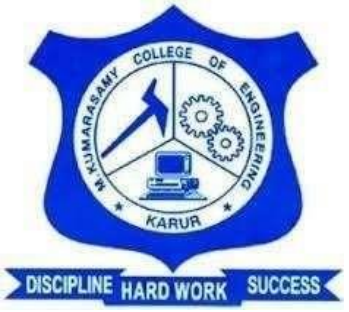
M.KUMARASAMY
COLLEGE OF ENGINEERING
NAAC Accredited Autonomous Institution
Approved by AICTE & Affiliated to Anna University
ISO 9001:2015 Certified Institution
Thalavapalayam, Karur – 639 113.

A Minor Project Report
on

STREET LIGHT FAULT DETECTOR WITH GPS TRACKING SYSTEM

Submitted by

ABISHEK.B	**(927622BEE002)**
DEVADHARSHINI.R	**(927622BEE019)**
KISHORE.N	**(927622BEE059)**



DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

M.KUMARASAMY COLLEGE OF ENGINEERING

(An Autonomous Institution Affiliated to Anna University, Chennai)

THALAVAPALAYAM, KARUR-639113.

MAY 2024

M.KUMARASAMY COLLEGE OF ENGINEERING

(Autonomous Institution, Affiliated to Anna University, Chennai)

BONAFIDE CERTIFICATE

Certified that this Report titled **"STREET LIGHT FAULT DETECTOR WITH GPS TRACKING SYSTEM"** is the Bonafide work of **ABISHEK B (927622BEE002), DEVADHARSHINI R (927622BEE019), KISHORE N (927622BEE059),** who carried out the work during the academic year (2023-2024) 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.

SIGNATURE OF THE SUPERVISOR

Ms. B. Sharmiladevi M.E.,
Assistant Professor
Department of Electrical and Electronics Engineering
M. Kumarasamy College of Engineering, Karur

SIGNATURE OF THE HEAD OF THE DEPARTMENT

Dr. J. Uma M.E., Ph.D.,
Professor& Head
Department of Electrical and Electronics Engineering
M. Kumarasamy College of Engineering, Karur

Submitted for Minor Project II (18EEP202L) viva-voce Examination held at M. Kumarasamy College of Engineering, Karur-639113 on ……...

DECLARATION

We affirm that the Minor Project II report titled "**STREET LIGHT FAULT DETECTOR WITH GPS TRACKING 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.

REG.NO	STUDENT NAME	SIGNATURE
927622BEE002	**ABISHEK B**	**----------**
927622BEE019	**DEVADHARSHINI R**	**----------**
927622BEE059	**KISHORE N**	**----------**

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.

PROGRAMME EDUCATIONAL OBJECTIVES(PEOs)

- ✓ **PEO1:** Graduates will have flourishing career in the core areas of Electrical Engineering and also 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.

PROGRAMME 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 in formed 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.

PO9: Individual and Team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multi-disciplinary 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 multi-disciplinary 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.

Abstract (Key Words)	**Mapping of POs and PSOs**
GSM , GPS , Voltage Sensor , Current Sensor , Relay , Lamp , pic 16f688	PO1,PO2,PO3,PO4,PO5,PO6,PO7,PO8, PO9,PO10,PO11,PO12,PSO1,PSO2,PSO3

ACKNOWLEDGEMENT

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

It is a great privilege for us to express our gratitude to our esteemed **Principal Dr.B.S.Murugan M.Tech.,Ph.D.,** for providing us right ambiance for carrying out the project work.

We would like to thank our **Head of the Department Dr.J.Uma M.E., Ph.D., Department of Electrical and Electronics Engineering,** for her unwavering moral support throughout the evolution of the project.

We would like to express our deep and sincere gratitude to our Minor Project Guide, **Ms. B. Sharmiladevi, M.E., Assistant Professor, Department of Electrical and Electronics Engineering,** for his constant encouragement, kind co- operation, valuable suggestions and support rendered in making our project a success.

We offer our wholehearted thanks to our Minor project coordinator **Mr.P.Maniraj, M.E.,Assistant professor, Department of Electrical and Electronics Engineering,** for his constant encouragement, kind co-operation and valuable suggestions for making our project a success.

We are 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

TABLE OF CONTENTS

ABSTRACT

Whenever the street light got damaged or not on during night time, the LDR sensor senses it and sends the notification to the authorized person that the light is damaged and the location (using GPS) where the light is damaged. It reduces human efforts, delays in fixing the issues. The automatic control of street lights is used to find the exact location when the street light gets damaged. Further, this can be implemented for all the street lamps in rural lamps. Pre-identification of damaged. The IoT (Internet of Things) is a blooming technology that mainly concentrates on the interconnection of devices or components to one another and the people. As the time being, many of these connections are changing as ―Device –Device‖ from ―Human to Device‖. Finding the faulty street light automatically is become a vital milestone by using this technology. The primary goal of the project is to provide control and identification of the damaged street light automatically. The lighting system which targets the energy and automatic operation on economical affordable for the streets and immediate information response about the street light fault. In general, the damage of the street light is observed by getting the complaints from the colony (street) people. Whereas in this proposed work using sensors these lights working status is easily captured without any manual interaction. So that it reduces manual efforts and the delay to fix problems. So, to reduce such problem we come with the solution wherein automatic detection of street light issues i.e.; whether the street light is working or not will be found at night time and it should send the notification to the authorized person if there is a problem in particular streetlight and also the location of the place where the streetlight is damaged. The street lights are automatically ON/OFF using IoT. In this system, it checks whether the street light is ON/ OFF. The LDR sensor will ON/OFF the street lights automatically, based on the condition of the weather.

LIST OF FIGURES

LIST OF TABLES

CHAPTER 1

SURVEY FORM NALYSIS

1.1 NAME AND ADDRESS OF THE COMMUNITY

Mr. Mani. R, thalavapalayam, Karur.

Mr.Shanmugam,VIP Nagar,Karur.

Mr.Muthuraj,Velayuthapalayam ,Karur.

Mrs.Lakshmi, Moongil patty, Namakkal.

Mr.Arulkumar.T , pagampalayam ,Namakkal.

1.2 PROBLEM IDENTIFICATION

1. We have conducted a surveyed in several villages
2. The report of the survey says that people need to have street light facility
3. In villages there is no proper maintenance
4. The most of the peoples are daily wages workers they know when the light has under gone to fault after they call the street light maintenance workers

1.3 PROPOSED SOLUTION

The proposed street light fault detector integrates sensors, wireless communication, and machine learning for real-time monitoring. A user-friendly dashboard, prioritized fault alerts, and comprehensive solution. Remote control functionality and regular maintenance reminders ensure an efficient, reliable, and user-aware street light infrastructure.

CHAPTER 2

LITRATURE REVIEW

Paper 1: GLOBAL SYSTEM FOR MOBILE COMMUNICATION - SYSTEM

Reference:

Friedhelm Hillebrand: Often referred to as the "Father of SMS," Hillebrand played a key role in the development of GSM standards, particularly in the area of short message service (SMS). His work has had a lasting impact on mobile communication.

Inference:

The GSM system was designed as a second generation (2G) cellular phone technology. One of the basic aims was to provide a system that would enable greater capacity to be achieved than the previous first generation analogue systems. GSM achieved this by using a digital TDMA (time division multiple access approach).

Paper 2: VOLTAGE SENSING SYSTEM

Reference:

Sergey M. Dubinovsky: Specializes in sensors and transducers, often contributing to advancements in measurement technology.

Inference:

Investigate how voltage sensors are integrated into smart systems, IoT devices, or other advanced technologies. Understand the role of voltage sensors in enhancing the efficiency and reliability of these systems.

Paper 3: CURRENT SENSING SYSTEM

Reference:

George C. Alexandropoulos: Known for research in current measurement and sensors, particularly in power systems.

Inference:

Explore how current sensors are integrated into smart systems, IoT devices, or other advanced technologies. Understand their role in improving the efficiency and reliability of these systems.

Paper 4: GLOBAL POSITIONING SYSTEM

Reference:

Bradford W. Parkinson: Known as the "Father of GPS," Parkinson played a pivotal role in the development of the Global Positioning System.

Inference:

Explore recent developments and emerging trends in GPS technology, such as the use of low Earth orbit (LEO) satellites, improved anti-jamming capabilities, and advancements in software-defined GPS receivers.

Paper 5: A FAULT DETECTION SYSTEM

Reference:

Albert Y. Zomaya: An expert in the field of sensor networks and distributed computing, Zomaya may have contributions related to fault detection systems.

Inference:

A Fault detection System Review research on communication protocols utilized in safety monitoring systems, especially those enabling real-time reporting of faults. Consider studies on wireless communication technologies or IoT protocols.

CHAPTER 3

PROPOSED METHODOLOGY

3.1 BLOCK DIAGRAM

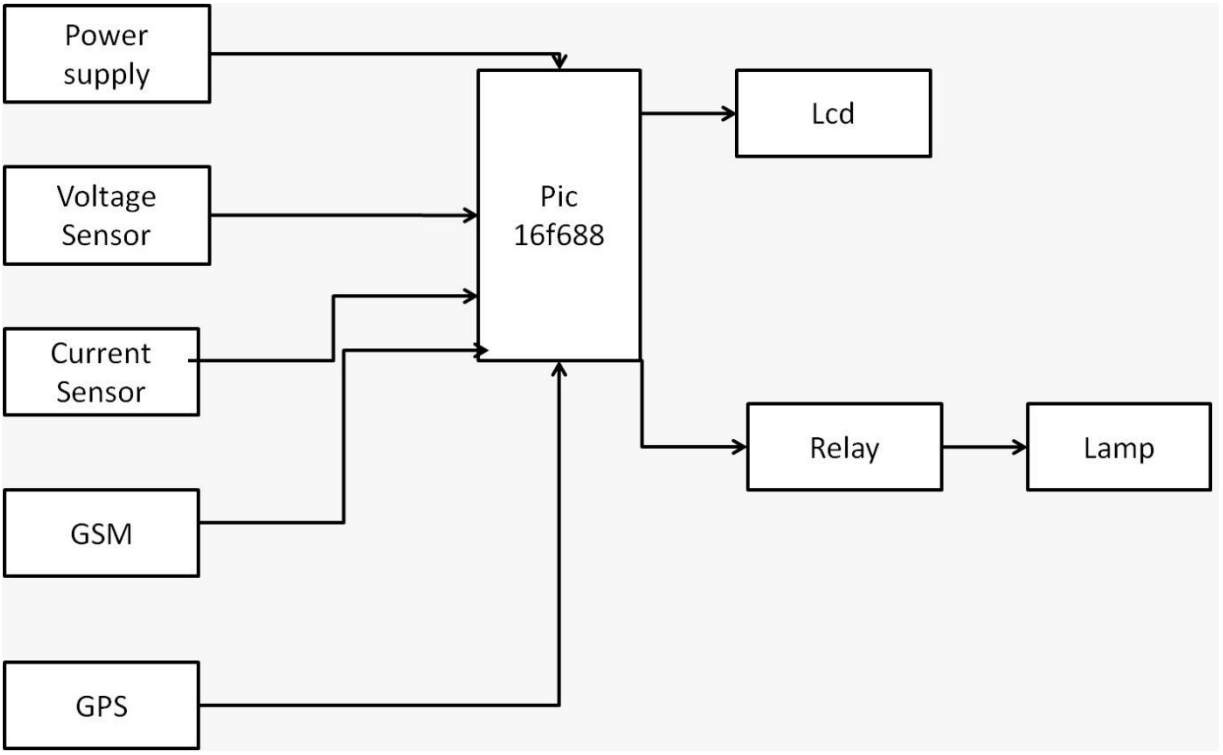


Fig: 3.1-Block diagram

3.2 DESCRIPTION

- The street light fault detector with GPS tracking project comprises several interconnected components.
- At the core are the street light units equipped with sensors for light intensity, motion, and temperature, along with GPS modules for location tracking.
- These units communicate wirelessly using dedicated protocols, transmitting data to a central hub or microcontroller.
- The microcontroller processes sensor data and interfaces with a data analytics and machine learning module for fault prediction.
- The system also integrates GPS tracking, sending location information to the centralized monitoring system.
- A user-friendly dashboard interfaces with the monitoring system, providing real-time data visualization and control.
- This interconnected structure allows for seamless communication, efficient fault detection, and accurate GPS tracking, contributing to a smart and responsive urban lighting infrastructure.

3.3 PROJECT - TOTAL COST

SNO	COMPONENT DESCRIPTION	QUANTITY	COST
1	Pic 16f688	**1**	**175**
2	Voltage Sensor	**1**	**200**
3	Current Sensor	**1**	**300**
4	GSM	**1**	**1000**
5	GPS	**1**	**1500**

Fig: 3.3-Hardware and its components

3.4 CIRCUIT DIAGRAM

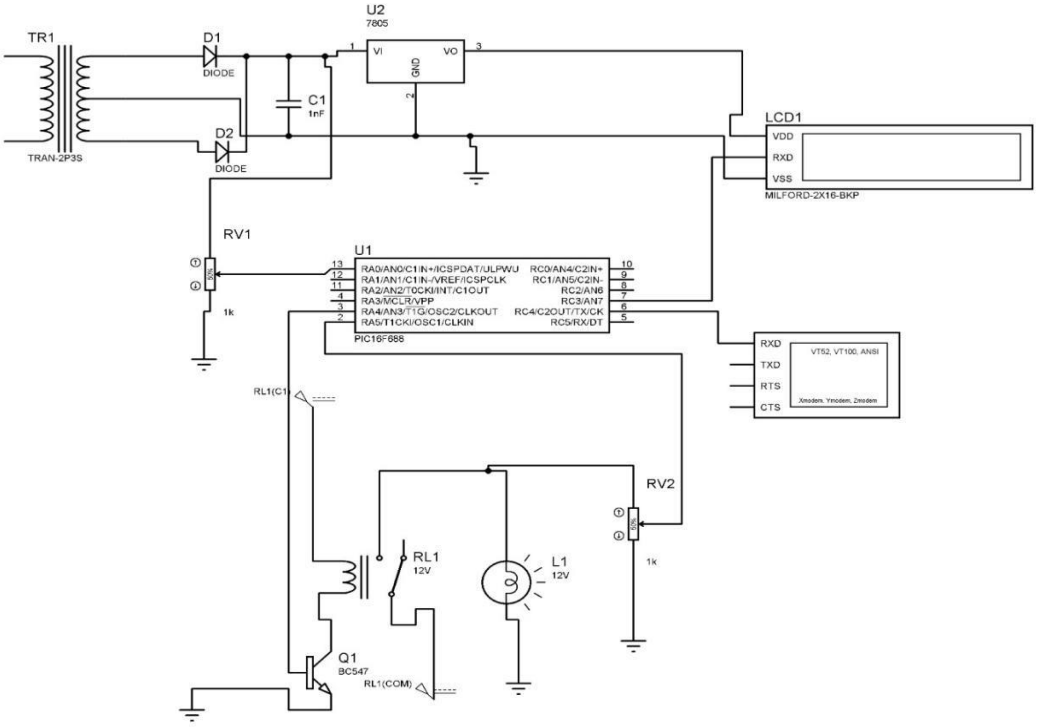


Fig: 3.4- Circuit diagram

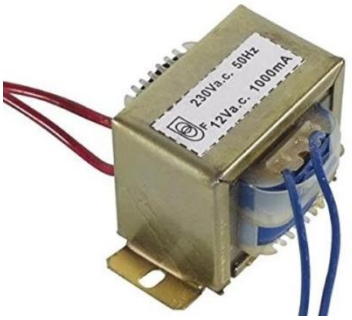
3.5 WORKING

- A street light fault detector with GPS tracking is a system designed to automatically detect faults in street lighting and pinpoint their exact location using GPS technology.
- Current Sensors: Monitor the electrical current to detect faults like blown fuses or short circuits.
- Voltage Sensors: Measure voltage levels to detect under-voltage or over-voltage conditions.
- GPS Module: Provides the exact location of the faulty street light.The sensors (light, current, and voltage) continuously monitor the street light's operation. When fault is detected (e.g., the light is off when it should be on, or there is an abnormal current/voltage reading), the microcontroller identifies this as a fault condition.
- The microcontroller processes the sensor data to confirm the type and occurrence of a fault. It also fetches the current GPS coordinates using the GPS module.
- The microcontroller sends the fault data, including the GPS coordinates, to the central monitoring system via the GSM/GPRS module. The central server receives the fault data and updates the status of the specific street light in its database.
- The monitoring software/application displays the location of the faulty street light on a map and generates an alert for maintenance personnel. Maintenance teams receive alerts and access the map to find the exact location of the faulty street light. They can then proceed to the location to diagnose and fix the issue.

CHAPTER 4
RESULT AND DISCUSSION

4.1 Hardware Components And Description:

Transformers

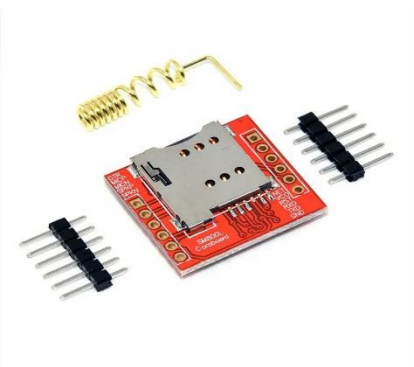


- Current transformers reduce high current to a lower, measurable value, while voltage transformers lower high voltage to a safe level for meters and relays, ensuring accurate monitoring and protection in electrical systems.

Relay module

- A relay module is an electronic device that uses an electromagnetic switch to control high voltage circuits with a low voltage signal. It allows microcontrollers and other low-power devices to safely operate higher power loads, such as lights, motors, and appliances, providing isolation and protection.

GSM Module



- A GSM module provides location data by receiving signals from GPS satellites, enabling accurate geolocation and navigation.

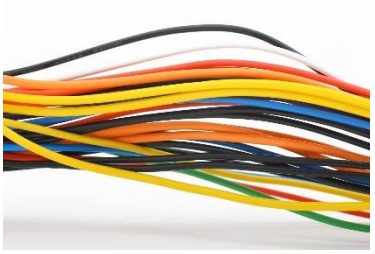
Current Controller

- A current controller regulates the flow of electrical current in a circuit to maintain a desired level. It ensures stability and protection by adjusting current flow in response to changes in load or input voltage, widely used in power supplies, motor control systems, and various electronic applications for efficient performance.

Voltage Controller

- A voltage controller regulates and stabilizes the output voltage in electrical circuits. It adjusts the voltage to a desired level despite variations in input voltage or load conditions, ensuring consistent performance. Commonly used in power supplies, voltage controllers protect sensitive electronic components and enhance the efficiency and reliability of electrical systems.

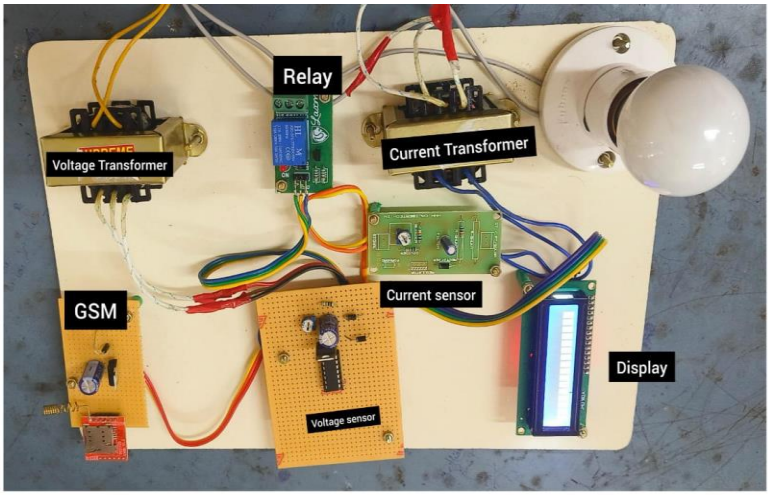
Connecting Wires



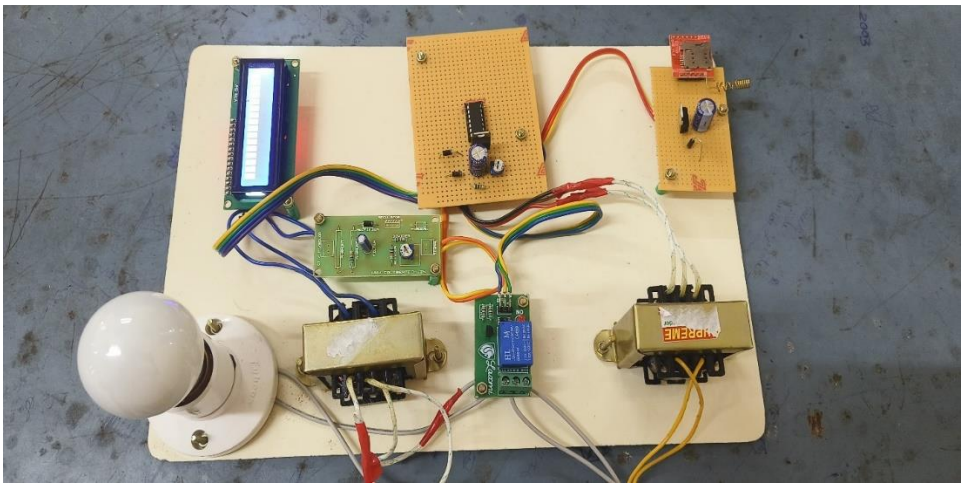
- Connecting wires refer to the process of joining electrical conductors to establish a continuous path for current flow. This is typically achieved using connectors, soldering, or terminals to ensure secure and reliable connections in various electrical and electronic applications, such as wiring circuits, devices, and components.

Bulb and Holder

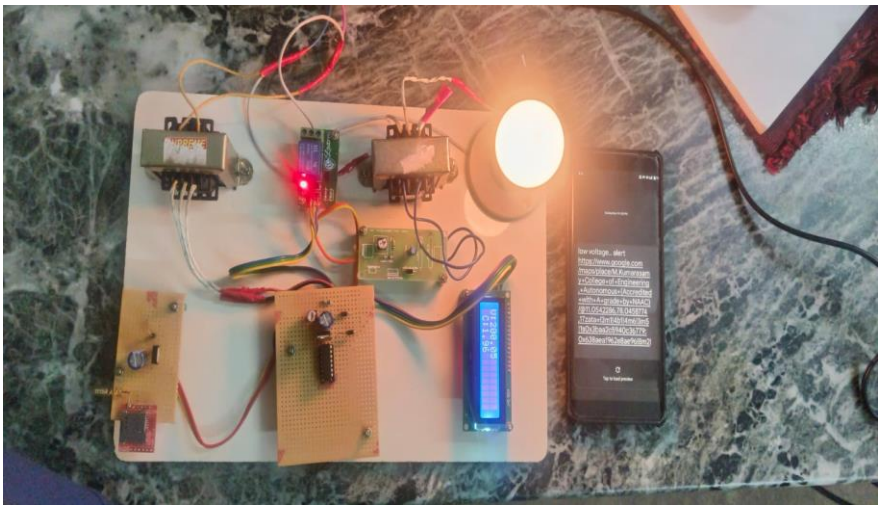
- A bulb, also known as a light bulb or lamp, is an electrically powered device that produces light by converting electrical energy into visible light through the heating of a filament or the excitation of gases within a sealed glass envelope. Bulbs are used for illumination in homes, offices, and various other settings.



4.2 Hardware Kit:



4.3 Experimental Output:



CHAPTER 5

CONCLUSION

The implementation of a street light fault detector system represent a significant advancement in urban infrastructure management, contributing to both energy efficiency and public safety. This project aimed to create an automated solution capable of detecting faults in street lighting, ensuring timely maintenance and optimal functionality. Through the integration of sensors, microcontrollers, and wireless communication technologies, the system continuously monitors street lights, identifies malfunctions, and communicates the status to a central management system.The successful deployment of the street light fault detector offers numerous benefits. Firstly, it enhances the efficiency of municipal maintenance operations by providing real-time data, which allows for the prompt identification and repair of faulty lights. This not only reduces downtime but also lowers maintenance costs by enabling a proactive rather than reactive approach. Secondly, the system significantly improves public safety. Well-lit streets are essential for preventing accidents and deterring criminal activities. By ensuring street lights are consistently operational, the fault detector system contributes to safer urban environments . Moreover, the project demonstrates the potential for integrating smart technology into urban infrastructure, paving the way for more comprehensive smart city solutions. The scalability of the street light fault detector system means it can be expanded to cover larger areas or integrated with other smart city applications, such as traffic management systems and environmental monitoring . In conclusion, the street light fault detector system represents a vital innovation in urban management. It leverages modern technology to address common issues in public lighting, offering a solution that is both efficient and effective. The implementation of such a system not only ensures better resource management and cost savings but also enhances public safety and quality of life in urban areas. As cities continue to grow and evolve, the adoption of intelligent infrastructure solutions like this will be crucial in meeting the demands of sustainable and safe urban living.

POST IMPLEMENTATION SURVEY FORM

Department of Electrical and Electronics Engineering

18EEP202L – Minor Project II

Problem Identification – Survey Form

1. **Name and Address of the community:**

2. Age Group

a) Less than 10 Years

b) 10 years to 20 Years

c) 21 years to 35 Years

d) 36 Years to 50 Years

e) More than 50 Years

3. Discussion:

a) What? (Define the Problem)

b). Why? (Reason for the Problem occurrence)

c). When? (When the problem began or first noticed)

d) Where? (Place of the problem's first occurrence or sighting)

e) Who? (The person or thing that the problem affects)

f) How? (The sequence of events that resulted in the problem) Signature of the respondent

g) Which? (People have attempted to solve the issue)

h) Does the problem appear to have only one possible solution?

4) Work Plan of the project

5) Final Solution Signature of the surveyor

PROJECT DEMONSRTATION VEDIO LINK:

file/jclb2j2fsqq5kp0/WhatsAppVideo2024-05-17at3.02.52PM(1)+(2).mp4/file

file/jclb2j2fsqq5kp0/WhatsAppVideo2024-05-17at3.05.22PM(1)+(2).mp4/file

PROJECT IMPLEMENTATION-GEOTAG PHOTO:

REFERENCES:

- International Telecommunication Union. (2005). Internet reports 2005: The internet of things. Geneva: ITU.

- Issarny, V., Teixeira, T., and Hachem, S. and (2011). Ontologies for the internet of things (pp. 1–6). New York: ACM.

- Suo, H., Wan, J., Li, F., and Yan, H. (2011). "Advances in cyberphysical systems research", KSII Transactions on Internet and Information Systems, 5(11), 1891–1908.

- Vasilakos, V., Lai, C., and Tsai, C.(2014). "Future internet of things: Open issues and challenges". ACM/Springer Wireless Networks.

- Morabito, G., Iera, A., & Atzori, L. and (2010). "The internet of things: A survey," Computer Networks, 54 (15), 2787–2805.doi: https://doi.org/10.1016/j.comnet.2010.05.010.