsten Carbide cutting tool while machining SS304. And also indicate that the cutting speed is the most influencing parameter out of the three parameters under study. Finally, the results are further confirmed by validation experiments or confirmation run.

Keywords: Taguchi method, CNC turning machine, Surface roughness, MRR, ANOVA Table, Minitab 16 software.

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ME8451 MANUFACTURING TECHNOLOGY –II

L T P C
3 0 0 3

OBJECTIVES:

- To understand the concept and basic mechanics of metal cutting, working of standard machine tools such as lathe, shaping and allied machines, milling, drilling and allied machines, grinding and allied machines and broaching.
- To understand the basic concepts of Computer Numerical Control (CNC) of machine tools and CNC Programming

UNIT I THEORY OF METAL CUTTING 9

Mechanics of chip formation, single point cutting tool, forces in machining, Types of chip, cutting tools– nomenclature, orthogonal metal cutting, thermal aspects, cutting tool materials, tool wear, tool life, surface finish, cutting fluids and Machinability.

UNIT II TURNING MACHINES 9

Centre lathe, constructional features, specification, operations – taper turning methods, thread cutting methods, special attachments, machining time and power estimation. Capstan and turret lathes- tool layout – automatic lathes: semi automatic – single spindle : Swiss type, automatic screw type – multi spindle:

UNIT III SHAPER, MILLING AND GEAR CUTTING MACHINES 9

Shaper - Types of operations. Drilling ,reaming, boring, Tapping. Milling operations-types of milling cutter. Gear cutting – forming and generation principle and construction of gear milling ,hobbing and gear shaping processes – finishing of gears.

UNIT IV ABRASIVE PROCESS AND BROACHING 9

Abrasive processes: grinding wheel – specifications and selection, types of grinding process– cylindrical grinding, surface grinding, centreless grinding and internal grinding- Typical applications – concepts of surface integrity, broaching machines: broach construction – push, pull, surface and continuous broaching machines

UNIT V CNC MACHINING 9

Numerical Control (NC) machine tools – CNC types, constructional details, special features, machining centre, part programming fundamentals CNC – manual part programming – micromachining – wafer machining.

TOTAL : 45 PERIODS

OUTCOMES: Upon the completion of this course the students will be able to

CO1 Explain the mechanism of material removal processes.
CO2 Describe the constructional and operational features of centre lathe and other special purpose lathes.
CO3 Describe the constructional and operational features of shaper, planner, milling, drilling, sawing and broaching machines.
CO4 Explain the types of grinding and other super finishing processes apart from gear manufacturing processes.
CO5 Summarize numerical control of machine tools and write a part program

TEXT BOOKS:

1. Hajra Choudhury, "Elements of Workshop Technology", Vol.II., Media Promoters 2014
2. Rao. P.N "Manufacturing Technology - Metal Cutting and Machine Tools",
3 rd Edition, Tata McGraw-Hill, New Delhi, 2013.

REFERENCES:

1. Richerd R Kibbe, John E. Neely, Roland O. Merges and Warren J.White "Machine Tool Practices", Prentice Hall of India, 1998
2. Geofrey Boothroyd, "Fundamentals of Metal Machining and Machine Tools", Mc Graw Hill, 1984
3. HMT, "Production Technology", Tata McGraw Hill, 1998.
4. Roy. A.Lindberg, "Process and Materials of Manufacture," Fourth Edition, PHI/Pearson Education 2006.

TRIBOLOGICAL BEHAVIOUR OF WS_2/Cu COATED ON AA7075 BY ELECTRICAL DISCHARGING COATING PROCESS

A PROJECT REPORT

Submitted by

GUGAN S	**(422120114004)**
MOHANARAJ S	**(422120114008)**
MUTHUKUMARAN K	**(422120114009)**
PRAVEEN RAJ U	**(422120114309)**

in partial fulfillment for the award of the degree

of

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in

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ANNA UNIVERSITY: CHENNAI 600 025

MAY 2024

ANNA UNIVERSITY : CHENNAI 600 025

BONAFIDE CERTIFICATE

Certified that this project report **"TRIBOLOGICAL BEHAVIOUR OF WS_2/Cu COATED ON AA7075 BY ELECTRICAL DISCHARGING COATING PROCESS"** is the bonafide work of **"GUGAN S (422120114004), MOHANARAJ S (422120114008), MUTHUKUMARAN K (422120114009)** and **PRAVEEN RAJ U (422120114309) "** who carried out the project under my supervision.

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Submitted to the Project Report Viva Voce held on 09.05.2024 . F.N

INTERNAL EXAMINER

EXTERNAL EXAMINER

ABSTRACT

A special aspect of EDM is surface modification by transferring the tool electrode material to work piece surface. In the present work, electrode prepared with tungsten disulfide (WS_2) 70% and copper (Cu) 30% by powder metallurgy route as tool and AA7075 as work piece substrate. By changing the polarity of EDM (work piece as cathode and tool as anode), the hard disulfide layer of WS_2/Cu tool has been deposited on the work piece). The experimentation was performed for analyzing the results of wear rate and Coefficient of friction the WS_2/Cu layer were examined to response surface methodology was utilized to conduct the Electrical Discharge Coating. The tribological study was carried out to increase the wear characteristics further the wear characteristics to be investigated using Pin-on-Disc tribometer with various wear parameters, to found the safest region.. The wear mechanism map is utilized to study the dominance of particular wear mechanism that dominates particular wear regimes such as mild wear, severe wear and ultra severe wear. It is observed that the wear rate increased with increased the applied load and sliding speed. Various mechanisms such as abrasion, oxidation, delamination and melting are identified through scanning electron microscope (SEM).

Key Words: Electrical discharge coating, wear rate, COF

ME8073 UNCONVENTIONAL MACHINING PROCESSES L T P C/ 3 0 0 3

OBJECTIVES:

- To learn about various unconventional machining processes, the various process parameters and their influence on performance and their applications

UNITI INTRODUCTION AND MECHANICAL ENERGYBASED PROCESSES 9

Unconventional machining Process – Need – classification – merits, demerits and applications. Abrasive Jet Machining – Water Jet Machining – Abrasive Water Jet Machining - Ultrasonic Machining. (AJM, WJM, AWJM and USM). Working Principles – equipment used – Process parameters – MRR- Applications.

UNITII THERMAL AND ELECTRICAL ENERGYBASED PROCESSES 9

Electric Discharge Machining (EDM) – Wire cut EDM – Working Principle-equipments-Process Parameters-Surface Finish and MRR- electrode / Tool – Power and control Circuits-Tool Wear – Dielectric – Flushing — Applications. Laser Beam machining and drilling, (LBM), plasma, Arc machining (PAM) and Electron Beam Machining (EBM). Principles – Equipment –Types - Beam control techniques – Applications.

UNITIII CHEMICAL AND ELECTRO-CHEMICAL ENERGYBASED PROCESSES 9

Chemical machining and Electro-Chemical machining (CHM and ECM)- Etchants – Maskant - techniques of applying maskants - Process Parameters – Surface finish and MRR-Applications. Principles of ECM- equipments-Surface Roughness and MRR Electrical circuit-Process Parameters- ECG and ECH - Applications.

UNITIV ADVANCED NANOFINISHINGPROCESSES 9

Abrasive flow machining, chemo-mechanical polishing, magnetic abrasive finishing, magneto rheological finishing, magneto rheological abrasive flow finishing their working principles, equipments, effect of process parameters, applications, advantages and limitations.

UNITV RECENT TRENDS IN NON-TRADITIONALMACHININGPROCESSES 9

Recent developments in non-traditional machining processes, their working principles, equipments, effect of process parameters, applications, advantages and limitations. Comparison of non-traditional machining processes.

TOTAL: 45 PERIODS

TEXT BOOK:

1. Vijay.K. Jain "Advanced Machining Processes" Allied Publishers Pvt. Ltd., New Delhi, 2007
2. Pandey P.C. and Shan H.S. "Modern Machining Processes" Tata McGraw-Hill, New Delhi, 2007.

REFERENCES

1. Benedict, G.F. "Nontraditional Manufacturing Processes", Marcel Dekker Inc., New York, 1987.
2. Mc Geough, "Advanced Methods of Machining", Chapman and Hall, London, 1998.
3. Paul De Garmo, J.T.Black, and Ronald. A.Kohser, "Material and Processes in Manufacturing" Prentice Hall of India Pvt. Ltd., 8thEdition, New Delhi , 2001.

INVESTIGATION ON PERFORMANCE OF HYBRID NATURAL REINFORCED POLYMERS

A Project Report

Submitted by

ALWIN BRUNIX J	**(422120114001)**
NAGARAJ N	**(422120114010)**
PRASANTH S	**(422120114012)**
DINESH S	**(422120114303)**

in partial fulfillment for the award of the degree

of

BACHELOR OF ENGINEERING

in

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ST. ANNE'S COLLEGE OF ENGINEERING AND TECHNOLOGY

PANRUTI-607106

ANNA UNIVERSITY: CHENNAI 600 025

MAY 2024

ANNA UNIVERSITY: CHENNAI 600 025

BONAFIDE CERTIFICATE

Certified that the Project report about **"INVESTIGATION ON PERFORMANCE OF HYBRID NATURAL FIBRES REINFORCED POLYMERS"** is a bonafide work of **ALWIN BRUNIX J (422120114001), NAGARAJ N (422120114010), PRASANTH S (422120114012) and DINESH S (422120114303)** who carried out the project work under my supervision.

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Submitted to the project report viva voce held on 9/5/2024/FN

Internal Examiner

External Examiner 9/5/24

ABSTRACT

Natural fiber reinforced polymer composites (NFRCs) have demonstrated great potential for many different applications in various industries due to their advantages compared to synthetic fiber-reinforced composites, such as low environmental impact and low cost. However, one of the drawbacks is that the NFRCs present relatively low mechanical properties and the absorption of humidity due to the hydrophilic characteristic of the natural fibre. One method to increase their performance is hybridization. Therefore, understanding the properties and potential of using multiple reinforcement's materials to develop hybrid composites is of great interest. This paper provides an overview of the recent advances in hybrid natural fiber reinforced polymer composites. First, the main factors that affect the performance of hybrid fiber-reinforced composites were briefly discussed. The effect of hybridization on the mechanical and thermal properties of hybrid composites reinforced with several types of natural fibers (i.e., sisal, jute, curauá, ramie, banana, etc.) or natural fibers combined with synthetic fibers is presented. Finally, the water absorption behaviour of hybrid fiber-reinforced composites is also discussed. It was concluded that the main challenges that need to be addressed in order to increase the use of natural-natural or natural-synthetic hybrid composites in industry are the poor adhesion between natural fibers and matrix, thermal stability and moisture absorption of natural fibers. Some of these challenges were addressed by recent development in fibers treatment and modification, and product innovation (hybridization).

KEYWORDS: Natural fiber composites (NFC); hybrid composites; mechanical properties; thermal properties; water absorption

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ME8491 ENGINEERING METALLURGY

L T P C
3 0 0 3

OBJECTIVES:

- To impart knowledge on the structure, properties, treatment, testing and applications of metals and non-metallic materials so as to identify and select suitable materials for various engineering applications

UNIT I ALLOYS AND PHASE DIAGRAMS 9

Constitution of alloys – Solid solutions, substitutional and interstitial – phase diagrams, Isomorphous, eutectic, eutectoid, peritectic, and peritectoid reactions, Iron – carbon equilibrium diagram. Classification of steel and cast Iron microstructure, properties and application..

UNIT II HEAT TREATMENT 9

Definition – Full annealing, stress relief, recrystallisation and spheroidising – normalising, hardening and Tempering of steel. Isothermal transformation diagrams – cooling curves superimposed on I.T. diagram CCR – Hardenability, Jominy end quench test - Austempering, martempering – case hardening, carburizing, Nitriding, cyaniding, carbonitriding – Flame and Induction hardening – Vacuum and Plasma hardening. .

UNIT III FERROUS AND NON-FERROUS METALS 9

Effect of alloying additions on steel- α and β stabilisers– stainless and tool steels – HSLA, Maraging steels – Cast Iron - Grey, white, malleable, spheroidal – alloy cast irons, Copper and copper alloys – Brass, Bronze and Cupronickel – Aluminium and Al-Cu – precipitation strengthening treatment – Bearing alloys, Mg-alloys, Ni-based super alloys and Titanium alloys..

UNIT IV NON-METALLIC MATERIALS 9

Polymers – types of polymer, commodity and engineering polymers – Properties and applications of various thermosetting and thermoplastic polymers (PP, PS, PVC, PMMA, PET,PC, PA, ABS, PI, PAI, PPO, PPS, PEEK, PTFE, Polymers – Urea and Phenol formaldehydes)- Engineering Ceramics – Properties and applications of Al2O3, SiC, Si3N4, PSZ and SIALON –Composites Classifications- Metal Matrix and FRP - Applications of Composites.

UNIT V MECHANICAL PROPERTIES AND DEFORMATION MECHANISMS 9

Mechanisms of plastic deformation, slip and twinning – Types of fracture – Testing of materials under tension, compression and shear loads – Hardness tests (Brinell, Vickers and Rockwell), hardness tests, Impact test Izod and charpy, fatigue and creep failure mechanisms

TOTAL : 45 PERIODS

OUTCOMES: Upon the completion of this course the students will be able to

CO1 Explain alloys and phase diagram, Iron-Iron carbon diagram and steel classification. CO2 Explain isothermal transformation, continuous cooling diagrams and different heat treatment processes. CO3 Clarify the effect of alloying elements on ferrous and non-ferrous metals CO4 Summarize the properties and applications of non metallic materials. CO5 Explain the testing of mechanical properties .

TEXT BOOKS:

1. Avner, S.H., "Introduction to Physical Metallurgy", McGraw Hill Book Company,1997.
2. 2. Williams D Callister, "Material Science and Engineering" Wiley India Pvt Ltd, Revised Indian Edition 2014

REFERENCES:

1.Kenneth G.Budinski and Michael K. Budinski, "Engineering Materials", Prentice Hall of India Private Limited, 2010.
2. Raghavan.V, "Materials Science and Engineering", Prentice Hall of India Pvt. Ltd., 2015.
3. U.C.Jindal : Material Science and Metallurgy, "Engineering Materials and Metallurgy", First Edition, Dorling Kindersley, 2012
4. Upadhyay. G.S. and Anish Upadhyay, "Materials Science and Engineering", Viva Books Pvt. Ltd., New Delhi, 2006

STRUCTURAL ANALYSIS OF CAR CRASH

A PROJECT REPORT

Submitted by

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RAGHUL R	(422120114311)
SANTHOSH S	(422120114314)

in partial fulfillment for the award of the degree

of

BACHELOR OF ENGINEERING

in

MECHANICAL ENGINEERING

ST.ANNE'S

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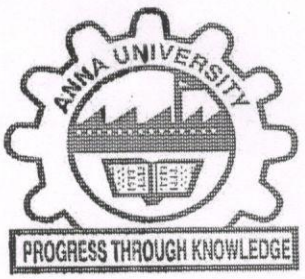
PANRUTI-607106



ANNA UNIVERSITY: CHENNAI 600 025

MAY 2024

ANNA UNIVERSITY : CHENNAI 600 025

BONAFIDE CIRTIFICATE

Certified that this project report **"STRUCTURAL ANALYSIS OF CAR CRASH"** is the bonafide work of **"SARATHI.S (422120114014), RAGHUL.R (422120114311) and SANTHOSH .S (422120114314)"** who carried out the project under my supervision.

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Submitted to the Project Report Viva Voce held on 09-05-2024 FN

INTERNAL EXAMINER

EXTERNAL EXAMINER 9/5/24

ABSTRACT

During an automobile crash, some parts in the front of an automobile body will have plastic deformation and absorb a lot of energy. Hence it becomes necessary to check the car structure for its crash ability so that safety is achieved together with fuel economy. A simple finite element (FE) model of a car is developed in ANSYS and it is solved for full frontal impact in ANSYS LSDYNA explicit code. Computational simulations and various results are plotted and analyzed. There are various test configurations. We have limited our analysis to frontal impact with a rigid wall at a speed of 35 mph, corresponding to a NHTSA (National Highway Traffic Safety Administration) full frontal impact. The current project discusses the development, modification, and analysis of a finite element model of car body using Titanium alloy Computational simulations and various results are plotted and analyzed. The crash analysis simulation and results can be used to assess both the crashworthiness of current frame and to investigate ways to improve the design. This type of simulation is an integral part of the design cycle and can reduce the need for costly destructive testing program.

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ME8692 **FINITE ELEMENT ANALYSIS** L T P C 3 0 0 3

OBJECTIVES:

To introduce the concepts of Mathematical Modeling of Engineering Problems.
To appreciate the use of FEM to a range of Engineering Problems.

UNIT I INTRODUCTION 9

Historical Background–Mathematical Modeling of field problems in Engineering–Governing Equations–Discrete and continuous models – Boundary, Initial and Eigen Value problems- Weighted Residual Methods – Variational Formulation of Boundary Value Problems–Ritz Technique–Basic concepts of the Finite Element Method.

UNIT II ONE-DIMENSIONAL PROBLEMS 9

One Dimensional Second Order Equations – Discretization – Element types- Linear and Higher order Elements – Derivation of Shape functions and Stiffness matrices and force vectors- Assembly of Matrices - Solution of problems from solid mechanics and heat transfer. Longitudinal vibration frequencies and mode shapes. Fourth Order Beam Equation–Transverse deflections and Natural frequencies of beams.

UNIT III TWO DIMENSIONAL SCALAR VARIABLE PROBLEMS 9

Second Order 2D Equations involving Scalar Variable Functions–Variational formulation–Finite Element formulation–Triangular elements – Shape functions and element matrices and vectors. Application to Field Problems - Thermal problems–Torsion of Non circular shafts–Quadrilateral elements–Higher Order Elements.

UNIT IV TWO DIMENSIONAL VECTOR VARIABLE PROBLEMS 9

Equations of elasticity – Plane stress, plane strain and axisymmetric problems – Body forces and temperature effects – Stress calculations - Plate and shell elements.

UNIT V ISOPARAMETRIC FORMULATION 9

Natural co-ordinate systems–Isoparametric elements–Shape functions for iso parametric elements–One and two dimensions–Serendipity elements–Numerical integration and application to plane stress problems - Matrix solution techniques–Solutions Techniques to Dynamic problems–Introduction to Analysis Software.

TOTAL: 45 PERIODS

OUTCOMES: Upon the completion of this course the students will be able to

CO1 Summarize the basics of finite element formulation.
CO2 Apply finite element formulations to solve one dimensional Problems.
CO3 Apply finite element formulations to solve two dimensional scalar Problems.
CO4 Apply finite element method to solve two dimensional Vector problems.
CO5 Apply finite element method to solve problems on isoparametric element and dynamic Problems

TEXT BOOKS:

1.Reddy. J.N.,"An Introduction to the Finite Element Method', 3rd Edition, Tata McGraw-Hill, 2005
2. Seshu, P,"Text Book of Finite Element Analysis', Prentice-Hall of India Pvt. Ltd., New Delhi, 2007.

REFERENCES:

1. Bhatti Asghar M, "Fundamental Finite Element Analysis and Applications", John Wiley & Sons, 2005 (Indian Reprint 2013)*
2. Chandrupatla & Belagundu,"Introduction to Finite Elements in Engineering', 3rd Edition, Prentice Hall College Div, 1990
3. Logan, D.L.,"A first course in Finite Element Method', Thomson Asia Pvt. Ltd., 2002
4. Rao, S.S.,"The Finite Element Method in Engineering', 3rd Edition, Butterworth Heinemann, 2004
5. Robert D. Cook, David S. Malkus, Michael E. Plesha, Robert J. Witt,"Concepts and Applications of Finite Element Analysis', 4th Edition, Wiley Student Edition, 2002.

INVESTIGATION OF PROCESS PARAMETERS ON DEPOSITION RATE AND SURFACE ROUGHNESS OF ELECTRO DISCHARGE COATING ON AA7075 ALUMINIUM ALLOY

A PROJECT REPORT

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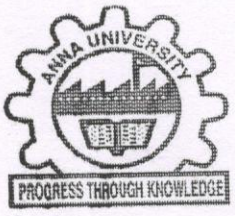

ANNA UNIVERSITY: CHENNAI 600 025

MAY 2024

ANNA UNIVERSITY : CHENNAI 600 025

BONAFIDE CERTIFICATE

Certified that this project report **"INVESTIGATION OF PROCESS PARAMETERS ON DEPOSITION RATE AND SURFACE ROUGHNESS OF ELECTRO DISCHARGE COATING ON AA7075 ALUMINIUM ALLOY"** is the bonafide work of **" ARAVINDHAN S (422120114002), NARESH D (422120114011), VIKRAM K (422120114017)** and **ANBUMANI L (422120114301)"** who carried out the project under my supervision.

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Panruti-607106

Submitted to the Project Report Viva - Voce held on 09.05.2024 &F.N

INTERNAL EXAMINER

EXTERNAL EXAMINER

ABSTRACT

EDM is an unconventional machining process widely used for machining tough material. A special aspect of EDM is surface modification by transferring the tool material to work piece surface. In the present work, electrode prepared with tungsten disulfide (WS_2) 70% and copper (Cu) 30% by powder metallurgy route as tool and AA7075 as work piece substrate. By changing the polarity of EDM (work piece as cathode and tool as anode), the hard disulfide layer of WS_2/Cu tool has been deposited on the work piece).The experimentation was performed for analyzing the results of deposition parameters on Deposition Rate, Surface Roughness of the WS_2/Cu layer were examined to response surface methodology was utilized to conduct the Electrical Discharge Coating. The study was carried out for the optimized condition, and surface characteristics on the worn-out surface were analyzed. When compared to the base material, the obtained results show a higher deposition rate and surface roughness.

Keywords: Electric Discharge Machining(EDM), Electric Discharge Coating(EDC), Surface Roughness, Deposition Rate, Response Surface Methodology(RSM).

ME8073 UNCONVENTIONAL MACHINING PROCESSES L T P C/ 3 0 0 3

OBJECTIVES:

- To learn about various unconventional machining processes, the various process parameters and their influence on performance and their applications

UNITI INTRODUCTION AND MECHANICAL ENERGYBASED PROCESSES 9

Unconventional machining Process – Need – classification – merits, demerits and applications. Abrasive Jet Machining – Water Jet Machining – Abrasive Water Jet Machining - Ultrasonic Machining. (AJM, WJM, AWJM and USM). Working Principles – equipment used – Process parameters – MRR- Applications.

UNITII THERMAL AND ELECTRICAL ENERGYBASED PROCESSES 9

Electric Discharge Machining (EDM) – Wire cut EDM – Working Principle-equipments-Process Parameters-Surface Finish and MRR- electrode / Tool – Power and control Circuits-Tool Wear – Dielectric – Flushing — Applications. Laser Beam machining and drilling, (LBM), plasma, Arc machining (PAM) and Electron Beam Machining (EBM). Principles – Equipment –Types - Beam control techniques – Applications.

UNITIII CHEMICAL AND ELECTRO-CHEMICAL ENERGYBASED PROCESSES 9

Chemical machining and Electro-Chemical machining (CHM and ECM)- Etchants – Maskant - techniques of applying maskants - Process Parameters – Surface finish and MRR-Applications. Principles of ECM- equipments-Surface Roughness and MRR Electrical circuit-Process Parameters- ECG and ECH - Applications.

UNITIV ADVANCED NANOFINISHINGPROCESSES 9

Abrasive flow machining, chemo-mechanical polishing, magnetic abrasive finishing, magneto rheological finishing, magneto rheological abrasive flow finishing their working principles, equipments, effect of process parameters, applications, advantages and limitations.

UNITV RECENT TRENDS IN NON-TRADITIONALMACHININGPROCESSES 9

Recent developments in non-traditional machining processes, their working principles, equipments, effect of process parameters, applications, advantages and limitations. Comparison of non-traditional machining processes.

TOTAL: 45 PERIODS

TEXT BOOK:

1. Vijay.K. Jain "Advanced Machining Processes" Allied Publishers Pvt. Ltd., New Delhi, 2007
2. Pandey P.C. and Shan H.S. "Modern Machining Processes" Tata McGraw-Hill, New Delhi, 2007.

REFERENCES

1. Benedict. G.F. "Nontraditional Manufacturing Processes", Marcel Dekker Inc., New York, 1987.
2. Mc Geough, "Advanced Methods of Machining", Chapman and Hall, London, 1998.
3. Paul De Garmo, J.T.Black, and Ronald. A.Kohser, "Material and Processes in Manufacturing" Prentice Hall of India Pvt. Ltd., 8thEdition, New Delhi , 2001.

STRUCTURAL AND VIBRATIONAL ANALYSIS OF CONNECTING ROD USING VARIOUS MATERIALS

A Project Report

Submitted by

GURUDEVAN S	**(422120114005)**
SARATHI K	**(422120114013)**
THIVAN T	**(422120114016)**
THIRUNAVUKARASAN J	**(422120114315)**

in partial fulfillment for the award of the degree

of

BACHELOR OF ENGINEERING

in

MECHANICAL ENGINEERING

ST. ANNE'S COLLEGE OF ENGINEERING AND TECHNOLOGY

ANGUCHETTIPALAYAM, PANRUTI-607106

ANNA UNIVERSITY: CHENNAI 600 025

MAY 2024

ANNA UNIVERSITY: CHENNAI 600 025

BONAFIDE CERTIFICATE

Certified that the Project report about **"STRUCTURAL AND VIBRATIONAL ANALYSIS OF CONNECTING ROD BY VARIOUS MATERIALS"** is a bonafide work of **GURUDEVAN S (422120114005), SARATHI K(422120114013), THIVAN T (422120114016) and THIRUNAVUKARASAN J (422120114315)** who carried out the project work under my supervision.

K. Shanmuga 8/5/24

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External Examiner

ABSTRACT

The objective of this work is to carry out the structural analysis of a connecting rod made from three differing types of alloys. Connecting Rods has a wide use in all sorts of automobile engines acting as a crucial middle point between the piston and therefore the crankshaft of an engine of an automobile. It's liable for transmission of the up and down movement of the piston to the crankshaft of the engine, by converting the reciprocating motion of the piston to the rotation of crankshaft. The performance of a rod in an engine depends on its design and weight. Hence, for the assembly of a long-lasting, economical and light-weight rod, analysis and optimization become necessary. The material "structural steel" of rod is replaced with Aluminium alloy, Titanium alloy and Grey cast iron material for rod. The model of rod is made in AUTOCAD and imported in ANSYS 2024 R1 workbench for static analysis. After analysis, a comparison is formed between an existing steel rod and therefore the four composite rods in terms of Von Misses stress, equivalent strain, Strain energy and total deformation. All these parameters also are found analytically and compared with results of Finite Element Analysis .All those results are within the range and therefore the values of these materials are found as compared of steel. The general work is split into three phases. First, concept and a review of existing material.Second, we do modeling and static structural analysis.Third, is comparison of elastic strain, total deformation, strain energy and maximum Von misses stress value in alloy connecting rods. And finally random vibrational analysis is analysed.

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ME8091 **AUTOMOBILE ENGINEERING** L T P C
3 0 0 3

OBJECTIVES:

- To understand the construction and working principle of various parts of an automobile.
- To have the practice for assembling and dismantling of engine parts and transmission system.

UNIT I VEHICLE STRUCTURE AND ENGINES 9

Types of automobiles vehicle construction and different layouts, chassis, frame and body, Vehicle aerodynamics (various resistances and moments involved), IC engines –components-functions and materials, variable valve timing (VVT).

UNIT II ENGINE AUXILIARY SYSTEMS 9

Electronically controlled gasoline injection system for SI engines, Electronically controlled diesel injection system (Unit injector system, Rotary distributor type and common rail direct injection system), Electronic ignition system (Transistorized coil ignition system, capacitive discharge ignition system), Turbo chargers (WGT, VGT), Engine emission control by three way catalytic converter system, Emission norms (Euro and BS).

UNIT III TRANSMISSION SYSTEMS 9

Clutch-types and construction, gear boxes- manual and automatic, gear shift mechanisms, Over drive, transfer box, fluid flywheel, torque converter, propeller shaft, slip joints, universal joints, Differential and rear axle, Hotchkiss Drive and Torque Tube Drive.

UNIT IV STEERING, BRAKES AND SUSPENSION SYSTEMS 9

Steering geometry and types of steering gear box-Power Steering, Types of Front Axle, Types of Suspension Systems, Pneumatic and Hydraulic Braking Systems, Antilock Braking System (ABS), electronic brake force distribution (EBD) and Traction Control.

UNIT V ALTERNATIVE ENERGY SOURCES 9

Use of Natural Gas, Liquefied Petroleum Gas, Bio-diesel, Bio-ethanol, Gasohol and Hydrogen in Automobiles-Engine modifications required –Performance, Combustion and Emission Characteristics of SI and CI engines with these alternate fuels - Electric and Hybrid Vehicles, Fuel Cell Note: Practical Training in dismantling and assembling of Engine parts and Transmission Systems should be given to the students. TOTAL: 45 PERIODS

OUTCOMES: Upon the completion of this course the students will be able to

CO1 recognize the various parts of the automobile and their functions and materials.
CO2 discuss the engine auxiliary systems and engine emission control.
CO3 distinguish the working of different types of transmission systems.
CO4 explain the Steering, Brakes and Suspension Systems.
CO5 predict possible alternate sources of energy for IC Engines.

TEXT BOOKS:

1. Jain K.K. and Asthana .R.B, "Automobile Engineering" Tata McGraw Hill Publishers, New Delhi, 2002.
2. 2. Kirpal Singh, "Automobile Engineering", Vol 1 & 2, Seventh Edition, Standard Publishers, New Delhi, 13th Edition 2014..

REFERENCES:

1. Ganesan V. "Internal Combustion Engines", Third Edition, Tata McGraw-Hill, 2012.
2. Heinz Heisler, "Advanced Engine Technology," SAE International Publications USA, 1998.
3. Joseph Heitner, "Automotive Mechanics," Second Edition, East-West Press, 1999.
4. Martin W, Stockel and Martin T Stockle , "Automotive Mechanics Fundamentals," The Good heart - Will Cox Company Inc, USA ,1978. 5. Newton ,Steeds and Garet, "Motor Vehicles", Butterworth Publishers,1989.

ME8692 **FINITE ELEMENT ANALYSIS** L T P C 3 0 0 3

OBJECTIVES:

To introduce the concepts of Mathematical Modeling of Engineering Problems.
To appreciate the use of FEM to a range of Engineering Problems.

UNIT I INTRODUCTION 9

Historical Background–Mathematical Modeling of field problems in Engineering–Governing Equations–Discrete and continuous models – Boundary, Initial and Eigen Value problems- Weighted Residual Methods – Variational Formulation of Boundary Value Problems–Ritz Technique–Basic concepts of the Finite Element Method.

UNIT II ONE-DIMENSIONAL PROBLEMS 9

One Dimensional Second Order Equations – Discretization – Element types- Linear and Higher order Elements – Derivation of Shape functions and Stiffness matrices and force vectors- Assembly of Matrices - Solution of problems from solid mechanics and heat transfer. Longitudinal vibration frequencies and mode shapes. Fourth Order Beam Equation–Transverse deflections and Natural frequencies of beams.

UNIT III TWO DIMENSIONAL SCALAR VARIABLE PROBLEMS 9

Second Order 2D Equations involving Scalar Variable Functions–Variational formulation–Finite Element formulation–Triangular elements – Shape functions and element matrices and vectors. Application to Field Problems - Thermal problems–Torsion of Non circular shafts–Quadrilateral elements–Higher Order Elements.

UNIT IV TWO DIMENSIONAL VECTOR VARIABLE PROBLEMS 9

Equations of elasticity – Plane stress, plane strain and axisymmetric problems – Body forces and temperature effects – Stress calculations - Plate and shell elements.

UNIT V ISOPARAMETRIC FORMULATION 9

Natural co-ordinate systems–Isoparametric elements–Shape functions for iso parametric elements–One and two dimensions–Serendipity elements–Numerical integration and application to plane stress problems - Matrix solution techniques–Solutions Techniques to Dynamic problems–Introduction to Analysis Software.

TOTAL: 45 PERIODS

OUTCOMES: Upon the completion of this course the students will be able to

CO1 Summarize the basics of finite element formulation.
CO2 Apply finite element formulations to solve one dimensional Problems.
CO3 Apply finite element formulations to solve two dimensional scalar Problems.
CO4 Apply finite element method to solve two dimensional Vector problems.
CO5 Apply finite element method to solve problems on isoparametric element and dynamic Problems

TEXT BOOKS:

1.Reddy. J.N.,"An Introduction to the Finite Element Method', 3rd Edition, Tata McGraw-Hill, 2005
2. Seshu, P,'Text Book of Finite Element Analysis', Prentice-Hall of India Pvt. Ltd., New Delhi, 2007.

REFERENCES:

1. Bhatti Asghar M, "Fundamental Finite Element Analysis and Applications", John Wiley & Sons, 2005 (Indian Reprint 2013)*
2. Chandrupatla & Belagundu,'Introduction to Finite Elements in Engineering', 3rd Edition, Prentice Hall College Div, 1990
3. Logan, D.L.,"A first course in Finite Element Method', Thomson Asia Pvt. Ltd., 2002
4. Rao, S.S.,"The Finite Element Method in Engineering', 3rd Edition, Butterworth Heinemann, 2004
5. Robert D. Cook, David S. Malkus, Michael E. Plesha, Robert J. Witt,'Concepts and Applications of Finite Element Analysis', 4th Edition, Wiley Student Edition, 2002.

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CERTIFICATE OF IN-PLANT TRAINING

This is to certify that **Ms. SHANMUGAPRIYA N** student at **ST.ANNE'S COLLEGE OF ENGINEERING AND TECHNOLOGY** has undergone In-Plant Training in Manufacturing Operations for the period from **19.08.2023** to **31.08.2023**.

She has displayed professional acumen during the period of In-plant Training and we appreciate her interest in learning.

We wish her all success in her future endeavours.

For Lenovo (India) Pvt. Ltd.

Lenovo (India) Private Limited

Authorized Signatory

Lenovo.com

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RBD Icon, Level-2, Doddenakundi Village
Marathahalli Outer Ring Road
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Pondicherry - 605 007.
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CERTIFICATE OF IN-PLANT TRAINING

This is to certify that **Ms. SHEKINA JEBASTINA Y** student at **ST.ANNE'S COLLEGE OF ENGINEERING AND TECHNOLOGY** has undergone In-Plant Training in Manufacturing Operations for the period from **19.08.2023** to **31.08.2023**.

She has displayed professional acumen during the period of In-plant Training and we appreciate her interest in learning.

We wish her all success in her future endeavours.

For Lenovo (India) Pvt. Ltd.

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CERTIFICATE OF IN-PLANT TRAINING

This is to certify that **Ms. LEELA G** student at **ST.ANNE'S COLLEGE OF ENGINEERING AND TECHNOLOGY** has undergone In-Plant Training in Manufacturing Operations for the period from **19.08.2023** to **31.08.2023**.

She has displayed professional acumen during the period of In-plant Training and we appreciate her interest in learning.

We wish her all success in her future endeavours.

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