Mohamed Sathak A J College of Engineering, Chennai-603103

Department of Electronics & Communication Engineering

1.3.2. Average percentage of courses that include experiential learning through project work / field work / internship during AY2023-24

S.No	Title of IV yr Project	Subject code & Subjects name related to the Projects
1	Pneumonia, Tuberculosis and COVID-19 classification and segmentation using deep learning	EC8093 - Digital Image Processing
2	Elevating Blood Bank with Analytics	EC8073 - Medical Electronics
3	Real Time Street Light Fault Detection Precise Location Tracking and Efficient Maintenance in Cities	EC8791 - Embedded and Real Time Systems
4	Implementing a Human-Centric Approach to Preparing Tea Utilizing A 6-Axis Robotic Arm Enhanced with Reinforcement Learning	EC8791 - Embedded and Real Time Systems
5	Transforming Sign Language into Speech and Text	EC8791 - Embedded and Real Time Systems
6	Agri Robot	EC8791 - Embedded and Real Time Systems
7	Green Energy Harvesting: A Home Waste Management System with Biogas and Electricity Generation	EC8791 - Embedded and Real Time Systems
8	Plant Leaf Disease Detection Using Image Processing and Deep Learning	EC8093 - Digital Image Processing

HoD

MOHAMED SATHAK A J COLLEGE OF ENGINEERING, Chennai - 603103

PROJECT WORK REVIEW MARKS FOR THE ACADEMIC YEAR - 2023 / 2024

Department of Electronics and Communication Engineering

Batch No	Reg No	Name of the Student	Project title	Guide Name
1	311820106001	Abinaya K	Pneumonia and COVID-19 classification and segmentation using deep learning	Mr.M.Kamarajan
	311820106002	Abitha B		
	311820106009	Janani E		
2	311820106014	Mohamed Mukshith N	Elevating Blood Bank with Analytics	Mrs.E.Jayanthi
	311820106017	Poosathishkumar M		
	311820106306	Mohamed Nayeem B		
3	311820106006	Basharathulla A	Real Time Street Light Fault Detection, Precise Location Tracking and Efficient Maintenance in Cities	Dr.I.Manju
	311820106013	Madhivanan R		
	311820106010	Jaseem Mohamed P		
4	311820106020	Sathesh Kumar V	Implementing a Human-Centric Approach to Preparing Tea Utilizing A 6-Axis Robotic Arm Enhanced with Reinforcement Learning	Mr.M.Ashok Kumar
	311820106021	Shahrukh Fakrudeen K		
	311820106004	Ahmad Syed Semar		
5	311820106003	Aflal Ahamed M	Transforming Sign Languages into Speech and Text	Mrs.S.Piriyadharshini
	311820106022	Shaik Abdulla A		
	311820106016	Nirmal K		
6	311820106025	Thanveer Sheriff A	Agri Robot	Mrs.S.Anusya
	311820106301	Bala Krishnan S		
	311820106702	Kishore R		
7	311820106007	Carol Persy N	Green Energy Harvesting : A Home Waste Management System with Biogas and Electricity Generation	Mrs.J.Ajeetha Thasneem
	311820106018	Safrin S		
	311820106303	Girish R		
8	311820106005	Amudeshwaran S	Plant Leaf Diseases Detection Using Image Processing and deep learning	Dr.G.Sivaranjani
	311820106011	Kishore S		
	311820106305	Kamali D		
	311820106302	Fouzia Jabeen S P		

Name & Sign of Project Coordinator

Format No : TLP 31

Head of the deaprtment

Rev No.: 1.0   Rev. Date: 04.01.21

PNEUMONIA AND COVID-19 CLASSIFICATION AND SEGMENTATION USING DEEP LEARNING

A PROJECT REPORT

Submitted by

ABINAYA K (311820106001)

ABITHA B (311820106002)

JANANI M E (311820106009)

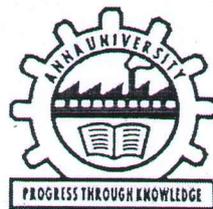*in partial fulfillment of the award of the degree*

of

BACHELOR OF ENGINEERING

in

ELECTRONICS AND COMMUNICATION ENGINEERING

MOHAMED SATHAK A.J COLLEGE OF ENGINEERING

EGATTUR, CHENNAI-603103
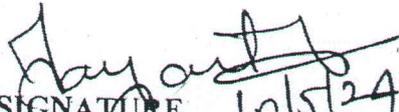
ANNA UNIVERSITY :: CHENNAI 600 025

MAY - 2024

ANNA UNIVERSITY : CHENNAI 600 025

BONAFIDE CERTIFICATE

Certified that this project report "PNEUMONIA AND COVID-19 CLASSIFICATION AND SEGMENTATION USING DEEP LEARNING" is the bonafide work of ABINAYA K (311820106001), ABITHA B (311820106002), JANANI M E (311820106009) who carried out the project work under my supervision.
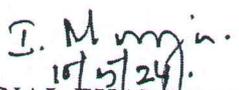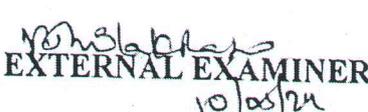
SIGNATURE 10/5/24

Mrs. E.JAYANTHI,

HEAD OF THE DEPARTMENT,

ELECTRONICS AND COMMUNICATION ENGG,

MOHAMED SATHAK A.J COLLEGE OF ENGINEERING CHENNAI.

SIGNATURE

Mr. M.KAMARAJ,

SUPERVISOR,

ELECTRONICS AND COMMUNICATION ENGG,

MOHAMED SATHAK A.J COLLEGE OF ENGINEERING CHENNAI.

Project Viva-Voce held on ......10/5/24...

INTERNAL EXAMINER

EXTERNAL EXAMINER
10/05/24

ABSTRACT

The current global Covid-19 pandemic is related to an acute respiratory disease caused by a new coronavirus (SARS-CoV-2), which is highly contagious and whose evolution is still little known. Considering the current case definition, based on the diagnosis of pneumonia, more than 100,000 cases of Covid-19 infection have been confirmed worldwide, and the associated mortality rate has fluctuated around 2%. Currently, available laboratory tests might not be widely accessible to a growing infected population, but new screening strategies are necessary. Chest CT as a screening tool has yet to be determined, recent studies have demonstrated a central role of CT in the early detection and management of Covid-19 pulmonary manifestations. It has shown high sensitivity but limited specificity. We present a Neural Network in TensorFlow and Keras based on Covid-19 and Pneumonia classification. The proposed system is based on CNN using images to classify, Covid-19 or Pneumonia in this system using the CNN model. It is predicted that the success of the obtained results will increase. If the CNN method is supported by adding extra feature extraction methods and images to classify successfully by covid-19 or Pneumonia.

PRINCIPAL
Mohamed Sathak A.J. College of Engineering
No.34, Rajiv Gandhi Salai (OMR)
Sipcot - IT Highway Egattur,
Chenai - 603103.

8.2 CONCLUSION

In this project, research to classify covid and pneumonia over static facial images using deep learning techniques was developed. This is a complex problem that has already been approached several times with different techniques. While good results have been achieved using feature engineering, this project focused on feature learning, which is one of DL promises. While feature engineering is not necessary, image pre-processing boosts classification accuracy. Hence, it reduces noise on the input data. Nowadays, covid and pneumonia detection software includes the use of feature engineering. A solution totally based on feature learning does not seem close yet because of a major limitation. Thus, covid and pneumonia classification could be achieved by means of deep learning techniques.

PRINCIPAL
Mohamed Sathak A.J. College of Engineering
No.34, Rajiv Gandhi Salai (OMR)
Sipcot - IT Highway Egattur,
Chenai - 603103.

EC8093	DIGITAL IMAGE PROCESSING	L	T	P	C
		3	0	0	3

OBJECTIVES:

- To become familiar with digital image fundamentals
- To get exposed to simple image enhancement techniques in Spatial and Frequency domain.
- To learn concepts of degradation function and restoration techniques.
- To study the image segmentation and representation techniques.
- To become familiar with image compression and recognition methods

UNIT I   DIGITAL IMAGE FUNDAMENTALS   9

Steps in Digital Image Processing – Components – Elements of Visual Perception – Image Sensing and Acquisition – Image Sampling and Quantization – Relationships between pixels - Color image fundamentals - RGB, HSI models, Two-dimensional mathematical preliminaries, 2D transforms - DFT, DCT.

UNIT II   IMAGE ENHANCEMENT   9

Spatial Domain: Gray level transformations – Histogram processing – Basics of Spatial Filtering– Smoothing and Sharpening Spatial Filtering, Frequency Domain: Introduction to Fourier Transform– Smoothing and Sharpening frequency domain filters – Ideal, Butterworth and Gaussian filters, Homomorphic filtering, Color image enhancement.

UNIT III   IMAGE RESTORATION   9

Image Restoration - degradation model, Properties, Noise models – Mean Filters – Order Statistics – Adaptive filters – Band reject Filters – Band pass Filters – Notch Filters – Optimum Notch Filtering – Inverse Filtering – Wiener filtering

UNIT IV   IMAGE SEGMENTATION   9

Edge detection, Edge linking via Hough transform – Thresholding - Region based segmentation – Region growing – Region splitting and merging – Morphological processing- erosion and dilation, Segmentation by morphological watersheds – basic concepts – Dam construction – Watershed segmentation algorithm.

UNIT V   IMAGE COMPRESSION AND RECOGNITION   9

Need for data compression, Huffman, Run Length Encoding, Shift codes, Arithmetic coding, JPEG standard, MPEG. Boundary representation, Boundary description, Fourier Descriptor, Regional Descriptors – Topological feature, Texture - Patterns and Pattern classes - Recognition based on matching.

TOTAL :45 PERIODS

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

- Know and understand the basics and fundamentals of digital image processing, such as digitization, sampling, quantization, and 2D-transforms.
- Operate on images using the techniques of smoothing, sharpening and enhancement.
- Understand the restoration concepts and filtering techniques.
- Learn the basics of segmentation, features extraction, compression and recognition methods for color models.

PRINCIPAL
Mohamed Sathak A.J. College of Engineering
No.34, Rajiv Gandhi Salai (OMR)
Sipcot - IT Highway Egattur,
Chenai - 603103.

TEXT BOOKS:

1. Rafael C. Gonzalez, Richard E. Woods, 'Digital Image Processing', Pearson, Third Edition, 2010.
2. Anil K. Jain, 'Fundamentals of Digital Image Processing', Pearson, 2002.

REFERENCES

1. Kenneth R. Castleman, 'Digital Image Processing', Pearson, 2006.
2. Rafael C. Gonzalez, Richard E. Woods, Steven Eddins, 'Digital Image Processing using MATLAB', Pearson Education, Inc., 2011.
3. D,E. Dudgeon and RM. Mersereau, 'Multidimensional Digital Signal Processing', Prentice Hall Professional Technical Reference, 1990.
4. William K. Pratt, 'Digital Image Processing', John Wiley, New York, 2002
5. Milan Sonka et al 'Image processing, analysis and machine vision', Brookes/Cole, Vikas Publishing House, 2nd edition, 1999.

ELEVATING BLOOD BANKING WITH ANALYTICS

A PROJECT REPORT

Submitted by

POOSATHISHKUMAR .M – 311820106017

MOHAMED NAYEEM .B – 311820106306

MOHAMED MUKSHITH .N – 311820106014
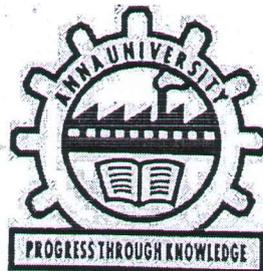
in partial fulfillment for the award of the degree

of

BACHELOR OF ENGINEERING

IN

ELECTRONICS AND COMMUNICATION ENGINEERING

MOHAMED SATHAK A.J. COLLEGE OF ENGINEERING, CHENNAI

ANNA UNIVERSITY :: CHENNAI 600 025

MAY 2024

ANNA UNIVERSITY : CHENNAI 600 025

BONAFIDE CERTIFICATE

Certified that this project report " **ELEVATING BLOOD BANKING WITH ANALYTICS** " is the bonafide work of " **POOSATHISHKUMAR. M (311820106017) , MOHAMED NAYEEM. B (311820106306) , MOHAMED MUKSHITH. N (311820106014)** " who carried out the project work under my supervision.
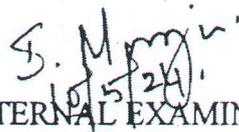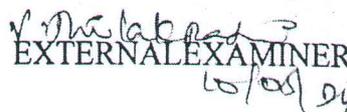
SIGNATURE

Mrs.E.JAYANTHI,

HEAD OF THE DEPARTMENT,

ELECTRONICS AND COMMUNICATION

ENGG,

MOHAMED SATHAK A.J. COLLEGE OF

ENGINEERING, CHENNAI.

SIGNATURE

Mrs.E.JAYANTHI,

SUPERVISOR,

ASSISTANT PROFESSOR/ECE ,

ELECTRONICS AND COMMUNICATION

ENGG,

MOHAMED SATHAK A.J. COLLEGE OF

ENGINEERING,CHENNAI.

Project Viva-Voce held on 10-05 - 2024

INTERNAL EXAMINER

EXTERNAL EXAMINER

PRINCIPAL
Mohamed Sathak A.J. College of Engineering
No.34, Rajiv Gandhi Salai (OMR)
Sipcot - IT Highway Egattur,
Chenai - 603103.

ABSTRACT

This project presents a comprehensive approach to analyzing blood bank data focusing on geographical distribution and availability of blood units. The data-setcomprises key information including blood bank names, available blood units, blood groups, addresses, latitude and longitude coordinates, as well as state, city, and country details. Leveraging this data-set, a graph visualization is generated to illustrate the distribution of blood units across different locations. Moreover, a web application is developed using Flask framework, enabling users to input their desired blood group, required units, and geographical coordinates. Utilizing the provided information, the application filters relevant blood banks based on proximity to the user's location, calculated through the distance between latitude and longitude coordinates. This dynamic filtering mechanism ensures efficient access to blood banks with the required blood group and units within the user's vicinity, enhancing the effectiveness of blood donation initiatives.

PRINCIPAL
Mohamed Sathak A.J. College of Engineering
No.34, Rajiv Gandhi Salai (OMR)
Sipcot - IT Highway Egadur,
Chenai - 603103.

3

10. CONCLUSION

The suggested method offers a comprehensive solution to meet the urgent requirement for immediate access to blood units, taking into account both blood type and geographical proximity. Our project intends to transform the accessibility and management of blood donation and transfusion services by utilizing advanced data analytic techniques and web application development.

By creating a user-friendly web application equipped with dynamic filtering capabilities, users will have immediate access to the most current information on blood availability. This will facilitate prompt and precise matching of donors with recipients, resulting in efficient and accurate outcomes. The system's extensive geographical reach and seamless interaction with healthcare providers' systems guarantee that users, regardless of their location, may easily find nearby blood banks and access vital supplies in times of urgent need.

Furthermore, the suggested approach enhances healthcare technology by utilizing the potential of data-driven analysis and cutting-edge technologies. Our initiative seeks to have a significant impact on patient outcomes and healthcare delivery by enhancing the efficiency and efficacy of blood donation and transfusion operation

Essentially, the suggested approach is a major advancement in improving the availability of blood transfusion services and ultimately saving lives in crucial situations. We are confident that the suggested system, which prioritizes the needs of users, offers real-time functionality, and is dedicated to advancing new ideas, has the capacity to revolutionize the field of blood banking and transfusion services, ultimately benefiting society.

EC8073	MEDICAL ELECTRONICS	L	T	P	C
		3	0	0	3

OBJECTIVES:

The student should be made:

- To gain knowledge about the various physiological parameters both electrical and non electrical and the methods of recording and also the method of transmitting these parameters
- To study about the various assist devices used in the hospitals
- To gain knowledge about equipment used for physical medicine and the various recently developed diagnostic and therapeutic techniques.

UNIT I   ELECTRO-PHYSIOLOGY AND BIO-POTENTIAL RECORDING   9

Sources of bio medical signals, Bio-potentials, Biopotential electrodes, biological amplifiers, ECG, EEG, EMG, PCG, typical waveforms and signal characteristics

UNIT II   BIO-CHEMICAL AND NON ELECTRICAL PARAMETER   9
**   MEASUREMENT**

pH, PO2, PCO2, Colorimeter, Blood flow meter, Cardiac output, respiratory, blood pressure, temperature and pulse measurement, Blood Cell Counters.

UNIT III   ASSIST DEVICES   9

Cardiac pacemakers, DC Defibrillator, Dialyser, Ventilators, Magnetic Resonance Imaging Systems, Ultrasonic Imaging Systems.

UNIT IV   PHYSICAL MEDICINE AND BIOTELEMETRY   9

Diathermies- Shortwave, ultrasonic and microwave type and their applications, Surgical Diathermy, Biotelemetry.

UNIT V   RECENT TRENDS IN MEDICAL INSTRUMENTATION   9

Telemedicine, Insulin Pumps, Radio pill, Endomicroscopy, Brain machine interface, Lab on a chip.

TOTAL:45 PERIODS

OUTCOMES:

On successful completion of this course, the student should be able to:

- Know the human body electro- physiological parameters and recording of bio-potentials
- Comprehend the non-electrical physiological parameters and their measurement – body temperature, blood pressure, pulse, blood cell count, blood flow meter etc.
- Interpret the various assist devices used in the hospitals viz. pacemakers, defibrillators, dialyzers and ventilators
- Comprehend physical medicine methods eg. ultrasonic, shortwave, microwave surgical diathermies , and bio-telemetry principles and methods
- Know about recent trends in medical instrumentation

REAL TIME STREET LIGHT FAULT DETECTION, PRECISE LOCATION TRACKING AND EFFICIENT MAINTENANCE IN CITIES

A PROJECT REPORT

Submitted by

BASHARATHULLA K (311820106006)

JASEEM MOHAMED P (311820106010)

MADHIVANAN R (311820106013)

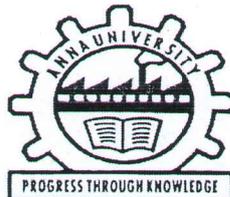*in partial fulfillment for the award of the degree*

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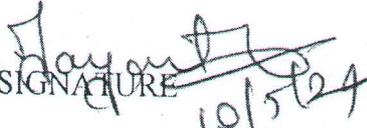MOHAMED SATHAK A.J. COLLEGE OF ENGINEERING

ANNA UNIVERSITY: CHENNAI 600025

PRINCIPAL
Mohamed Sathak A.J. College of Engineering
No.34, Rajiv Gandhi Salai (OMR)
Sipcot - IT Highway Egattur,
Chenai - 603103.

MAY 2024

ANNA UNIVERSITY: CHENNAI 600 025

BONAFIDE CERTIFICATE

Certified that this project report "**REAL TIME STREET LIGHT FAULT DETECTION, PRECISE LOCATION TRACKING AND EFFICIENT MAINTENANCE IN CITIES**" is the Bonafide work of BASHARATHULLA.K (311820106006), JASEEM MOHAMED.P(311820106010), MADHIVANAN.R (311820106013) who carried out the project work under my supervision.
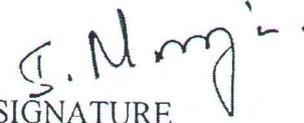
SIGNATURE

Mrs. E. JAYANTHI
HEAD OF THE DEPARTMENT

Electronics and Communication

Engineering

Mohamed Sathak A J College of
Engineering
Chennai

Tamil Nadu-603103
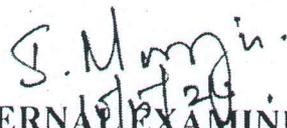
SIGNATURE

DR. I. MANJU
SUPERVISOR/HEAD IQAC

Electronics and communication

Engineering

Mohamed Sathak A J College of
Engineering
Chennai

Tamil Nadu-603103

Project Viva-Voce held on ___10/05/2024___

INTERNAL EXAMINER

EXTERNAL EXAMINER
10/05/24

II

ABSTRACT

This Project presents an innovative automated system designed for real-time streetlight fault detection, precise location tracking, and efficient maintenance in urban environments. Leveraging Light Dependent Resistors (LDR), Node MCU, DC lights and the system ensures swift identification of faults in streetlights. Integrated with GPS technology, the system precisely tracks the location of faulty lights, providing valuable information for targeted maintenance. The inclusion of GSM modules facilitates instant communication of fault alerts to maintenance personnel. This comprehensive solution not only enhances the reliability of street lighting infrastructure but also streamlines the maintenance process, contributing to more sustainable and well-lit urban spaces.

PRINCIPAL
Mohamed Sathak A.J. College of Engineering
No.34, Rajiv Gandhi Salai (OMR)
Sipcot - IT Highway Egattur,
Chenai - 603103.

IV

8.3. CONCLUSION

In conclusion, our project on real-time street light fault detection, precise location tracking, and efficient maintenance in cities marks a significant milestone in urban infrastructure management. Leveraging IoT sensors, GPS technology, and advanced analytics, we've tackled key challenges in maintaining street lighting networks. Our system enables swift detection of faults, precise location tracking, and proactive maintenance scheduling. Through field trials, we've validated the practical feasibility and effectiveness of our solution in diverse urban environments. Stakeholder feedback underscores the tangible benefits of improved fault detection and maintenance efficiency. Moving forward, we envision a future where urban lighting networks are smarter, more sustainable, and resilient, enhancing safety and quality of life for all.

PRINCIPAL
Mohammed Sathak A.J. College of Engineering
No.34, Rajiv Gandhi Salai (OMR)
Sipcot - IT Highway Egattur,
Chenai - 603103.

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 real- time 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:

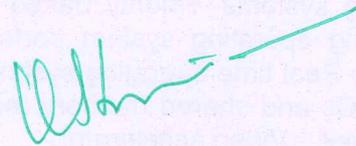**At the end of the course, the student should be able to:**
- Describe the architecture and programming of ARM processor
- Outline the concepts of embedded systems
- Explain the basic concepts of real time operating system design
- Model real-time applications using embedded-system concepts

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)

REFERENCES:
1. Lyla B.Das, "Embedded Systems : An Integrated Approach" Pearson Education, 2013.
2. Jonathan W.Valvano, "Embedded Microcomputer Systems Real Time Interfacing", Third Edition Cengage Learning, 2012.
3. David. E. Simon, "An Embedded Software Primer", 1st Edition, Fifth Impression, Addison- Wesley Professional, 2007.
4. Raymond J.A. Buhr, Donald L.Bailey, "An Introduction to Real-Time Systems-From Design to Networking with C/C++", Prentice Hall, 1999.
5. C.M. Krishna, Kang G. Shin, "Real-Time Systems", International Editions, Mc Graw Hill 1997
6. K.V.K.K.Prasad, "Embedded Real-Time Systems: Concepts, Design & Programming", Dream Tech Press, 2005.
7. Sriram V Iyer, Pankaj Gupta, "Embedded Real Time Systems Programming", Tata Mc Graw Hill, 2004.

PRINCIPAL
Mohamed Sathak A.J. College of Engineering
No.34, Rajiv Gandhi Salai (OMR)
Sipcot - IT Highway Egattur,
Chenai - 603103.

IMPLEMENTING A HUMAN-CENTRIC APPROACH TO PREPARING TEA UTILIZING A 6-AXIS ROBOTIC ARM ENHANCED WITH REINFORCEMENT LEARNING

A PROJECT REPORT

Submitted by

K SHAHRUKH FAKRUDEEN (311820106021)

AHMAD SYED SEMAR (311820106004)

V SATHESH KUMAR (311820106020)

in partial fulfilment for the award of the degree

of

BACHELOR OF ENGINEERING

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ELECTRONICS AND COMMUNICATION ENGINEERING

MOHAMED SATHAK A.J. COLLEGE OF ENGINEERING

ANNA UNIVERSITY: CHENNAI 600025

MAY 2024

i

ANNA UNIVERSITY: CHENNAI 600 025

BONAFIDE CERTIFICATE

Certified that this project report "IMPLEMENTING A HUMAN-CENTRIC APPROACH TO PREPARING TEA UTILIZING A 6-AXIS ROBOTIC ARM ENHANCED WITH REINFORCEMENT LEARNING" is the Bonafide work of SHAHRUKH FAKRUDEEN.K (311820106021), AHMAD SYED SEMAR(311820106004), V SATHESH KUMAR (311820106020) who carried out the project work under my supervision.
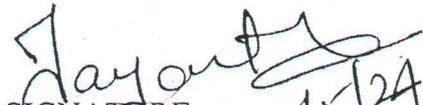
SIGNATURE 10/5/24

Mrs. E. JAYANTHI
HEAD OF THE DEPARTMENT

Electronics and Communication

Engineering

Mohamed Sathak A J College of
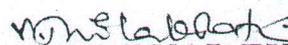Engineering
Chennai

Tamil Nadu-603103

SIGNATURE 10/5/24

Mr. M. ASHOKKUMAR
SUPERVISOR/ASSISTANT
PROFESSOR

Electronics and communication

Engineering

Mohamed Sathak A J College of
Engineering
Chennai

Tamil Nadu-603103

Project Viva-Voce held on___10/05/2024___
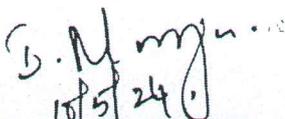
INTERNAL EXAMINER

EXTERNAL EXAMINER

10/05/24

ABSTRACT

In India, chai has evolved from a simple drink to a vital component of daily existence and culture. There is a definite need for solutions that combine conventional methods with cutting-edge technology as the world becomes more automated. In this study, we introduce "Chai Bot," a robotic system that focuses on the complex task of preparing tea by combining the capabilities of reinforcement learning with a six-axis robotic arm. This effort aims to both demonstrate a real-world reinforcement learning application in a culturally relevant activity and investigate how flexible the technology may be in different automation scenarios. The arm's skill in the intricate and customary act of preparing chai is used to illustrate how well-respected cultural practices may blend seamlessly.

KEYWORDS - Chai Bot, reinforcement learning, six-axis robotic arm, automation, cultural practices

PRINCIPAL
Mohamed Sathak A.J. College of Engineering
No.34, Rajiv Gandhi Salai (OMR)
Sipcot - IT Highway Egattur,
Chenai - 603103.

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CHAPTER 6

CONCLUSION

6.1 RESULT AND DISCUSSION

The "Chai Bot" project has effectively showcased the fusion of advanced robotics and reinforcement learning to automate the culturally significant task of chai preparation. This endeavor not only demonstrates the practical application of a 6-axis robotic arm in performing a task deeply rooted in Indian tradition but also underscores the adaptability of reinforcement learning in diverse automation scenarios.

Our journey from conceptualization to realization involved meticulous design processes, harnessing the processing power of the NVIDIA Jetson Nano Developer Kit, and utilizing PyBullet to develop our reinforcement learning model. This integration enabled the creation of a robotic system capable of comprehending and executing the nuanced steps involved in tea making. Moreover, the utilization of a URDF generated from our design significantly contributed to the simulation phase, facilitating accurate and realistic testing of the robotic arm's movements and functions before physical implementation.

Despite encountering challenges in the additive manufacturing process, such as optimizing layer adhesion and managing thermal stresses, our team successfully refined the printing parameters to achieve the desired quality and durability of the robotic arm's components. These experiences have provided valuable insights into the complexities of developing a functional robotic system from scratch.

Looking forward, the "Chai Bot" project establishes a precedent for future research in robotics and artificial intelligence. Its successful implementation
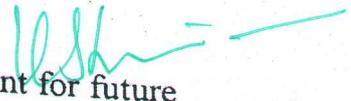
opens up new avenues for exploring how technology can harmoniously integrate with traditional practices. As we progress, it is imperative to continue refining our approach, exploring IoT integration, and enhancing the AI capabilities of our system to pave the way for more innovative and culturally sensitive automation solutions.

In conclusion, the "Chai Bot" project exemplifies the potential of robotics and AI to enrich our cultural practices, offering a glimpse into the future of automation where technology not only serves functional purposes but also preserves and celebrates our heritage.

6.1.1 ADVANTAGES

- Automates chai preparation, reducing manual labor and enhancing efficiency.
- Integrates advanced robotics and reinforcement learning for versatile task execution.
- Preserves cultural heritage by automating a tradition deeply ingrained in Indian culture.
- Demonstrates the practical application of 6-axis robotic arm technology in daily tasks.
- Showcases the potential of AI and robotics to revolutionize traditional practices while celebrating cultural significance.

EC8791   **EMBEDDED AND REAL TIME SYSTEMS**   **L   T   P   C**
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OBJECTIVES:
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TOTAL: 45   PERIODS

PRINCIPAL
Mohamed Sathak A.J. College of Engineering
No.34, Rajiv Gandhi Salai (OMR)
Sipcot - IT Highway Egattur,
Chenai - 603103.

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PRINCIPAL
Mohamed Sathak A.J. College of Engineering
No.34, Rajiv Gandhi Salai (OMR)
Sipcot - IT Highway Egattur,
Chenai - 603103.

TRANSFORMING SIGN LANGUAGE INTO SPEECH AND TEXT

A PROJECT REPORT

Submitted by

SHAIK ABDULLA A.S	**(311820106022)**
AFLAL AHAMED M	**(311820106003)**
NIRMAL K	**(311820106016)**

In partial fulfillment for the award of the degree

of

BACHELOR OF ENGINEERING

IN

ELECTRONICS AND COMMUNICATION ENGINEERING

MOHAMED SATHAK A J COLLEGE OF ENGINEERING.
SIRUSERI IT PARK, OMR, CHENNAI-603 103

ANNA UNIVERSITY :: CHENNAI-600025

MAY-2024

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ANNA UNIVERSITY: CHENNAI 600 025

BONAFIDE CERTIFICATE

It is certified that this project report "TRANSFORMING SIGN LANGUAGE INTO SPEECH AND TEXT" is the bonafide work of "SHAIK ABDULLA A.S (311820106022), AFLAL AHAMED M (311820106003), NIRMAL K (311820106016)" who carried out the project work under my supervision.

SIGNATURE

Mrs.Jayanthi.E M.Tech (Ph.D)

HEAD OF THE DEPARTMENT

ASSISTANT PROFESSOR

Department of Electronics and Communication Engineering

Mohamed Sathak AJ College of Engineering, Siruseri IT park, OMR, Chennai - 603 103
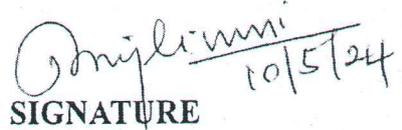
SIGNATURE

Mrs.S.Priyadharshini M.E (Ph.D)

SUPERVISOR

ASSISTANT PROFESSOR

Department of Electronics and Communication Engineering

Mohamed Sathak AJ College of Engineering, Siruseri IT park, OMR, Chennai - 603 103

Project Viva- Voce held on 10.05.2024 .
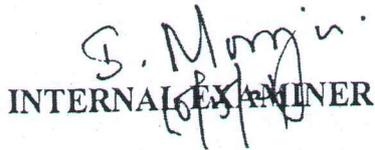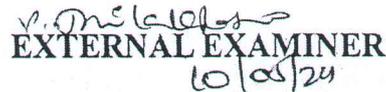
INTERNAL EXAMINER

EXTERNAL EXAMINER

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ABSTRACT

Converting sign language to text and speech is a complex process that bridges the communication gap between signers and non-signers. It involves several interconnected stages. Initially, data acquisition methods like cameras or motion-capture devices capture the hand gestures or signs. Then, sophisticated algorithms in gesture recognition analyze these movements, identifying key points and mapping them to corresponding signs. This recognition step is critical for accuracy and relies heavily on computer vision techniques. Once the signs are recognized, the system translates them into textual representations. Each sign corresponds to a specific word, phrase, or character in the target language. This translation process is fundamental in ensuring clear communication between signers and non-signers. Following translation, text-to- speech technology converts the textual representation into spoken words. Text- to-speech engines use natural language processing algorithms to generate human-like speech from the input text. The final output, synthesized speech, and translated text are then presented to the user through a suitable interface, such as a screen display or audio output. Continuous advancements in machine learning and AI contribute to enhancing the accuracy and reliability of these systems, making sign language more accessible to a wider audience and facilitating inclusive communication in various settings.

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PRINCIPAL
Mohamed Sathak A.J. College of Engineering
No.34, Rajiv Gandhi Salai (OMR)
Sipcot - IT Highway Egattur,
Chenai - 603103.

CHAPTER IX

CONCLUSION AND FUTURE ENHANCEMENTS

The sign language translation systems represent a remarkable advancement in technology, offering a transformative solution to bridge the communication gap between signers and non-signers. These systems have evolved significantly over the years, driven by advancements in artificial intelligence, machine learning, computer vision, and natural language processing. By harnessing the p ower of these technologies, sign language translation systems empower deaf and hard-of-hearing individuals to communicate effectively and participate fully in all aspects of society.

One of the key strengths of sign language translation systems lies in their ability to accurately recognize and interpret the intricate hand movements, facial expressions, and body language that constitute sign language. Through sophisticated algorithms and deep learning models, these systems can analyze and classify sign language gestures with impressive accuracy, enabling seamless translation into textual representations or synthesized speech. This cap ability not only facilitates direct communication between signers and non -signers but also promotes greater understanding and inclusivity within society.

Moreover, the mobility and accessibility of sign language translation systems have been significantly enhanced through the integration of lightweight and portable hardware solutions, such as wearable devices or mobile ap plications. This allows users to access translation capabilities in various environments, without the need for cumbersome equipment or complex setup p rocedures. By making sign language translation technology more accessible and us er-friendly, these systems empower deaf and hard-of-hearing individuals to communicate effectively in diverse settings, whether at home, in school, or in the workplace.

Furthermore, the real-time translation capabilities of sign language translation systems enable fluid and natural communication between signers and non-signers, minimizing latency and ensuring timely interpretation of sign language gestures. This facilitates more spontaneous and interactive communication experiences, enhancing engagement and collaboration among individuals with diverse communication needs. Additionally, the user-centered design approach adopted by many sign language translation systems ensures inclusivity, usability, and accessibility, incorporating feedback from deaf and hard-of- hearing individuals throughout the development process.

Despite these advancements, sign language translation systems still face several challenges and limitations. Variability and complexity in sign languages across different regions and communities pose difficulties for automated recognition and translation systems. Addressing these challenges requires ongoing research, collaboration, and input from diverse stakeholders, including sign language users, linguists, technologists, and policymakers. Moreover, the availability and affordability of sign language translation technology remain barriers for many deaf and hard-of-hearing individuals, particularly in resource-constrained settings or underserved communities. Efforts to promote equitable access to these systems require collaboration among governments, advocacy organizations, technology developers, and other stakeholders to address systemic barriers and ensure that these tools reach those who need them most.

In conclusion, sign language translation systems have the potential to significantly improve the quality of life for deaf and hard-of-hearing individuals, empowering them to communicate effectively and participate fully in all aspects of society. By breaking down communication barriers and fostering greater understanding and inclusivity, these systems contribute to a more equitable and accessible world for everyone, regardless of their communication abilities.

PRINCIPAL
Mohamed Sathak A.J. College of Engineering
No.34, Rajiv Gandhi Salai (OMR)
Sipcot - IT Highway Egattur,
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PRINCIPAL
Mohamed Sathak A.J. College of Engineering
No.34, Rajiv Gandhi Salai (OMR)
Sipcot - IT Highway Egattur,
Chenai - 603103.

AGRI ROBOT

A PROJECT REPORT

Submitted by

BALAKRISHNAN - 311820106301

KISHORE R - 311820106702

THANVEER SHERIFF - 311820106025

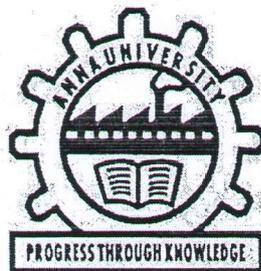*in partial fulfillment for the award of the degree*

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PRINCIPAL
Mohamed Sathak A.J. College of Engineering
No.34, Rajiv Gandhi Salai (OMR)
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Chenai - 603103.

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BONAFIDE CERTIFICATE

Certified that this project report " AGRI ROBOT " is the bonafide work of " BALAKRISHNAN (311820106301), KISHORE R (311820106702), THANVEER SHERIFF (311820106025) " who carried out the project work under my supervision.

SIGNATURE

Mrs.E.JAYANTHI,

HEAD OF THE DEPARTMENT,

ELECTRONICS AND COMMUNICATION

ENGG,

MOHAMED SATHAK A.J. COLLEGE OF

ENGINEERING, CHENNAI.

SIGNATURE

Mrs.S.ANUSHYA,

SUPERVISOR,

ASSISTANT PROFESSOR/ECE ,

ELECTRONICS AND COMMUNICATION

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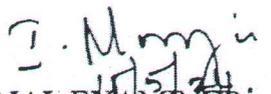
INTERNAL EXAMINER

EXTERNALEXAMINER
10/05/24

ABSTRACT

The integration of a deep learning UNet model into agriculture flying drone systems represents a significant advancement in the realm of precision agriculture. This proposed solution harnesses the power of advanced image processing techniques to detect and manage plant diseases effectively. The UNet architecture, renowned for its prowess in semantic segmentation tasks, will play a pivotal role in accurately identifying diseased regions within crop images captured by the drone's onboard camera.

MATLAB's robust toolbox provides an ideal environment for the implementation and optimization of the UNet model. Leveraging MATLAB's capabilities, researchers and engineers can fine-tune the model parameters and streamline the optimization process, ensuring efficient and accurate disease detection. The versatility of MATLAB enables seamless integration with the drone system, facilitating real-time image processing and analysis.

The autonomous nature of the drone allows it to traverse agricultural fields with ease, capturing high-resolution images of crops from various vantage points. These images serve as input data for the UNet model, which meticulously analyzes each pixel to identify potential disease outbreaks. By leveraging deep learning algorithms, the system can detect subtle patterns and anomalies indicative of disease presence, even in complex and cluttered environments.

Upon detecting diseased regions, the system highlights and categorizes them, providing farmers with actionable insights for targeted interventions. This real-time feedback enables farmers to promptly address emerging issues, preventing the spread of diseases and minimizing crop losses. Additionally, by categorizing the detected diseases, the system facilitates informed decision-making regarding treatment strategies and resource allocation.

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PRINCIPAL
Mohamed Sathak A.J. College of Engineering
No.34, Rajiv Gandhi Salai (OMR)
Sipcot - IT Highway Egattur,
Chenai - 603103.

10. CONCLCUSION

In conclusion, the integration of deep learning UNet models into agriculture flying drone systems represents a significant advancement in crop disease detection and management. Through rigorous field trials and validation studies, the proposed system has demonstrated its effectiveness in early disease detection, precise delineation of diseased regions, and actionable insights for farmers. By leveraging advanced imaging, machine learning, and automation technologies, the integrated system offers unprecedented capabilities for proactive disease management, optimized resource allocation, and data-driven decision-making in agriculture.

Moving forward, addressing challenges related to algorithm robustness, data quality, regulatory compliance, and cost-effectiveness will be crucial to realizing the full potential of this technology and facilitating its widespread adoption. Collaborative efforts between researchers, policymakers, industry stakeholders, and end-users will be essential to overcome these challenges and accelerate the deployment of the integrated system in agricultural settings worldwide.

Ultimately, by harnessing the power of innovation, technology, and collaboration, we can build a more resilient, sustainable, and productive food system that meets the needs of a growing global population while minimizing environmental impact and ensuring food security for future generations. The integration of deep learning UNet models into agriculture flying drone systems represents a transformative step towards achieving these goals and unlocking the full potential of modern agriculture.

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PRINCIPAL
Mohamed Sathak A.J. College of Engineering
No.34, Rajiv Gandhi Salai (OMR)
Sipcot - IT Highway Egattur,
Chenai - 603103.

Green Energy Harvesting: A Home Waste Management System with Biogas and Electricity Generation

A PROJECT REPORT

Submitted by

N.CAROL PERSY(311820106007)

S.SAFRIN(311820106018)

R.GIRISH(311820106303)

in partial fulfillment for the award of the degree

of

BACHELOR OF ENGINEERING

IN

ELECTRONICS AND COMMUNICATION ENGINEERING

MOHAMED SATHAK A.J. COLLEGE OF ENGINEERING

ANNA UNIVERSITY: CHENNAI 600025

MAY 2024

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BONAFIDE CERTIFICATE

Certified that this project report **"Green Energy Harvesting: A Home Waste Management System with Biogas and Electricity Generation"** is the Bonafide work of N.CAROL PERSY(311820106007), S.SAFRIN(311820106018), R.GIRISH(311820106303) who carried out the project work under my supervision.

SIGNATURE

Mrs. E. JAYANTHI
HEAD OF THE DEPARTMENT

Electronics and Communication

Engineering

Mohamed Sathak A J College of
Engineering
Chennai

Tamil Nadu-603103

SIGNATURE

Mrs.J.AJEETHA THASEEM
AP/ECE

Electronics and communication

Engineering

Mohamed Sathak A J College of
Engineering
Chennai

Tamil Nadu-603103

Project Viva-Voce held on ___10|5|2024___

INTERNAL EXAMINER

EXTERNAL EXAMINER
16|05|24

II
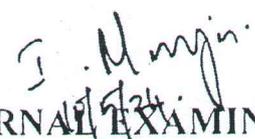
ABSTRACT

This project proposes a novel approach to harnessing electricity from food waste, addressing both environmental sustainability and energy production challenges. The hardware configuration comprises an IoT module for data collection and transmission, a mobile charging unit for accessibility, a DC-DC converter for voltage regulation, electrodes with an amplifier for energy generation, an LCD display for user feedback, a battery for energy storage, and a power supply unit for consistent operation. Food waste is a significant global issue, contributing to environmental pollution and greenhouse gas emissions. Converting this waste into electricity offers a dual benefit by reducing environmental impact and providing a renewable energy source. The IoT module facilitates real-time monitoring of energy generation and waste levels, allowing for efficient management and optimization. The mobile charging unit enables convenient access to the generated electricity, catering to diverse applications and users. The electrodes, coupled with the amplifier, extract energy from microbial activity in the decomposing food waste through microbial fuel cell technology. The DC-DC converter ensures stable voltage output compatible with various devices. The LCD display provides users with essential information such as energy output and system status. Overall, this project presents a sustainable solution for converting food waste into electricity.

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CHAPTER 5

CONCLUSION AND FUTURE WORK

The research on power generation from food waste utilizing electrodes, a DC-DC converter, a battery, and Node MCU has yielded promising results, showcasing the potential of harnessing energy from organic waste through microbial digestion. The integration of innovative technologies and real-time monitoring has opened avenues for sustainable energy solutions and waste management practices. Microbial Digestion as a Sustainable Energy Source. The study demonstrated the viability of microbial digestion as a sustainable energy source. The breakdown of food waste by microorganisms leads to the generation of electrons, forming the basis for voltage production. This eco-friendly process aligns with circular economy principles, offering an innovative approach to waste-to-energy initiatives. Steady Voltage Generation and Optimization Strategies The system exhibited consistent voltage generation, emphasizing the stability of the microbial digestion process. While the results are promising, further exploration into optimization strategies is essential. Adjusting microbial composition, waste input parameters, and environmental conditions could enhance voltage output, ensuring sustained and reliable energy production. Efficient DC-DC Conversion and Battery Storage. The DC-DC converter played a crucial role in regulating and converting the generated voltage, contributing to efficient energy harvesting. The charged battery acted

PRINCIPAL   85

Mohamed Sathak A.J. College of Engineering
No.34, Rajiv Gandhi Salai (OMR)
Sipcot - IT Highway Egatlur,
Chenai - 603103.

as a storage reservoir, providing a consistent energy supply. Ongoing research could focus on optimizing battery technologies to improve storage efficiency and overall system performance. Node MCU for Real-time Monitoring and System Optimization. The integration of Node MCU allowed real-time monitoring of key parameters, including temperature, pH levels, and microbial activity. The obtained data provided valuable insights into the microbial environment, facilitating ongoing system optimization. The significance of continuous monitoring cannot be overstated, as it ensures the system's long-term sustainability and effectiveness. Environmental and Economic Implications Harnessing energy from food waste carries significant environmental and economic implications. Addressing waste management challenges while simultaneously contributing to renewable energy generation reflects a holistic and sustainable approach. This technology has the potential to play a pivotal role in waste treatment facilities, decentralized energy systems, and regions facing energy poverty.

Challenges and Lessons Learned:

The research identified challenges, including variability in microbial activity and scalability issues. Understanding and addressing these challenges is crucial for the successful implementation of this technology. Lessons learned from this

study provide valuable insights for future endeavors, emphasizing the importance of adapting strategies to different waste compositions and environmental conditions.

FUTURE WORK:

1. Scalability and Large-Scale Deployment:

Future research should focus on scaling up the technology for larger applications. Investigating the scalability of the system and its integration into waste treatment facilities or community-based energy systems will be instrumental in assessing its real-world impact.

2. Advanced Monitoring and Machine Learning:

Enhancing real-time monitoring capabilities through advanced sensors and machine learning algorithms could further optimize system performance. Predictive analytics based on historical data could contribute to adaptive control mechanisms, improving energy yield and overall efficiency.

3. Integration with Existing Infrastructure:

Exploring opportunities for integrating the technology with existing waste

treatment infrastructure would facilitate seamless adoption. Collaborations with municipal waste management systems and pilot projects in partnership with relevant stakeholders could pave the way for practical implementation.

4. Technological Innovations in Electrodes and Batteries:

Continued research into technological innovations, particularly in electrode materials and battery technologies, is imperative. Advancements in these components could lead to improved energy conversion efficiency, longer battery life, and increased overall system reliability.

5. Environmental Impact Assessment:

Conducting comprehensive environmental impact assessments is crucial for evaluating the sustainability of the technology. Analyzing the life cycle assessment and potential environmental benefits and risks will contribute to a holistic understanding of the system's ecological footprint.

6. Community Engagement and Awareness:

Engaging with local communities and raising awareness about the benefits of power generation from food waste is essential for successful implementation. Community involvement can foster acceptance, promote sustainable practices, and ensure the technology's long-term viability.

In conclusion, the research on power generation from food waste using electrodes, a DC-DC converter, a battery, and Node MCU represents a significant step towards sustainable energy solutions and waste management practices. The promising results, coupled with ongoing advancements and future directions, position this technology as a valuable contributor to the transition towards cleaner and more resilient energy systems. The interdisciplinary nature of this research, combining microbiology, engineering, and real-time monitoring, holds immense potential for creating innovative and impactful solutions at the intersection of renewable energy and waste management.

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 real- time 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)

REFERENCES:
1. Lyla B.Das, "Embedded Systems : An Integrated Approach" Pearson Education, 2013.
2. Jonathan W.Valvano, "Embedded Microcomputer Systems Real Time Interfacing", Third Edition Cengage Learning, 2012.
3. David. E. Simon, "An Embedded Software Primer", 1st Edition, Fifth Impression, Addison- Wesley Professional, 2007.
4. Raymond J.A. Buhr, Donald L.Bailey, "An Introduction to Real-Time Systems- From Design to Networking with C/C++", Prentice Hall, 1999.
5. C.M. Krishna, Kang G. Shin, "Real-Time Systems", International Editions, Mc Graw Hill 1997
6. K.V.K.K.Prasad, "Embedded Real-Time Systems: Concepts, Design & Programming", Dream Tech Press, 2005.
7. Sriram V Iyer, Pankaj Gupta, "Embedded Real Time Systems Programming", Tata Mc Graw Hill, 2004.

PLANT LEAF DISEASE DETECTION USING IMAGE PROCESSING AND DEEP LEARNING

A PROJECT REPORT

Submitted by

S AMUDESHWARAN	**- 311820106005**
S KISHORE	**- 311820106011**
D KAMALI	**- 311820106305**
S P FOUZIA JABEEN	**- 311820106302**

In partial fulfilment for the award of the degree

of

BACHELOR OF ENGINEERING

IN

ELECTRONICS AND COMMUNICATION ENGINEERING

MOHAMED SATHAK A.J. COLLEGE OF ENGINEERING

ANNA UNIVERSITY: CHENNAI 600 025

MAY 2024

ANNA UNIVERSITY: CHENNAI 600 025

BONAFIDE CERTIFICATE

Certified that this project report "PLANT LEAF DISEASE DETECTION USING IMAGE PROCESSING AND DEEP LEARNING" is the Bonafide work of S. AMUDESHWARAN (311820106005), S. KISHORE (311820106011), D. KAMALI (311820106305), FOUZIA JABEEN (311820106302) who carried out the project work under my supervision.
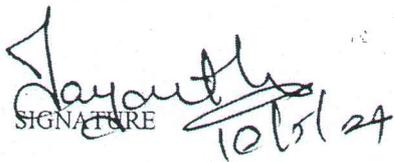
SIGNATURE

Mrs. E. Jayanthi M.E.
HEAD OF THE DEPARTMENT
ASSISTANT PROFESSOR

Electronics and Communication
Engineering.

Mohamed Sathak A J College of
Engineering, Chennai,
Tamil Nadu-603103.

SIGNATURE

Mrs. Dr. G. Sivaranjani M.E, Ph.D.
SUPERVISOR
ASSISTANT PROFESSOR

Electronics and communication
Engineering.

Mohamed Sathak A J College of
Engineering, Chennai,
Tamil Nadu-603103.

Project Viva-Voice held on 10|5|2024
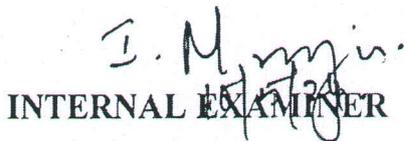
INTERNAL EXAMINER

EXTERNAL EXAMINER

1

ABSTRACT

Plants are the major source of food for all kinds of living beings. With the increase in population, it is now more important to keep this supply continue. To cop-up with suchhigh demand, it is very important keep the plants healthy from various kinds of diseases. The detection of disease is sometimes very difficult for even experienced farmers.Latest technologies like Deep Learning and Image Processing have made it significantly easy to detect and cure such plant diseases earlier to reduce loss. In this project, we proposed a system that is capable of detecting disease in leaf. We will be using back and forward propagation to train our neural network. Data set of resolution 250*250 images are being used in this project. Our goal is to find a suitable and efficient model that can predict the disease in the plant.For this project, we'll be using creating different models using Keras to develop different models and train them with the data set for various types of leaves taken fromdifferent plants. Data collected from various models then will be analyzed and an efficient model will be suggested.

PRINCIPAL
Mohamed Sathak A.J. College of Engineering
No.34, Rajiv Gandhi Salai (OMR)
Sipcot - IT Highway Egattur,
Chenai - 603103.

Chapter 5

Conclusion

Plant growth and health play a significant role in the economy in courtesies like India, where a huge sector of the population is dependent on agriculture. Due to many reasons like droughts, floods. Improper rain and other, a large part of crops got wasted. Since we can't control the natural factors we have to take proper care of our agriculture to minimize the losses and hence the plant health issue can't be ignored.

The system we have created can solve this problem to an extent. In our system, we have collected data set from various sources and plants. This data set is then divided into training, validation, and testing data sets. Then we developed a model that can takeRGB images as input and convert them to greyscale images to analyze them. We in total had made three models that can efficiently test the data. In our second approach we implemented the same program but this time our system can also analyze RGB images to provide better results.

Here are the results of our system:

	Training Accuracy	Validation Accuracy	Underfitting
Model 1	52.6%	74%	---
Model 2	95.6%	78%	Found
Model 3	93.6%	85.5%	Resolved
Model 1 (RGB)	89.19%	91.86%	---

Our first system consists of a single epoch and it has a training efficiency of ~52% which jumps to 95% in our second model which comprises 5 epochs. Then wedeveloped other models to obtain a better result. So, In this model, we increased the

57

number of hidden layers, the batch size is changed to 100 and for improving the training results epochs are changed to 10. The training accuracy in this model is obtained 95 % and validation accuracy is 85.5%.

Hence we concluded that model 3 is better from both the first and second models and has satisfactorily achieved the results for us. In this model, we also have solved the problem of underfitting which was observed in models 1 and 2. We have also observed that by increasing the depth of neural network underfitting can be removed significantly.

Then we created a model that can process the RGB images as well. This model consists of three epochs and this model has trained on ~6k samples and validated on ~650 samples. The results obtained on this model are very efficient, with a training accuracy of 89% and validation accuracy of 91%.

5.1 Future Scope

The system developed in this project has significantly produced the efficient results of data tested on the system. Further, In future versions, we will be thinking of adding some features like spot detection and shape/edge analysis of the image. As we all know the leaves are the place where photosynthesis takes place and hence helps a plant to make its food. A plant getting proper sunlight on their surface are more healthy. Hence the shape of leaves should be perfect to get proper sunlight.

In our feature, we are also seeking to implement a similar feature where we can test and analyze the shape of a leaf. For this, we can implement an edge detection feature that will be able to detect an edge deformity in the plant. In edge detection, we can usea canny edge detector to detect edges and it will also provide us with the control over the details that we would like to have over edges. To detect spots we can use a Blob detector which is very good in detecting the spots or sudden spikes in intensity.

EC8093	DIGITAL IMAGE PROCESSING	L	T	P	C
		3	0	0	3

OBJECTIVES:

- To become familiar with digital image fundamentals
- To get exposed to simple image enhancement techniques in Spatial and Frequency domain.
- To learn concepts of degradation function and restoration techniques.
- To study the image segmentation and representation techniques.
- To become familiar with image compression and recognition methods

UNIT I   DIGITAL IMAGE FUNDAMENTALS   9

Steps in Digital Image Processing – Components – Elements of Visual Perception – Image Sensing and Acquisition – Image Sampling and Quantization – Relationships between pixels - Color image fundamentals - RGB, HSI models, Two-dimensional mathematical preliminaries, 2D transforms - DFT, DCT.

UNIT II   IMAGE ENHANCEMENT   9

Spatial Domain: Gray level transformations – Histogram processing – Basics of Spatial Filtering–Smoothing and Sharpening Spatial Filtering, Frequency Domain: Introduction to Fourier Transform–Smoothing and Sharpening frequency domain filters – Ideal, Butterworth and Gaussian filters, Homomorphic filtering, Color image enhancement.

UNIT III   IMAGE RESTORATION   9

Image Restoration - degradation model, Properties, Noise models – Mean Filters – Order Statistics – Adaptive filters – Band reject Filters – Band pass Filters – Notch Filters – Optimum Notch Filtering – Inverse Filtering – Wiener filtering

UNIT IV   IMAGE SEGMENTATION   9

Edge detection, Edge linking via Hough transform – Thresholding - Region based segmentation – Region growing – Region splitting and merging – Morphological processing- erosion and dilation, Segmentation by morphological watersheds – basic concepts – Dam construction – Watershed segmentation algorithm.

UNIT V   IMAGE COMPRESSION AND RECOGNITION   9

Need for data compression, Huffman, Run Length Encoding, Shift codes, Arithmetic coding, JPEG standard, MPEG. Boundary representation, Boundary description, Fourier Descriptor, Regional Descriptors – Topological feature, Texture - Patterns and Pattern classes - Recognition based on matching.

TOTAL :45 PERIODS

OUTCOMES:

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

- Know and understand the basics and fundamentals of digital image processing, such as digitization, sampling, quantization, and 2D-transforms.
- Operate on images using the techniques of smoothing, sharpening and enhancement.
- Understand the restoration concepts and filtering techniques.
- Learn the basics of segmentation, features extraction, compression and recognition methods for color models.

TEXT BOOKS:

1. Rafael C. Gonzalez, Richard E. Woods, 'Digital Image Processing', Pearson, Third Edition, 2010.
2. Anil K. Jain, 'Fundamentals of Digital Image Processing', Pearson, 2002.

REFERENCES

1. Kenneth R. Castleman, 'Digital Image Processing', Pearson, 2006.
2. Rafael C. Gonzalez, Richard E. Woods, Steven Eddins, 'Digital Image Processing using MATLAB', Pearson Education, Inc., 2011.
3. D,E. Dudgeon and RM. Mersereau, 'Multidimensional Digital Signal Processing', Prentice Hall Professional Technical Reference, 1990.
4. William K. Pratt, 'Digital Image Processing', John Wiley, New York, 2002
5. Milan Sonka et al 'Image processing, analysis and machine vision', Brookes/Cole, Vikas Publishing House, 2nd edition, 1999.

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Mohamed Sathak A.J. College of Engineering
No.34, Rajiv Gandhi Salai (OMR)
Sipcot - IT Highway Egattur,
Chenai - 603103.

MOHAMED SATHAK A J COLLEGE OF ENGINEERING, Chennai - 603103

CONSOLIDATED INTERNSHIP FOR THE ACADEMIC YEAR - 2023 / 2024

Department of Electronics and Communication Engineering

S.No	Comapny name	Subject code & Subjects name related to the Internship
1	NLC INDIA LIMITED	BE8255 - Basic Electrical,Electronics & Measurement Engineering
2	ZOHO TECH'S	CS8251 - Programming in C
3	ZOHO TECH'S	CS8251 - Programming in C
4	THERMODYN EDUTECH	MG8591 - Principles of Management
5	UNICONVERGE Technologies Pvt Ltd	IT8601 - Computational Intelligence
6	Exposys Data Labs	CS8251 - Programming in C
7	ZOHO TECH'S	CS8251 - Programming in C
8	ZOHO TECH'S	CS8251 - Programming in C
9	Intern Pe	IT8501 - Web Technology
10	ZOHO TECH'S	CS8251 - Programming in C
11	ZOHO TECH'S	CS8251 - Programming in C
12	ZOHO TECH'S	CS8251 - Programming in C
13	THERMODYN EDUTECH	MG8591 - Principles of Management
14	THERMODYN EDUTECH	MG8591 - Principles of Management
15	Lenovo	EC8252 - Electron Devices
16	Lenovo	EC8252 - Electron Devices
17	Lenovo	EC8252 - Electron Devices
18	Lenovo	EC8252 - Electron Devices
19	Lenovo	EC8252 - Electron Devices
20	Lenovo	EC8252 - Electron Devices
21	Lenovo	EC8252 - Electron Devices

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No.34, Rajiv Gandhi Salai (OMR)
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upSkill CAMPUS

Certificate of Internship

This certificate is presented to

Assifa A

in recognition of his/her efforts and achievement for successfully completing the internship program in

Internet Of Things

from 15th JUNE 2023 to 30th JULY 2023.

We wish him/her best of luck for all the future endeavours

PRINCIPAL
Mohamed Sathak A.J. College of Engineering
No.34, Rajiv Gandhi Salai (OMR)
Sipcot - IT Highway Egattur,
Chennai - 603103.

UNICONVERGE TECHNOLOGIES PVT.LTD
NOIDA

Authorized Signatory

Certification ID: USC318643TIA

Issue Date: 1st AUGUST 2023

ThermoDyn
Harte Arbeit

THERMODYN EDUTECH

Date: 29.07.2023

TO WHOM EVER IT MAY CONCERN

This is to certify that **Mr.SYED AFRID**
Reg.No: 311821106035 pursuing Bachelor of Electronics and Communication
Engineering in Mohamed Sathak AJ College ofEngineering, Chennai has
successfully completedan Internship from 05/07/2023 TO 29/07/2023. During
this period his characterand conduct was good.

For THERMODYN EDUTECH

Director

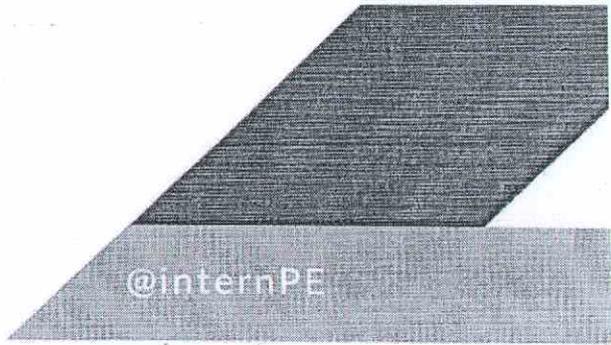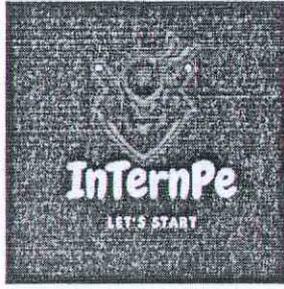**PRINCIPAL**
Mohamed Sathak A.J. College of Engineering
No.34, Rajiv Gandhi Salai (OMR)
Sipcot - IT Highway Egattur,
Chenai - 603103.

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Harte Arbeit

THERMODYN EDUTECH

Date: 29.07.2023

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This is to certify that **Ms.G.SOWNDHARYA**
Reg.No: 311821106031 pursuing Bachelor of Electronics and Communication
Engineering in Mohamed Sathak AJ College ofEngineering, Chennai has
successfully completedan Internship from 05/07/2023 TO 29/07/2023. During
this period his characterand conduct was good.

For THERMODYN EDUTECH

Director

PRINCIPAL
Mohamed Sathak A.J. College of Engineering
No.34, Rajiv Gandhi Salai (OMR)
Sipcot - IT Highway Egattur,
Chenai - 603103.

ZOHOTECH'S

Training & Placement Services

Certificate of Completion

We hereby certify that **Safia farheen ZR (Reg.No 311821106027)** pursuing his/her **BE-ECE** at **Mohamed Sathak A.J. College of Engineering Chennai** successfully completed his/her internship in our organization, the period of internship is from. **July 03-2023 to July 20-2023**. His/her has shown keen interest in **Java with Angular UI Development**. His/her attendance and conduct was good during the training period.

We wish his/her all the best towards his/her academic and professional career.

Nandhinee S

Nandhinee S

Director of Training.

Zohotech's Services.

PRINCIPAL
Mohamed Sathak A.J. College of Engineering
No.34, Rajiv Gandhi Salai (OMR)
Sipcot - IT Highway Egattur,
Chenai - 603103.

Zohotech's Placement Services

No.44 1st Floor, Mahalakshmi Nagar, Kanchipuram High Road, Chengalpet 603101.

Email: info@zohotechs.com Phone: +91 85085 85683

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We hereby certify that **S.Pavithra (Reg.No 311821106025)** pursuing his/her **BE-ECE** at **Mohamed Sathak A.J. College of Engineering Chennai** successfully completed his/her internship in our organization, the period of internship is from. **July 03-2023 to July 20-2023**. His/her has shown keen interest in **Java with Angular UI Development**. His/her attendance and conduct was good during the training period.

We wish his/her all the best towards his/her academic and professional career.

Nandhinee S

Nandhinee S
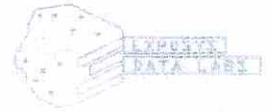Director of Training.
Zohotech's Services.

PRINCIPAL
Mohamed Sathak A.J. College of Engineering
No.34, Rajiv Gandhi Salai (OMR)
Sipcot - IT Highway Egattur,
Chenai - 603103.

Zohotech's Placement Services

No.44 1st Floor, Mahalakshmi Nagar, Kanchipuram High Road, Chengalpet 603101.

Email: info@zohotechs.com **Phone**: +91 85085 85683

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We hereby certify that **S.Chithra (Reg.No 311821106007)** pursuing his/her **BE-ECE** at **Mohamed Sathak A.J. College of Engineering Chennai** successfully completed his/her internship in our organization, the period of internship is from. **July 03-2023 to July 20-2023**. His/her has shown keen interest in **Java with Angular UI Development**. His/her attendance and conduct was good during the training period.

We wish his/her all the best towards his/her academic and professional career.

Nandhinee S

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Nandhinee S
Director of Training.
Zohotech's Services.

PRINCIPAL
Mohamed Sathak A.J. College of Engineering
No.34, Rajiv Gandhi Salai (OMR)
Sipcot - IT Highway Egattur,
Chenai - 603103.

Zohotech's Placement Services

No.44 1st Floor, Mahalakshmi Nagar, Kanchipuram High Road, Chengalpet 603101.

Email: info@zohotechs.com Phone: +91 85085 85683

InTernPe
LET'S START

COMPLETION CERTIFICATE

CID : IPIA#2641

To whomever it may concern

This is to certify that **Poosathishkumar M** worked as an Intern in our company from **24-July-2023** to **20-Aug-2023**.

Please find the internship details below:

Company Name: InternPe
Location: Remote
Domain: Web Development
Designation: Intern

During their working period, we found him/her to be a sincere and dedicated intern with a professional attitude and very good knowledge of the job.

We thank him/her for their efforts and contribution and wish him/her the best in future endeavors.

Yours Sincerely

(Co-Founder)
InternPe

PRINCIPAL
Mohamed Sathak A.J. College of Engineering
No.34, Rajiv Gandhi Salai (OMR)
Sipcot - IT Highway Egaitcir,
Chenai - 603103.

InternPe

Registered By MSME

ZOHOTECH'S

Certificate of Completion

We hereby certify that **Asma Fathima.P.T (Reg.No 311821106005)** pursuing his/her **BE-ECE** at **Mohamed Sathak A.J. College of Engineering Chennai** successfully completed his/her internship in our organization, the period of internship is from. **July 03-2023 to July 20-2023**. His/her has shown keen interest in **Java with Angular UI Development**. His/her attendance and conduct was good during the training period.

We wish his/her all the best towards his/her academic and professional career.

Nandhinee S

Nandhinee S

Director of Training.

Zohotech's Services.

PRINCIPAL
Mohamed Sathak A.J. College of Engineering
No.34, Rajiv Gandhi Salai (OMR)
Sipcot - IT Highway Egattur,
Chenai - 603103.

Zohotech's Placement Services

No.44 1st Floor, Mahalakshmi Nagar, Kanchipuram High Road, Chengalpet 603101.

Email: info@zohotechs.com Phone: +91 85085 85683

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We hereby certify that **N.I Mohamed Yahya (Reg.No 311821106019)** pursuing his/her **BE-ECE** at **Mohamed Sathak A.J. College of Engineering Chennai** successfully completed his/her internship in our organization, the period of internship is from. **July 03-2023 to July 20-2023**. His/her has shown keen interest in **Java with Angular UI Development**. His/her attendance and conduct was good during the training period.

We wish his/her all the best towards his/her academic and professional career.

Nandhinee S

_____

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Director of Training.
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Mohamed Sathak A.J. College of Engineering
No.34, Rajiv Gandhi Salai (OMR)
Sipcot - IT Highway Egattur,
Chenai - 603103.

Exposys
Data Labs

Certificate of Internship

<u>**TO WHOM IT MAY CONCERN**</u>

This is to certify that **Mr. K SHAHRUKH FAKRUDEEN** has completed internship programme on **"Web Developer"** from 08.04.2023 to 07.05.2023.

He took keen interest in the work assigned and successfully completed it. During the period of internship, we found him to be punctual, hardworking and inquisitive.

We wish him luck and success in all his future endeavours.

Y Vishnuvardhan

Chief Director

PRINCIPAL
Mohamed Sathak A.J. College of Engineering
No.34, Rajiv Gandhi Salai (OMR)
Sipcot - IT Highway Egattur,
Chenai - 603103.

hr@exposysdata.com
www.exposysdata.com

THERMODYN EDUTECH

Date: 29.07.2023

TO WHOM EVER IT MAY CONCERN

This is to certify that **Ms.K.NANDHINI**
Reg.No: 311821106024 pursuing Bachelor of Electronics and Communication Engineering in Mohamed Sathak AJ College ofEngineering, Chennai has successfully completedan Internship from 05/07/2023 TO 29/07/2023. During this period his characterand conduct was good.

For THERMODYN EDUTECH

Director

PRINCIPAL
Mohamed Sathak A.J. College of Engineering
No.34, Rajiv Gandhi Salai (OMR)
Sipcot - IT Highway Egattur,
Chenai - 603103.

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We hereby certify that **Humaira Nusrath (Reg.No 311821106013)** pursuing his/her **BE-ECE** at **Mohamed Sathak A.J. College of Engineering Chennai** successfully completed his/her internship in our organization, the period of internship is from. **July 03-2023 to July 20-2023**. His/her has shown keen interest in **Java with Angular UI Development**. His/her attendance and conduct was good during the training period.

We wish his/her all the best towards his/her academic and professional career.

Nandhinee S

_____

Nandhinee S
Director of Training.
Zohotech's Services.

PRINCIPAL
Mohamed Sathak A.J. College of Engineering
No.34, Rajiv Gandhi Salai (OMR)
Sipcot - IT Highway Egattur;
Chenai - 603103.

ZOHOTECH'S

Certificate of Completion

We hereby certify that **Bhavani.H (Reg.No 311821106006)** pursuing his/her **BE-ECE** at **Mohamed Sathak A.J. College of Engineering Chennai** successfully completed his/her internship in our organization, the period of internship is from. **July 03-2023 to July 20-2023**. His/her has shown keen interest in **Java with Angular UI Development**. His/her attendance and conduct was good during the training period.

We wish his/her all the best towards his/her academic and professional career.

Nandhinee S

_____

Nandhinee S

Director of Training.

Zohotech's Services.

PRINCIPAL
Mohamed Sathak A.J. College of Engineering
No.34, Rajiv Gandhi Salai (OMR)
Sipcot - IT Highway Egattur,
Chenai - 603103.

Zohotech's Placement Services

No.44 1st Floor, Mahalakshmi Nagar, Kanchipuram High Road, Chengalpet 603101.

Email: info@zohotechs.com Phone: +91 85085 85683

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NEYVELI – 607 802, TAMIL NADU

CERTIFICATE

This is to certify that
ABINAYA V

Studying BACHELOR OF ENGINEERING in
ELECTRONICS AND COMMUNICATION at

**MOHAMED SATHAK A J COLLEGE OF ENGINEERING,
SIRUSERI, CHENNAI**

Has undergone Internship Training on
"STUDY OF TELECOMMUNICATION BASICS"
During the period from **22.06.2023** to **19.07.2023** at

**THERMAL POWER STATION – II EXPANSION
NLC INDIA LIMITED, NEYVELI**

19.7.23
(CHIEF MANAGER
LEARNING AND DEVELOPMENT CENTRE
NLC INDIA LIMITED,
Chief Manager
Learning & Development Centre
NLC India Limited, Neyveli-3.

DATE: 19.07.2023
PLACE: NEYVELI

Training adding Value to life

PRINCIPAL
Mohamed Sathak A.J. College of Engineering
No.34, Rajiv Gandhi Salai (OMR)
Sipcot - IT Highway Egattur,
Chenai - 603103.
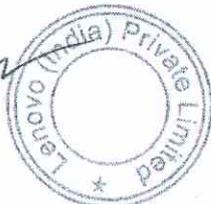
09.06.2023

CERTIFICATE OF IN-PLANT TRAINING

This is to certify that **Mr. MOHAMMED RIYAZ J** student at **MOHAMED SATHAK A.J. COLLEGE OF ENGINEERING** has undergone **5 DAYS** In-Plant Training in Manufacturing Operations during the month of **May'2023**.
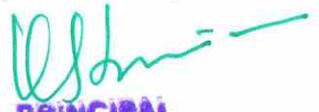
He has displayed professional acumen during the period of In-plant Training and we appreciate his interest in learning.

We wish him all success in his future endeavours.

For Lenovo (India) Pvt. Ltd.

PRINCIPAL
Mohamed Sathak A.J. College of Engineering
No.34, Rajiv Gandhi Salai (OMR)
Sipcot - IT Highway Egattur,
Chenai - 603103.

Authorized Signatory

09.06.2023

CERTIFICATE OF IN-PLANT TRAINING

This is to certify that **Mr. KARANRAJ R** student at **MOHAMED SATHAK A.J. COLLEGE OF ENGINEERING** has undergone **9 DAYS** In-Plant Training in Manufacturing Operations during the month of **May'2023**.

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

We wish him all success in his future endeavours.

For Lenovo (India) Pvt. Ltd.

PRINCIPAL
Mohamed Sathak A.J. College of Engineering
No.34, Rajiv Gandhi Salai (OMR)
Sipcot - IT Highway Egattur,
Chenai - 603103.

Authorized Signatory

09.06.2023

CERTIFICATE OF IN-PLANT TRAINING

This is to certify that **Mr. KARTHIK S** student at **MOHAMED SATHAK A.J. COLLEGE OF ENGINEERING** has undergone **9 DAYS** In-Plant Training in Manufacturing Operations during the month of **May'2023**.

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

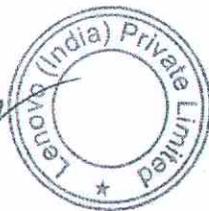We wish him all success in his future endeavours.

For Lenovo (India) Pvt. Ltd.

PRINCIPAL
Mohamed Sathak A.J. College of Engineering
No.34, Rajiv Gandhi Salai (OMR)
Sipcot - IT Highway Egattur,
Chenai - 603103.

Authorized Signatory

09.06.2023

CERTIFICATE OF IN-PLANT TRAINING

This is to certify that **Mr. MOHAMMED SABIR S** student at **MOHAMED SATHAK A.J. COLLEGE OF ENGINEERING** has undergone **9 DAYS** In-Plant Training in Manufacturing Operations during the month of **May'2023**.

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

We wish him all success in his future endeavours.

For Lenovo (India) Pvt. Ltd.

PRINCIPAL
Mohamed Sathak A.J. College of Engineering
No.34, Rajiv Gandhi Salai (OMR)
Sipcot - IT Highway Egattur,
Chenal - 603103.

Authorized Signatory

09.06.2023

CERTIFICATE OF IN-PLANT TRAINING

This is to certify that **Mr. MOHAMED SUHAIL J** student at **MOHAMED SATHAK A.J. COLLEGE OF ENGINEERING** has undergone **9 DAYS** In-Plant Training in Manufacturing Operations during the month of **May'2023**.

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

We wish him all success in his future endeavours.

For Lenovo (India) Pvt. Ltd.

PRINCIPAL
Mohamed Sathak A.J. College of Engineering
No.34, Rajiv Gandhi Salai (OMR)
Sipcot - IT Highway Egattur,
Chenai - 603103.

Authorized Signatory
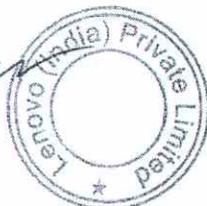
09.06.2023

CERTIFICATE OF IN-PLANT TRAINING

This is to certify that **Mr. MOHAMED THOUFIQ M** student at **MOHAMED SATHAK A.J. COLLEGE OF ENGINEERING** has undergone **10 DAYS** In-Plant Training in Manufacturing Operations during the month of **May'2023**.

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

We wish him all success in his future endeavours.

For Lenovo (India) Pvt. Ltd.

PRINCIPAL
Mohamed Sathak A.J. College of Engineering
No.34, Rajiv Gandhi Salai (OMR)
Sipcot - IT Highway Egattur,
Chenai - 603103.

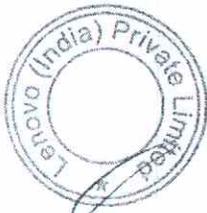**Authorized Signatory**

07.07.2023

CERTIFICATE OF IN-PLANT TRAINING

This is to certify that **Mr. YESHWANTH M** student at **MOHAMED SATHAK AJ COLLEGE OF ENGINEERING** has undergone In-Plant Training in Manufacturing Operations for the period from **06.06.2023** to **30.06.2023**.

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

We wish him all success in his future endeavours.

For Lenovo (India) Pvt. Ltd.

Authorized Signatory

PRINCIPAL
Mohamed Sathak A.J. College of Engineering
No.34, Rajiv Gandhi Salai (OMR)
Sipcot - IT Highway Egattur,
Chenai - 603103.