A Minor Project Report on

AUTOMATIC RAIN SENSING CAR WIPER SYSTEM

UNDER THE GUIDANCE OF

Mr.PL.SOMASUNDARAM (AP/EEE)

Submitted by

ABINAYA . P	**(20BEE4001)**
DHARUNISH.A.P	**(20BEE4015)**
SANTHOSH.K	**(20BEE4079)**

DEPARTMENT OF ELECTRICAL AND ELECTRONICSENGINEERING

ENGINEERING M.KUMARASAMY COLLEGE OF ENGINEERING

(An Autonomous Institution Affiliated to Anna University, Chennai)

KARUR-639113

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M.KUMARASAMY COLLEGE OF ENGINEERING

(Autonomous Institution affiliated to Anna University, Chennai)

BONAFIDE CERTIFICATE

Certified that this report titled **"AUTOMATIC RAIN SENSING CAR WIPER SYSTEM"** is the bonafide work of **ABINAYA.P (20BEE4001) , DHARUNISH.A.P (20BEE4015) , SANTHOSH.K (20BEE4079)** out the work during the academic year (2021-2022) under my supervision. Certified further that to the best of my knowledge the work reported herein does not form part of any other project report.

HEAD OF THE DEPARTMENT

Dr.C.Kumar M.E., Ph.D.

Professor & Head
Department of Electrical and Electronics
Engineering,
M.Kumarasamy College of Engineering,
Karur-639113

SUPERVISOR

Mr.PL.Somasundaram M.E.,

Assistant Professor,
Department of Electrical and Electronics Engineering,
M.Kumarasamy College of Engineering,
Karur-639113

Submitted for Minor project I (18EEP201L) Viva-Voice examination held at M.Kumarasamy College of Engineering,Karur-639113 on ………………..

DECLARATION

We affirm that the Minor Project report titled **"AUTOMATIC RAIN SENSING CAR WIPER SYSTEM"** being submitted in partial fulfillment for the award of **Bachelor of Engineering** in **Electrical and Electronics Engineering**, is the original work carried out by us.

Student Name	Signature
ABINAYA P	
DHARUNISH A P	
SANTHOSH K	

VISION AND MISSION OF THE INSTITUTION

VISION

- To emerge as a leader among the top institutions in the field of technical education

MISSION

- Produce smart technocrats with empirical knowledge who can surmount the global challenges.

- Create a diverse, fully-engaged, learner-centric campus environment to provide quality education to the students.

- Maintain mutually beneficial partnerships with our alumni, industry and professional associations.

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

VISION

- To produce smart and dynamic professionals with profound theoretical and practical knowledge comparable with the best in the field.

MISSION

- Produce hi-tech professionals in the field of Electrical and Electronics Engineering by inculcating core knowledge.
- Produce highly competent professionals with thrust on research.
- Provide personalized training to the students for enriching their skills.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

- **PEO1:** Graduates will have flourishing career in the core areas of Electrical Engineering and allied disciplines.
- **PEO2:** Graduates will pursue higher studies and succeed in academic/research careers.
- **PEO3:** Graduates will be a successful entrepreneur in creating jobs related to Electrical and Electronics Engineering /allied disciplines.
- **PEO4:** Graduates will practice ethics and have habit of continuous learning for their success in the chosen career.

PROGRAM OUTCOMES (POs)

After the successful completion of the B.E. Electrical and Electronics Engineering degree program, the students will be able to:

PO1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO 9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write

effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11: Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSOs)

The following are the program specific outcomes of Engineering Students:

PSO1: Apply the basic concepts of mathematics and science to analyse and design circuits, controls, Electrical machines and drives to solve complex problems.

PSO2: Apply relevant models, resources and emerging tools and techniques to provide solutions to power and energy related issues & challenges.

PSO3: Design, Develop and implement methods and concepts to facilitate solutions for electrical and electronics engineering related real-world problems.

ACKNOWLEDGEMENT

Our sincere thanks to **Thiru.M.Kumarasamy, Chairman** and **Dr.K.Ramakrishnan, M.E., Ph.D** of **M.Kumarasamy College of Engineering** for providing extra ordinary infrastructure, which helped us to complete the Minor project in time.

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We would like to express my deep gratitude to our Minor Project Guide **Mr.PL.Somasundaram Assistant Professor, Department of Electrical and Electronics Engineering,** for his/her constant encouragement, kind co-operation, valuable suggestions and support rendered in making our project a success.

We glad to thank all the **Faculty Members** of **Department of Electrical and Electronics Engineering** for extending a warm helping hand and valuable suggestions throughout the project.

Words are boundless to thank **Our Parents and Friends** for their constant encouragement to complete this Minor project successfully.

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ABSTRACT

- Today's car wipers are manual systems that work on the principle of manual switching. So, here an automatic wiper system that automatically switches ON by detecting rain and stops when rain stops.

- This project brings forward this system to automate the wiper system having no need for manual intervention.

- For this purpose we use rain sensor along with microcontroller and driver IC drive the wiper motor.

- This system uses rain sensor to detect rain, this signal is then processed by microcontroller to take the desired action.

- The rain sensor works on the principle of using water for completing its circuit, so when rain falls on it the circuit gets completed and sends out a signal to the microcontroller.

- The microcontroller now processes this data and drives the motor IC to perform required action. The driver motor IC now drives a servomotor to stimulate as a car wiper.

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LIST OF ABBREVIATIONS

S.No	ABBREVIATION	EXPANSION
1.	IC	Integrated Circuit
2.	GPRS	General Packet Radio Service
3.	MCU	Micro – Controller Unit
4.	PWU	Pulse with Modulation
5.	AC	Alternate Current
6.	DC	Direct Current
7.	LCD	Liquid Crystal Display

CHAPTER 1

INTRODUCTION

1.1 Introduction

We have pleasure in introduction our new project "*AUTOMATIC RAIN SENSING CAR WIPER SYSTEM*", which is fully equipped by sensors circuit and wiper motor. It is a genuine project which is fully equipped and designed for Automobile vehicles. This forms an integral part of best quality. This is an era of automation where it is broadly defined as replacement of manual effort mechanical power in all degrees of automation. In semi automation a combination of manual effort and mechanical power is required whereas in full automation human participation is very negligible.

1.2 Necessity

In the present automobiles the number of facilities is much higher. The driver has to concentrate on road while driving and with increased traffic, things get frustrating. The features in the car like GPRS to trace the route, music system, air condition system etc may drive away the attention of the driver. Thus an effort has been made to reduce the effort put by driver in controlling the speed of the wiper and put more concentration on his driving and it avoids the accidents. Since this system is put into use in many higher end cars and has been successfully working.

1.3 Scope of the work

Using more appropriate rain sensor , we can make more precise automatic wiper system. By adding microcontroller based system , we can implement some security features for automobiles. Using microcontroller we can make this project more effective as it will enable the wiper rotate through 180 angle rather than 360. We can use a capacitance sensor which will enable it work along line of sight. The speed controlling mechanism can be added in this project which will make it work according to the intensity and speed of water coming on the sensor.

CHAPTER 2

SYSTEM MODEL

2.1 Introduction

Many works had been done by researchers to design and implement cheap and efficient automatic car wipers. This will make the device to be affordable to all and sundry and also reduce auto accidents related to the use of wipers. Automatic wiper using rain sensor, servo motor and arduino uno microcontroller was design by Kalra et all (2020). The wiper which triggers automatically as it rain sensor detects rainfall on the windscreen, the design also incorporated the lcd that displays the intensity of the rainfall to the driver.
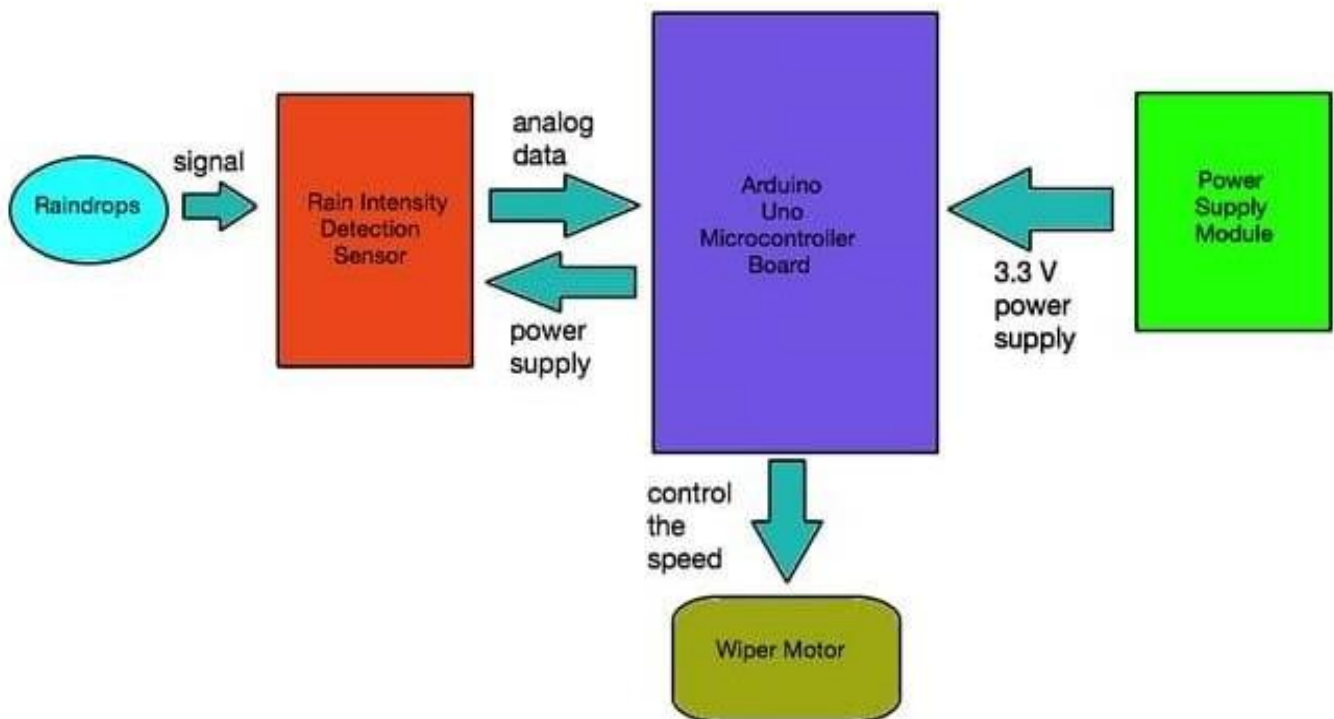
2.2 Block Diagram

Figure 2.1 Block diagram of the system

2.3 DESCRIPTION OF VARIOUS BLOCKS

RAIN INTENSITY DETECTION SENSOR

Rain Intensity Detection Sensor detects the rain droplets fall on the windshield of the automobiles. The function of this sensor is to detects the rainfall droplets and to measure the intensity of rainfall. Then it gives analog data to the Arduino uno microcontroller.

WIPER (OR) SERVO MOTOR

Servo Motor is used for controlling the wiper movements. A rain intensity detection sensor Which is also connected with MCU measures the intensity of rainfall and transmits signal to the microcontroller will adjust the speed of the wiper motor. Servo motor is controlled by generating Pulse with Modulation (PWU) through control wires. Servo motor can turn 90 degree from either direction form its neutral position.

ARDUINO UNO

Arduino UNO is the major component of this project because it acts as a control unit for this total project. AtMega328 microcontroller is the brain of this Arduino. This control unit consists of 14 digital input / output pins and 6 analog input pins. The major role of role of this Arduino is to control both the rain intensity detection sensor and servo motor by transmitting the signal through it.

POWER SUPPLY MODULE

The input power was given through an adapter then 230 V AC mains passes through the transformer to convert voltage from medium to another. Next the supply goes through rectifier to convert AC to DC. And then smoothing process takes place and it moves through regulator and 5V regulated DC supply pass throughout the circuit.

CHAPTER 3

HARDWARE DESCRIPTION

3.1 Introduction

Lohith et al (2017), designed a smart arduino based vehicle automatic wiper using a cuboid rain sensor incorporated with a blower to blow away water droplets on the rain sensor. This will eliminate the problem of false rain sensing by the sensor when water droplets fall on it. Das et all (2021) implemented a model wiper with rain sensor and controlled by AT89C51 Microcontroller that senses rains and automatically switches on the wiper and adjusts its speed according to the intensity of the rain. As the intensity of the rain increases, the speed of the wiper increases to a certain level. A system that successfully monitors the water content of the glass using the water sensor and also regulates the speed of wiper motor using servo motor was designed by Anshumali and Bhattacharya (2019). The Sensor values were successfully tested using reading through LCD module and if the motor suddenly stops, the stop message sent to the Arduino.

3.2 Circuit diagram
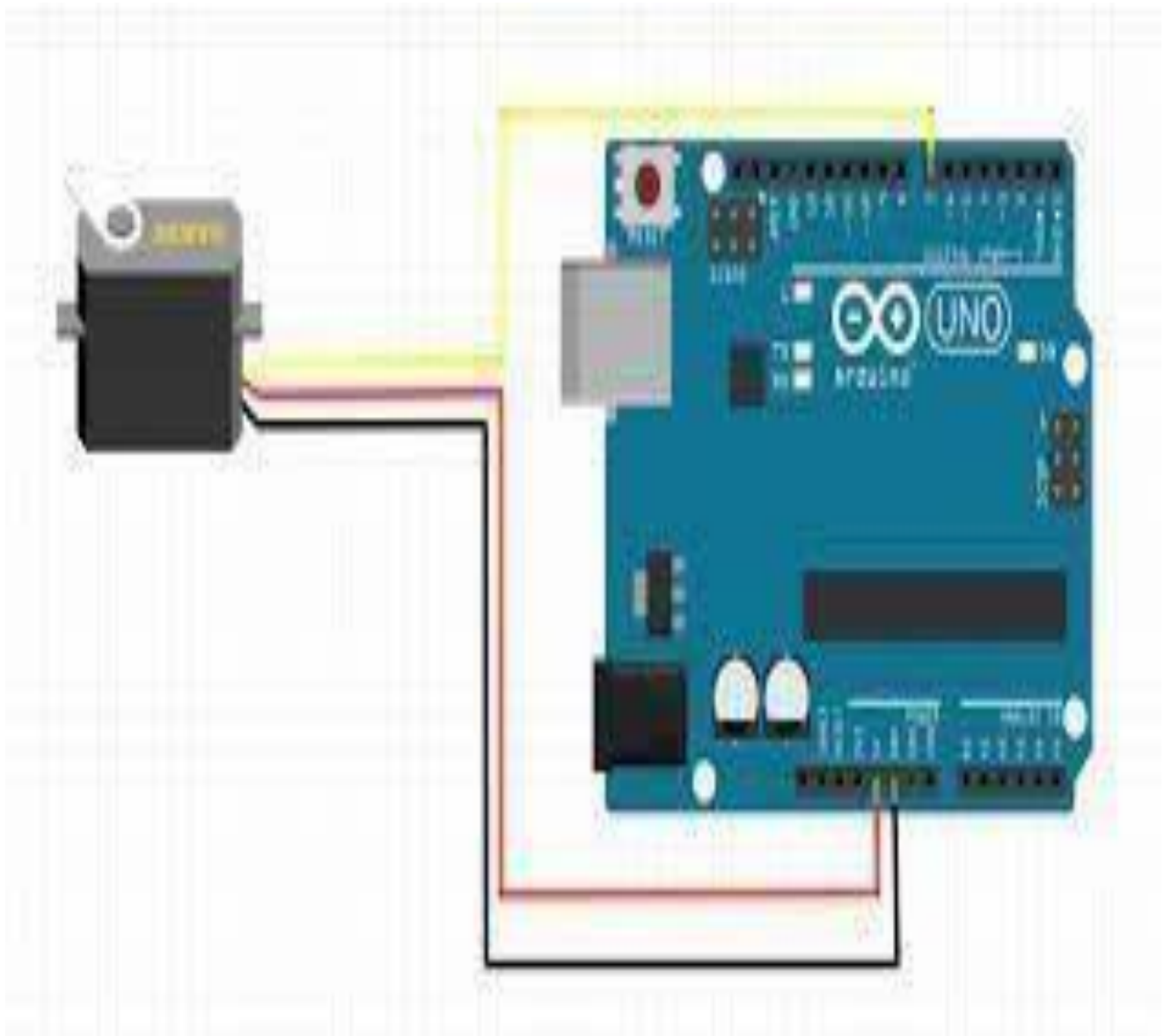
Figure 3.1 Circuit diagram of the system

3.3 Hardware Components

S.No	Components Used	No.	Cost in Rs.
1	Arduino UNO	1	Rs.885
2	Servo motor	1	Rs.175
3	Rain sensing module	1	Rs.165
4	Input power supply adapter	1	Rs.275

TOTAL   =   1500

Table 3.1 Hardware Components and its Cost

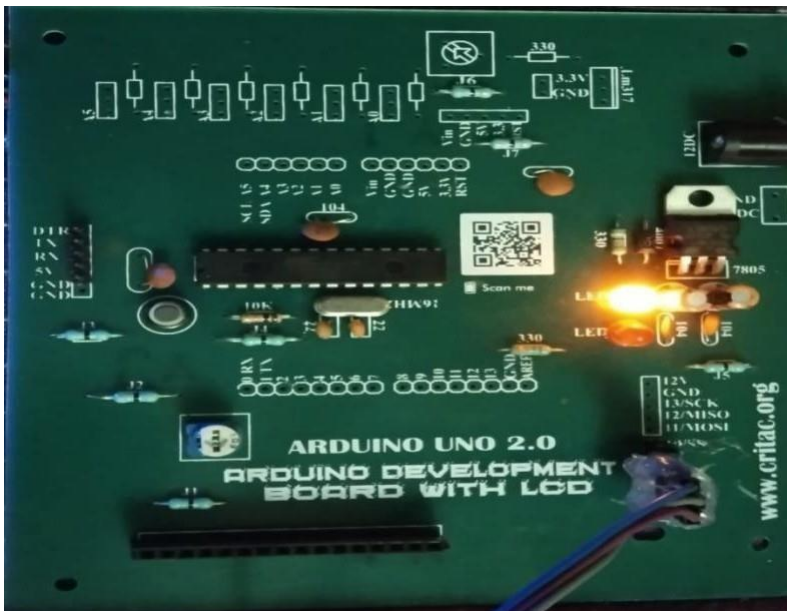# CHAPTER 4

RESULT AND DISCUSSION

4.1 Hardware Implementation

Figure 4.1 Experimental Setup

4.2 Working of Project model

❖ The servo motor takes the signal in the form of pulse width modulation, which is the representation of the intensity of the rain drops.

❖ The servo motor will then rotate the wiper in accordance with the signal given by the Arduino The rain sensor will be placed on the vehicle front glass.

❖ Whenever the droplets of the rain on the rain sensor, it will sense the rainfall and send Arduino the necessary information for the process to carry on.

❖ The Arduino module will estimate the intensity of rain fall by manipulating the signal given by the rain sensor module and then process the signal according to the rain fall.

❖ If the water on the sensor are few drops, the sensor will be activated by the microcontroller and blow the droplets away from the screen while the servo motor is in the off mode.

❖ As the intensity of the rainfall increases, the blower is switched off while the servo motor is switched on by the microcontroller.

❖ The servo motor will then rotate the wiper in accordance with the signal given by the Arduino module.

❖ The wiper will rotate in accordance with the intensity of the rain fall. For instance, if the rain fall intensity is very high the pulse width modulation will be high and hence the servo motor will drive the wiper speedily and if the rain fall intensity is low then wiper will rotate slowly.

❖ The rain sensor, servo motor and other required components will be powered by the battery.

CHAPTER 5

CONCLUSION AND FUTURE SCOPE

5.1 CONCLUSION

Proper vision is very important to the automobile drivers during heavy rainfall. Automatic wipers do not only reduce the stress of operation for the drivers but also prevent distractions which might cause accident and makes driving more comfortable during heavy rainfall. The proposed system designed will operate without interference of the driver during rainfall. It is also cheap and affordable system as this will encourage many automobile vehicle owners to acquire the system. This will also reduce accidents related to the use of wipers on the roads.

5.2 Future Scope

Using more appropriate rain sensor , we can make more precise automatic wiper system. By adding microcontroller based system , we can implement some security features for automobiles. Using microcontroller we can make this project more effective as it will enable the wiper rotate through 180 angle rather than 360. We can use a capacitance sensor which will enable it work along line of sight. The speed controlling mechanism can be added in this project which will make it work according to the intensity and speed of water coming on the sensor.

5.3 Applications

- ✓ It is used in four wheeler
- ✓ It is used in aircraft
- ✓ It is used in train
- ✓ It is used in six wheeler

REFERENCES

CONTENT SOURCE

https://www.electronicshub.org/portable-ultrasonic-range-meter/

VIDEO SOURCE

https://youtu.be/yG9Ioo7d2I4

PARTICIPATION CERTIFICATE IN NATATIONAL LEVEL PROJECT

IET The Institution of
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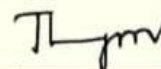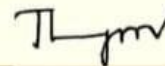### CERTIFICATE OF PARTICIPATION
THIS CERTIFICATE IS AWARDED TO

SANTHOSH K

For participating in **National level Project
presentation – PUROJEKUTO 2k21** held on
Nov 1, 2021.

Dr. A. SHEELA
HOD - EEE

Dr. T. LOGESWARAN
IET ONCAMPUS - FACULTY
INCHARGE