**IoT-based wireless street light operating system and light fault detection.**

**BY**

**Al Helal Md. Tasnim Shahriar Akash**
**ID: 191-15-2606**

**AND**

**Jannatul Ferdous**
**ID: 191-15-2693**

This Report Presented in Partial Fulfillment of the Requirements for the Degree of Bachelor of Science in Computer Science and Engineering

Supervised By

**Zakia Sultana**
Sr.Lecturer
Department of CSE
Daffodil International University

Co-Supervised By

**Mushfiqur Rahman**
Sr.Lecturer
Department of CSE
Daffodil International University


**DAFFODIL INTERNATIONAL UNIVERSITY**
**DHAKA, BANGLADESH**
**FEBRUARY 2023**

## APPROVAL

This Project titled **"IOT Based Wirless Street Light Operating System and Light Fault Detection"**, submitted by Al Helal MD Tasnim Shahriar Akash, ID No: 191-15-2606 and Jannatul Ferdous, ID No:191-15-2693 to the Department of Computer Science and Engineering, Daffodil International University has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. in Computer Science and Engineering and approved as to its style and contents. The presentation has been held on *04-Feb-2023*.

## BOARD OF EXAMINERS

**Chairman**

**Dr. Touhid Bhuiyan**
**Professor and Head**
Department of Computer Science and Engineering
Faculty of Science & Information Technology
Daffodil International University

**Internal Examiner**

**Dr. S. M. Aminul Haque**
**Associate Professor and Associate Head**
Department of Computer Science and Engineering
Faculty of Science & Information Technology
Daffodil International University

**Internal Examiner**

**Dewan Mamun Raza**
**Senior Lecturer**
Department of Computer Science and Engineering
Faculty of Science & Information Technology
Daffodil International University

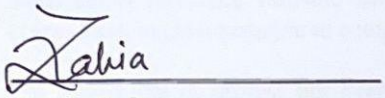
**External Examiner**

**Dr. Shamim H Ripon**
Professor
Department of Computer Science and Engineering
East West University

## DECLARATION

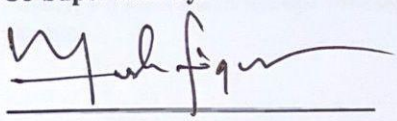
We hereby declare that this project has been done by us under the supervision of **Zakia Sultana, Sr.Lecturer, Department of CSE** Daffodil International University. We also declare that neither this project nor any part of this project has been submitted elsewhere for the award of any degree or diploma.

**Supervised by:**



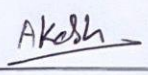
**Zakia Sultana**
Sr.Lecturer
Department of CSE
Daffodil International University

**Co-Supervised by:**

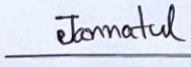


**Mushfiqur Rahman**
Sr.Lecturer
Department of CSE
Daffodil International University

**Submitted by:**



**Al Helal Md. Tasnim Shahriar Akash**
ID: -191-15-2606
Department of CSE
Daffodil International University



**Jannatul Ferdous**
ID: -191-15-2693
Department of CSE
Daffodil International University

# ACKNOWLEDGEMENT

First we express our heartiest thanks and gratefulness to almighty God for His divine blessing makes us possible to complete the final year project successfully.

We really grateful and wish our profound indebtedness to Supervisor Zakia Sultana, Lecturer, Department of CSE Daffodil International University, Dhaka. Deep Knowledge & keen interest of our supervisor in the field of "Field name" to carry out this project. His endless patience, scholarly guidance, continual encouragement, constant and energetic supervision, constructive criticism, valuable advice, reading many inferior drafts, and correcting them at all stages have made it possible to complete this project.

We would like to express our heartiest gratitude to Zakia Sultana, Mushfiqur Rahman, and the Head, Department of CSE, for his kind help to finish our project and also to other faculty members and the staff of the CSE department of Daffodil International University.

We would like to thank our entire coursemates at Daffodil International University, who took part in this discussion while completing the coursework.

Finally, we must acknowledge with due respect the constant support and patients of our parents.

# ABSTRACT

The Internet of Things (IoT) is like a physical device with tangible internet access. It could be a thermostat, lock, appliance, fitness tracker, or even a shinning bulb. The world is becoming more modern day by day. In this modernization competition, for today's people, time is most valuable. So we are thinking of something new to save time. The project's goal is to provide smart control and defect detection for street lights. With the help of the LDR sensor, the lights can be automatically switched ON or off according on the radiance of the sun. Disaster experienced in both lifestyle and the global economy are eased by automation. Before being transmitted to the street lights, the power system which is fed into the system is switched via a relay. Here, the system checks any street light issues and also utilizes the GSM module to send an alert message to the provided phone numbers. An infrared sensor is mostly used to measure an object's motion. The program indicates that such light will remain visible if any objects come close to the IR sensor. Otherwise, the light will seem to subtle.

# TABLE OF CONTENTS

# LIST OF FIGURES

# CHAPTER 1

# INTRODUCTION

## 1.1 Introduction

An vector control of inventory materials is defined as the IoT. Users can bond to each other because of that.Remote machine sensing and monitoring are attained by the IoT.It is an advanced form of artificial intelligence that is performed in an automated and analytic environment can provide unique and automated goods and services. Their processes are more responsive, powerful, and beneficial. With IoT, we can access a variety of automation applications, such as smart homes, smart parking, smart highway, and so on smart lighting.

In our community, corporate street lights use extra energy. Majority of the time, we forget to turn off street lights when they are not in use (roads are deserted), and we have all experienced street lights left on at the day time. However, the significance of energy conservation and preservation is expanding, that contributes in the future protection of natural resources.

A clever street light structure can be implemented instead of traditional street lights like HID (High-intensity discharge) lamps to resolve this issue. The characteristics of LED lights over conventional technologies include power savings because of increased current efficiency, fewer expenses, high building color index, rapid start-up, and longevity. The Fault may also be visible in any of the road lights. So the support we ultimately lean on, like coal, thermal energy, and hydroelectric, are scarce. The basic motive of the device is to bring elements that conserve energy such LDR, Relays, and LEDs that can enlighten a large sector with high strength light when essential. Appliances are utilized as computerized signals to almost reduce all physical effort frequently familiar as a photoresistor, is a resistor that relies on the concept of photoconductivity and is being utilized in this project to detect the motion of objects. Text messages are dispatched to the specified mobile number by using GSM module.

When the LDR discovers shadows, the lights automatically turn on, however still reflect poorly. When the IR finds a moving creature, the street light shines intensely. If the street light fails to magnify, the GSM module sends the signal to the possible designated service number.

## 1.2. Motivation:

The current system is controlled manually, which results in a number of inefficiencies. Every time, the human is in charge of maintaining system control. Personally go to work and manage all actions such as turning on and off-road lights. Today's road light system is not flexible; the main issue is dealing with remote area locations, and physical errors result in power wastage. This facilitated the idea of creating a smart system that could reduce the need for human intervention. Sensors cannot be used to implement the system because of issues such as high maintenance costs, high initial costs, and false interpretations. Taking this into account, all of these sensors cannot be used. The proposed system will be controlled by Android applications, which will reduce energy wastage. And a main target is to reach plenty of areas so that many can use this system to reduce our energy wastage.

## 1.3. Objectives:

The purpose of the project is to create a smart street light system that uses effective systems to cut power utilization while relaying info to a server.The project will be designed by using an Arduino UNO board, LDR, IR sensor, Motion sensor GSM module, and Breadboard. Smart street lights are effective and extremely dependable.

## 1.4. Expected Outcomes:

Here we hope for some outcomes from this project.

- Energy will be saved
- Less manpower will be required
- The broken light can be fixed in less time
- By understanding the objective, the light can increase or decrease light

## 1.5 Project Management and Finance

There are a couple of restrictions through this project that we hope to get past in the future. We employed feature selection approaches and fewer classifiers that we would like to work with in the future.


Figure 1.1: Project Management.

The budget of the project is shown below-

| NO | Item Name | Quantity | Price (TK) |
|---|---|---|---|
| 01 | Arduino Uno | 01 | 1,100 |
| 02 | GSM Module (A6 Pro) | 01 | 1,100 |
| 03 | Motion Sensor | 01 | 85 |
| 04 | LDR Sensor | 02 | 150 |
| 05 | 5V Relay Module | 01 | 160 |
| 06 | 3.5V Battery | 02 | 180 |
| 07 | Other | | 200 |
| | | | Total: 2,975 TK |

## 1.6 Report Layout

This project contains two chapters so far. In the first chapter named Introduction, we will talk about Introduction, Motivation, Objectives, Expected Outcome, and Report Layout. Also, the final chapter is named the Conclusion and Future scope of our project. In this chapter, we will talk about Discussion Conclusion and Scope for Further Development. In this report, we talk about our application and its various problem, solution, and use project.

# CHAPTER 2

# BACKGROUND

## 2.1 Background:

The introduction to this section's background information concerns Sweden's street lighting systems. Sections 2.2 and 2.3 discuss carbon dioxide equivalents after some data on the environmental consequences of street lighting. The Sala LED project is discussed in part 2.4, while section 2.5 presents details on the Uppsala municipality's street lighting system.

## 2.2 Related works

Manish Kumar [1] released a book in 2016 about activating leds with a Zigbee wireless module. Among the shapes were an LDR, a microcontroller, and a transmission module. Zigbee uses a wireless exchange of information with the lighting module. Using two LDR sensors, the computer analyzes day-night variation and led safety. The transmission system can collect the LDR data when it is read by the microcontroller. Wireless Zigbee is mostly used to connect the data to the control center, which reviews and controls each streetlight. In simple terms, to simplify it, wireless is a fixed-range wireless piece of technology [2].

Prof. K.Y. Rajput and three other TSE Mumbai researchers explored a GSM-based automatic streetlight control system to calculate multiple parameters. The system consists of a server microcontroller and sensors as well as smoke sensors, noise sensors, and light sensors, among others. The machine will be given an intervention signal beyond this device, that would sense the environment's temperatures and noise levels. The software is really cost-effective because the GSM modem must be placed in every streetlight, which is the concern. Several compatibility issues are also occurring. Because it extensively depends on hardware to control and monitor the computer, this configuration is more expensive [3].

A solar-powered traffic flow-based streetlight control system was built by M. Abhishek et al.Utilizing an 8052 series microcontroller and LED lights in place of standard bulbs, they were necessary to reduce electricity consumption by multiple times. When a vehicle is present or moving, sensors across each side of the road monitor activity and give a microcontroller command to turn on and off the lights as needed. Otherwise, all of the lights are shifted out, regardless of the moment of day or the weather [4].

[5] A GSM-based smart street light monitoring and control system utilizes timed-operated street light switching off to enhance the efficiency and accuracy of an industry.It consists of the following components: a client module and a server module. A GSM modem is leveraged on the client side and thus is attached to the microcontroller.A java-based application server is implemented on the user side.

[6] Using a GSM-based RFID solution for automated street lighting, this method involves a new method that could save electricity.The time it takes to return from a power outage can be cut in half and used this technology.Road maintenance, street light repairs, and other power-related tasks should be done by GSM.

The Electricity Department uses this technique in the future to conserve time and resources. By leveraging RFID, this idea can be expanded to accelerate the consideration of any new applicants for pinouts.

Earlier street lighting strategies in areas with a limited number of passersby are left on for the rest of the night. [7] Smart Street Lighting System once exploited GSM. Over this, a significant amount of energy is wasted. Flexible lighting technologies including light-emitting diode lamps and prevailing wireless internet availability have facilitated the ability for street lighting systems to work reliably, react faster, and while will use less power. In order to fulfill the need for agile public lighting systems, the Intelligent Street Lighting (ISL) strategy, which is the main process, is outlined in this paper.

## 2.3 Scope of the Problem

IoT Security Challenges

- Lack of visibility.
- Limited security integration.
- Open-source code vulnerabilities.
- Overwhelming data volume.
- Poor testing.
- Unpatched vulnerabilities.
- Vulnerable APIs.
- Weak passwords.

## 2.4 Challenges

Obtaining financing and approval from the government will be a major obstacle to the project's implementation. We wish as the project’s main goal is to prevent the wastage of electricity and also manpower reduce that’s why many people will lose their jobs. Another big problem is that there are many people in our country, who have very little knowledge about technology. So they need to be trained in technology. So that they have a good understanding of technology.

## 2.5 Implementation:

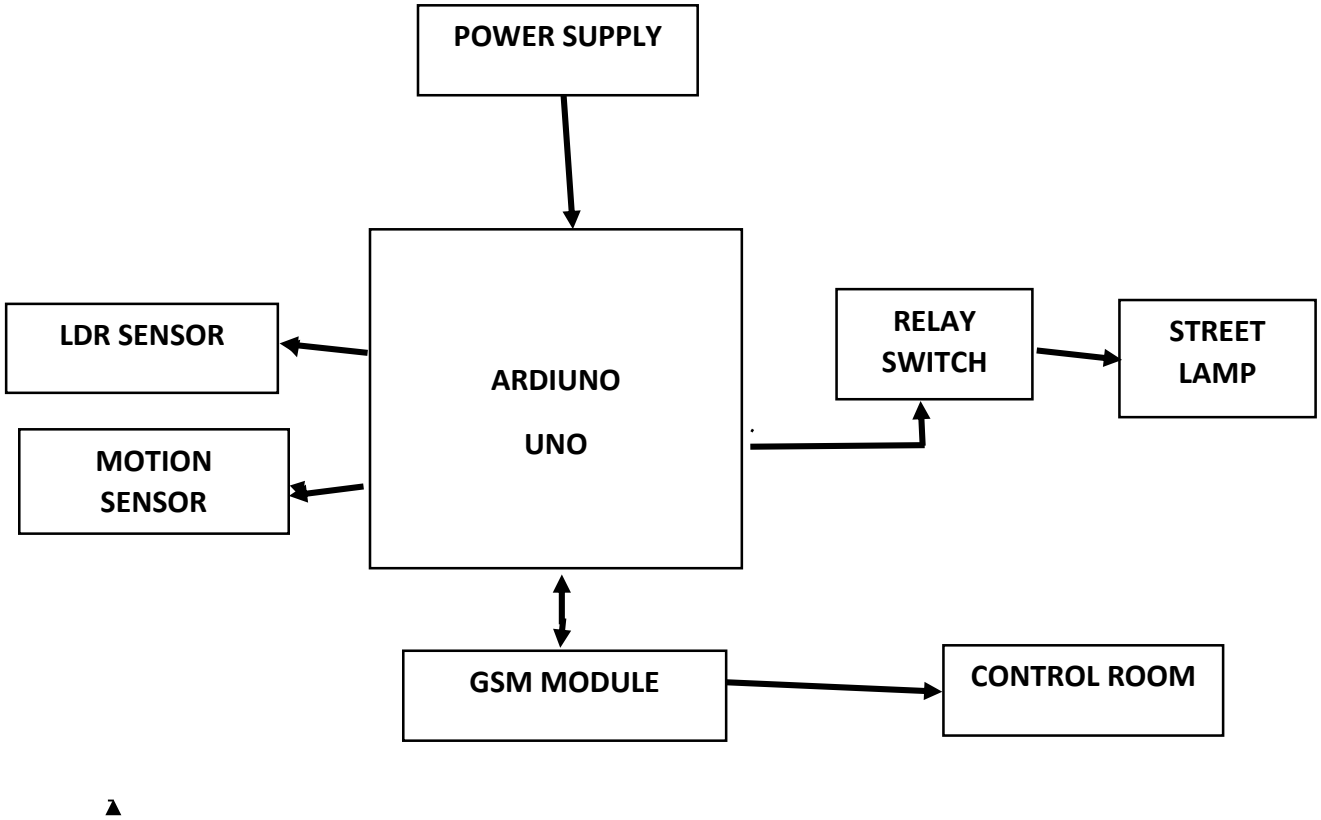



Figure 2.1: System Architecture.

A. Arduino UNO:

Depending on the Semiconductor ATmega328P microprocessor, the Arduino Uno is a free microcontroller created by Arduino.cc. A variety of associations for the advancement (shields) and other circuits can be connected to the board's analog and digital input/output (I/O) pins. The board has 14 digital I/O pins (six of which are capable of PWM output) and 6 analog I/O pins, and it is programmable via a type B USB cable with the Arduino IDE (Integrated Development Environment). It can be powered by a USB cable or an external 9-volt battery, and it accepts voltages ranging from 7 to 20 volts. It's comparable to the Arduino Nano and Leonardo.

The hardware reference design is available on GitHub under a Creative Commons Attribution Share-Alike 2.5 license. The most conspicuous applications made with Arduino UNO have included items mentioned below.

- The integrated smart platforms
- Robotics
- Control of object motion
- Counter in the workshop

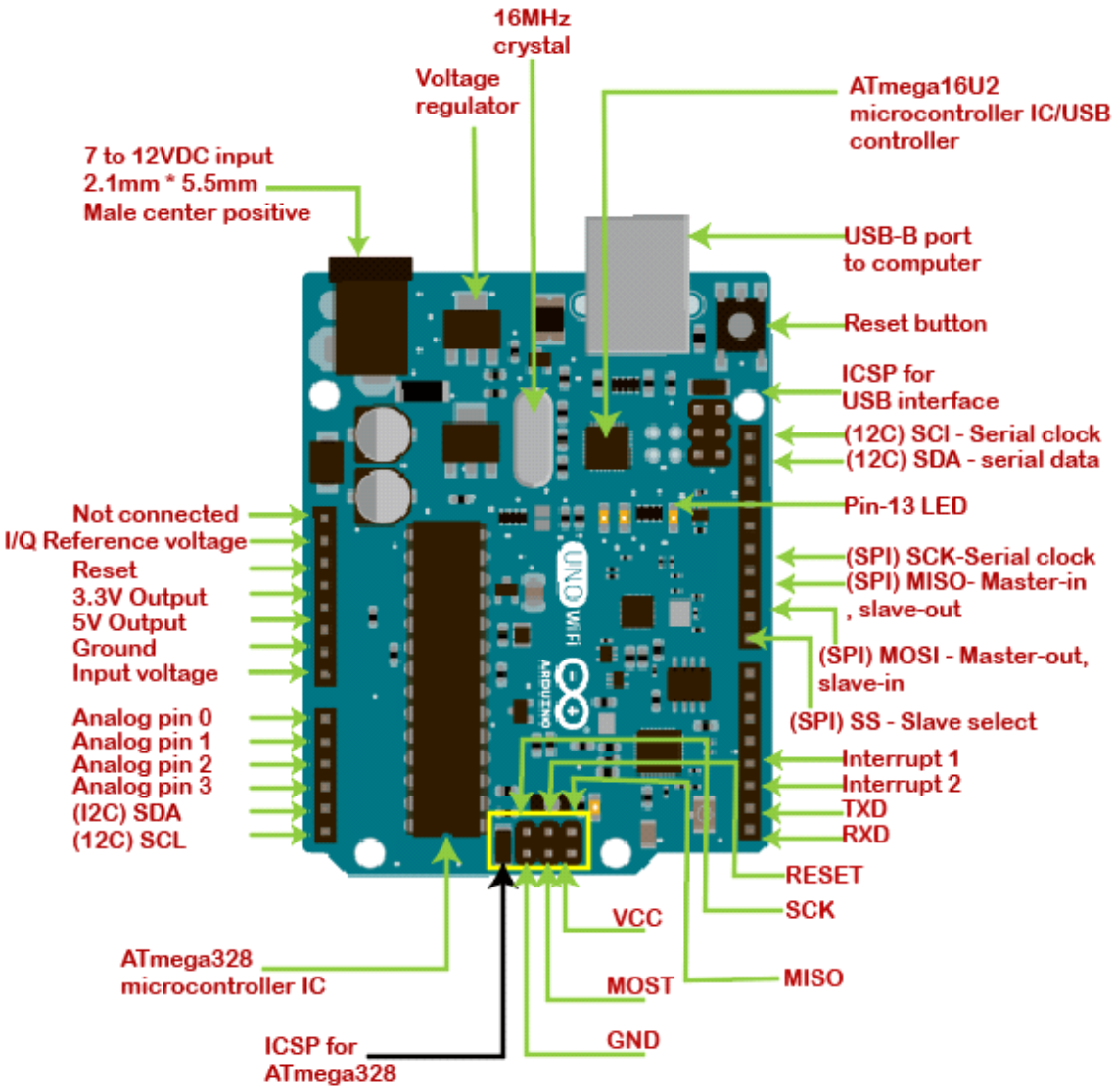



Figure 2.2: Arduino UNO.

B. Light-dependent resistor (LDR):

A device whose resistivity is affected by incoming electromagnetic radiation is known as a light-dependent resistor (LDR). They are therefore light-sensitive gadgets. Other names for them include photocells, photoconductive cells, and optoelectronic devices.

They are made of high-resistance semiconductor materials. There are numerous symbols used to represent a photoresistor or LDR, one of which is depicted in the figure below. The arrow represents the light falling on it. Photoelectric appliances are classified into two types: intrinsic and extrinsic. Photoresistors can be used in streetlights to determine when the light is turned on. When ambient light strikes the photoresistor, the streetlight turns off. By ensuring that the light is only turned on during the day time

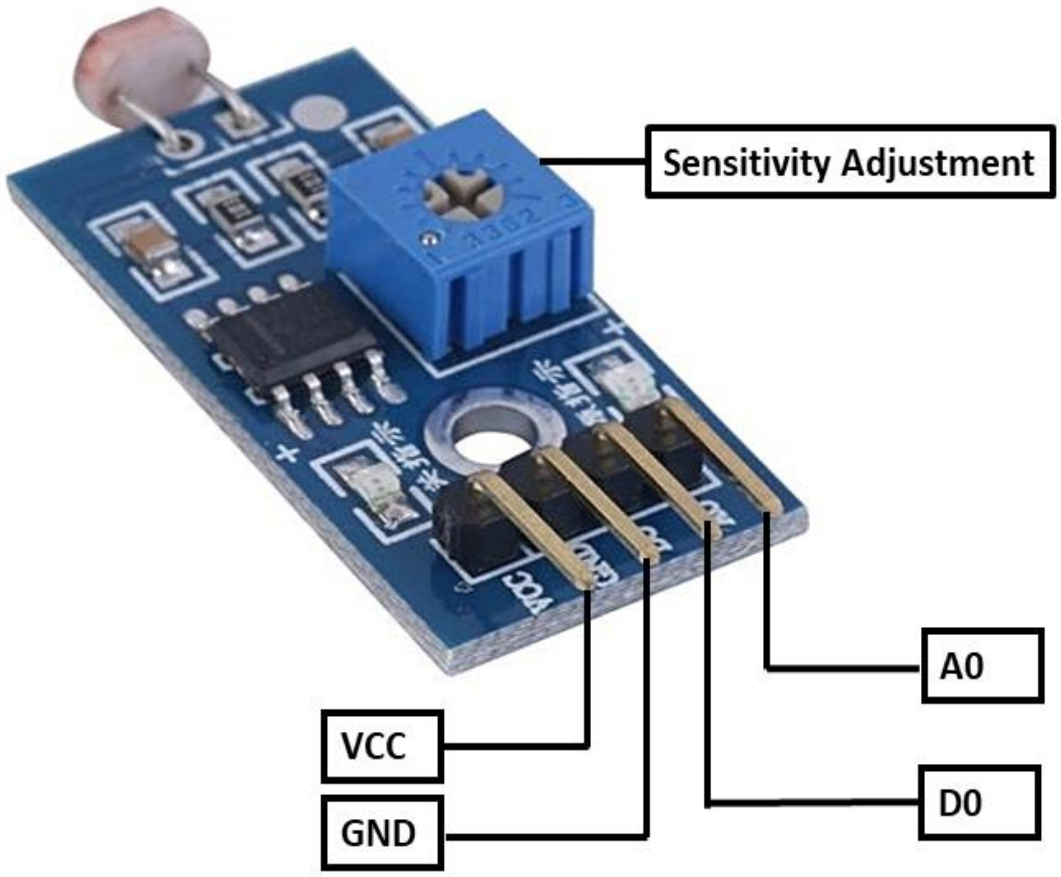



Figure 2.3: Light-dependent resistor (LDR).

C. Motion Sensor:

A motion sensor is a gadget that recognizes physical movement on such a thing or around it. It can detect and record physical and/or kinetic movements in real-time.

A type of electronic sensor is a motion sensor. It is typically found in consumer-level devices such as:

- Smartphones
- Tablet computers
- Smart TVs
- Physical security measures

Depending here on the motion sensor's capacity, it may be able to detect motions inside the share information or outside it. It is typically linked to a system or software that converts motion into action or information. Motion sensors, for example, are primarily used in smartphones to collect user input in supported games and other applications.

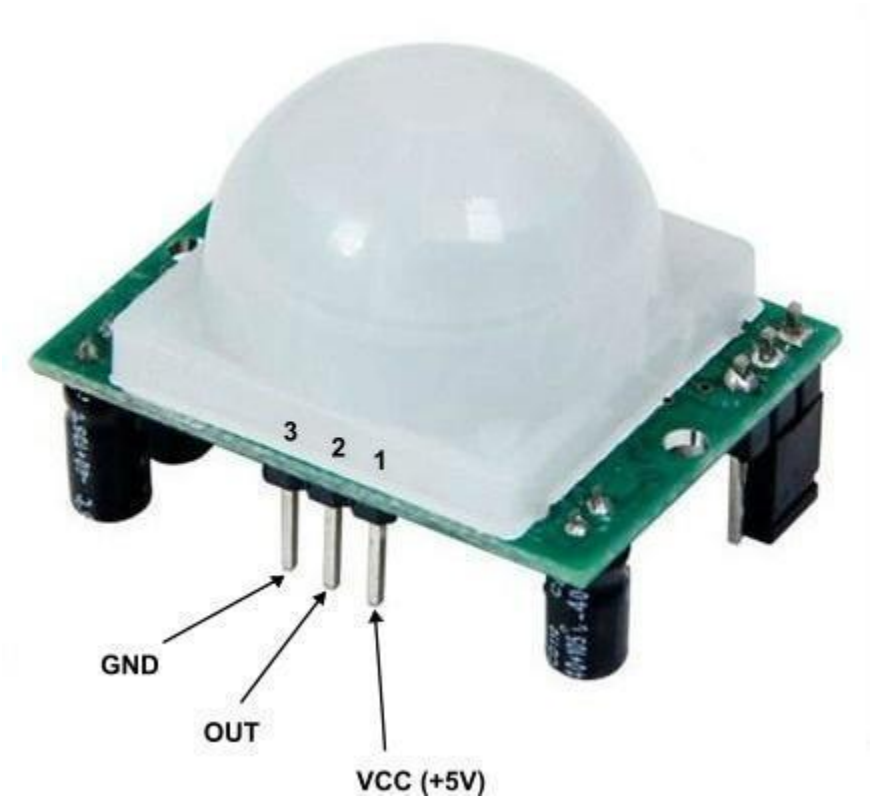



Figure 2.4: Motion Sensor.

D. Relay:

Other required work concepts have been developed, such as solid-state relays, which control without the use of moving parts. The most basic type of relay uses an electromagnet to lock or unlock the contacts. Relays with controlled design and operational and several operating coils are used to safeguard electrical circuits from overload or defects; in contemporary social electric power systems, these responsibilities are still carried out by personal technology called as protective relays. Relays are distinct from remote control switches. It is widely used because of its simplicity, dependability, and durability. Relays can convert electrical inputs into mechanical outputs or the other way around. It is essentially an electromechanical instrument that is powered by an electric current. The following are examples of such applications:

- A low-voltage circuit can often be split from a high-voltage circuit using relays.
- They are appeal to operate complex circuits.
- They also have appeal as automatic switchovers.
- Relays are employed by microprocessors to control a notable electrical load.

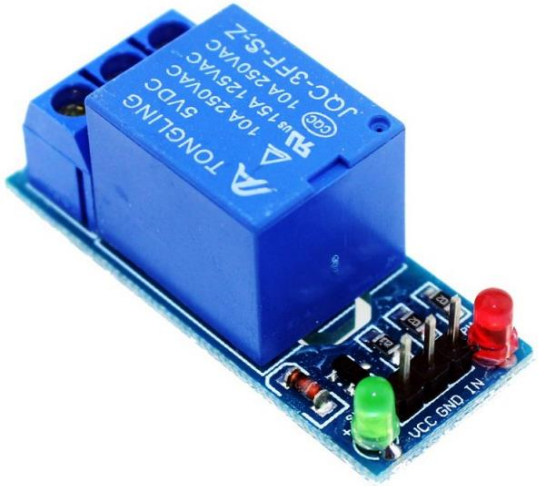



Figure 2.5: Relay.

E. GSM MODULE:

The European Telecommunications Standards Institute developed GSM (Global System for Mobile Communications, originally Groupe Spécial Mobile) (ETSI).

A wireless modem that can communicate via GSM and GPRS connections is called as a GSM/GPRS modem. Similar to a mobile phone, a SIM (Subscriber Identity Module) card is required to connect to the network. Like mobile phones, they too have IMEI (International Mobile Equipment Identity) numbers. To connect with the processing unit or controller, which is done through digital signals, the modem needs AT instructions.

- In order for the MODEM to connect with the Central processing unit or controller, AT commands must be communicated via serial connection.
- The controller or central processing unit (CPU) issues these instructions..
- The MODEM responds to instructions by presenting a result.
- 4 The MODEM can communicate a variety of AT commands that it supports.


Figure 2.6: GSM MODULE.

## 2.6 Circuit Design:

In this project, we used tinkercad to design the circuit. And also used tinkercad for iOT coding implementation and testing peruse.

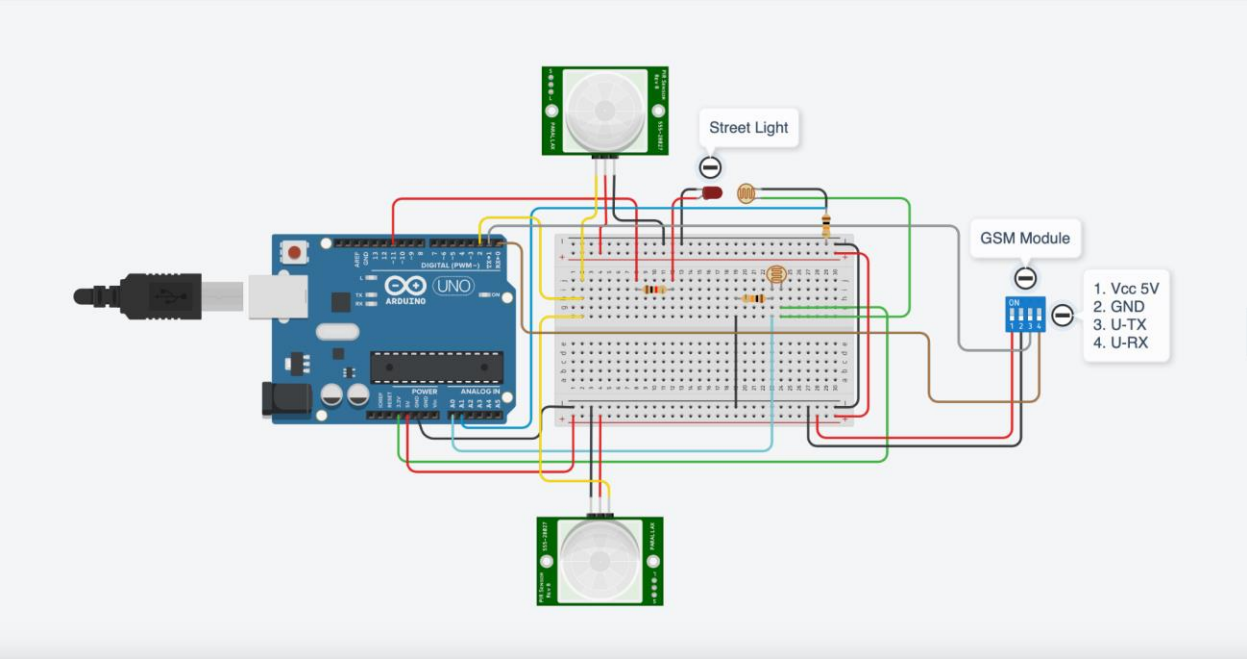



Figure 2.7: Circuit Design.

# CHAPTER 3

# REQUIREMENT SPECIFICATION

## 3.1 Requirement Collection and Analysis

### Introduction

Software documents are to specify the whole project as a writing method. This project is to control streetlights using a server connection. This project includes some functionality to control lights.

### General Description

Street light controlling system is an IoT-based system that is used to control street lights from large destinations. We already know about web-based technology. In web-based technology has some user interface to control the system using backend technology. In this project, there have two LED sensors that are used to specify day or night. A motion sensor is used to track the position of vehicles. On closing a vehicle, the light behaves as the most powerful otherwise acts as less powerful.

### Functional Requirement

In this project there are some processes to control. As we can see, the user authentication function is used to authenticate a user. After that, he can turn off or on a light. can searchlight the neighborhood.

- Register Users
- On/Off lights
- Delete Lights
- Add Light
- Live status changes

### Interface Requirement

This project is holding a user login form to authenticate a user. There is an add a light form that is used to add new light. New lights are specified as a cart. In a cart, there is a switch for turning on or off a light. Over their Sensor's status will show on the first line. After that, some of the statuses will show serially LDR status, and Motion status.

In the design process for the landing page, we added a user instruction guide to help a new user. This is an open-source light-controlling system.

## Performance Requirement

Performance is very important for a development project. In this application, we use REACT to ensure the high performance of our software. In their case, a network connection is very important to work within time. We use a high-speed Wi-Fi connection system to ensure all statuses into the server. For the server, we use the firebase server which is providing google for free.

## Non-Functional Requirement

In this step, we are using firebase authentication which is providing google is high-security web authentication. Sensor status is saved on the firebase server. In this case, the security of our software is depending on google's new security agreements. The local area network connection is acting on the performance of the system.

## Preliminary Schedule

The time management of the project is shown below-

| No | Works | Person | Time |
|---|---|---|---|
| 01 | UX, Project analysis | Jannatul Ferdoush | 2 months |
| 02 | UI Implementation, Algorithm, System Architect, Backend integration | Al Helal Md Tasnim Shariar Akash | 4 months |
| 03 | Circuit integration, middleware wifi connection setup, server setup | same | 2 months |

## 3.2 Use Case Modelling and Description

Use case modeling are used to declare system mythology using art or sketch. Bellow, we represent the use case diagram.

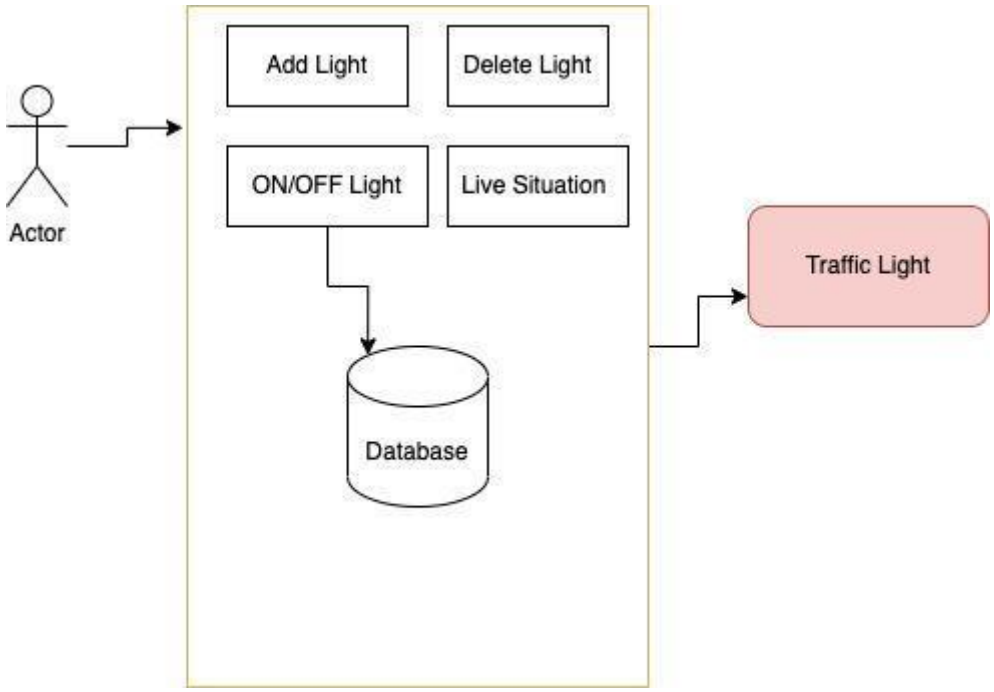



Figure 3.1: Use Case Modelling.

In the figure the actor/use can occur four functions those are added light- which can be used to add a street IoT light into the server, and delete light- which is another function to delete a light from the server. We can also visualize hole the system status. Light on off function- is used to turn the light on or off.

## 3.3 Logical Data Model

The logical data model is used to model data as a logical way representation. We also use logic to implement the IoT device. In the below, we added the model-

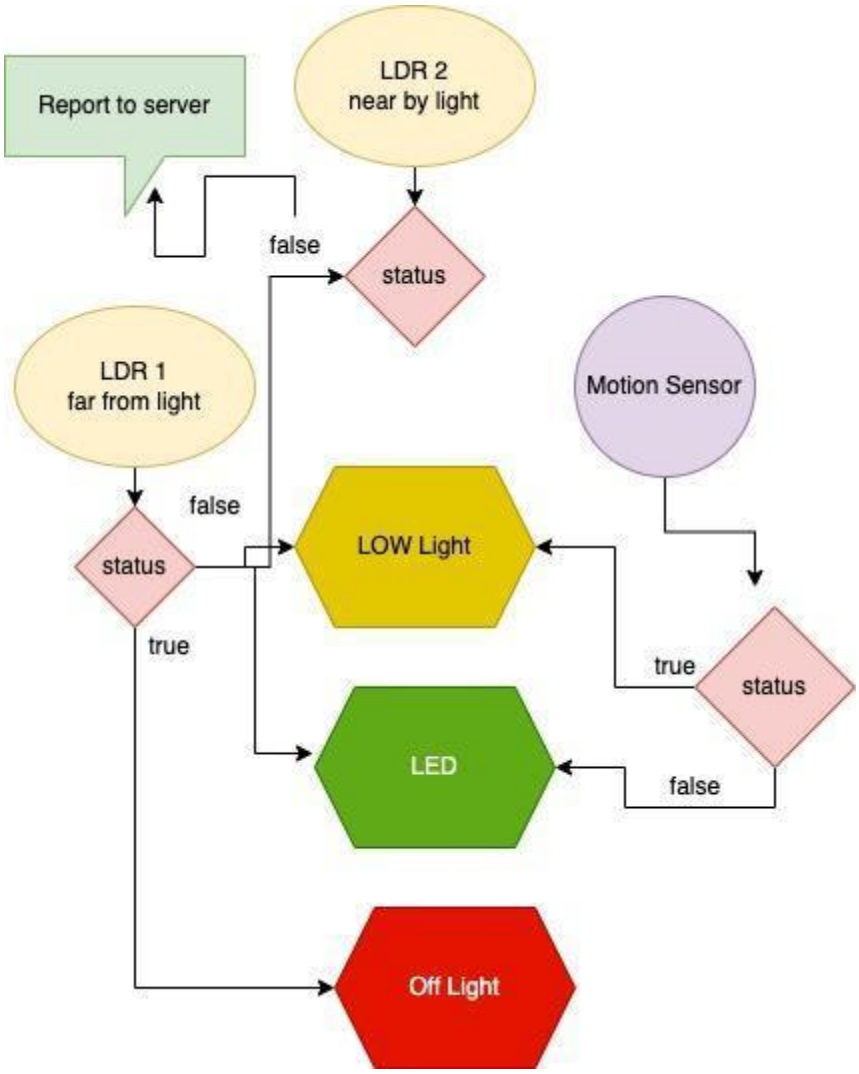



Figure 3.2: Data Model.

In this model there showing three conditions of light, these are Low, High, and Off. When the motion sensor's value is true and LDR 1 status is false we get LOW or if the sensor is true, we get HIGH. Another hand if the LDR 1 is true the light will OFF.

## 3.4 Design Requirement

Designs have their own structure. The flowing UI will represent a cart. UI needs more clearable to use and easy to understand. Some basic required things are needed to understand the system as follows -

- About the system
- How to use the system
- About the IoT device

## 3.5 Hardware Requirements

▪ Windows or iOS Operating System.
▪ A device that supports any Browser.
▪ Computer configuration:
- 4 GB RAM
- 520 GB HDD
- 2.1 GHz Processor

## 3.6 Hardware Implementation

The project is like below-

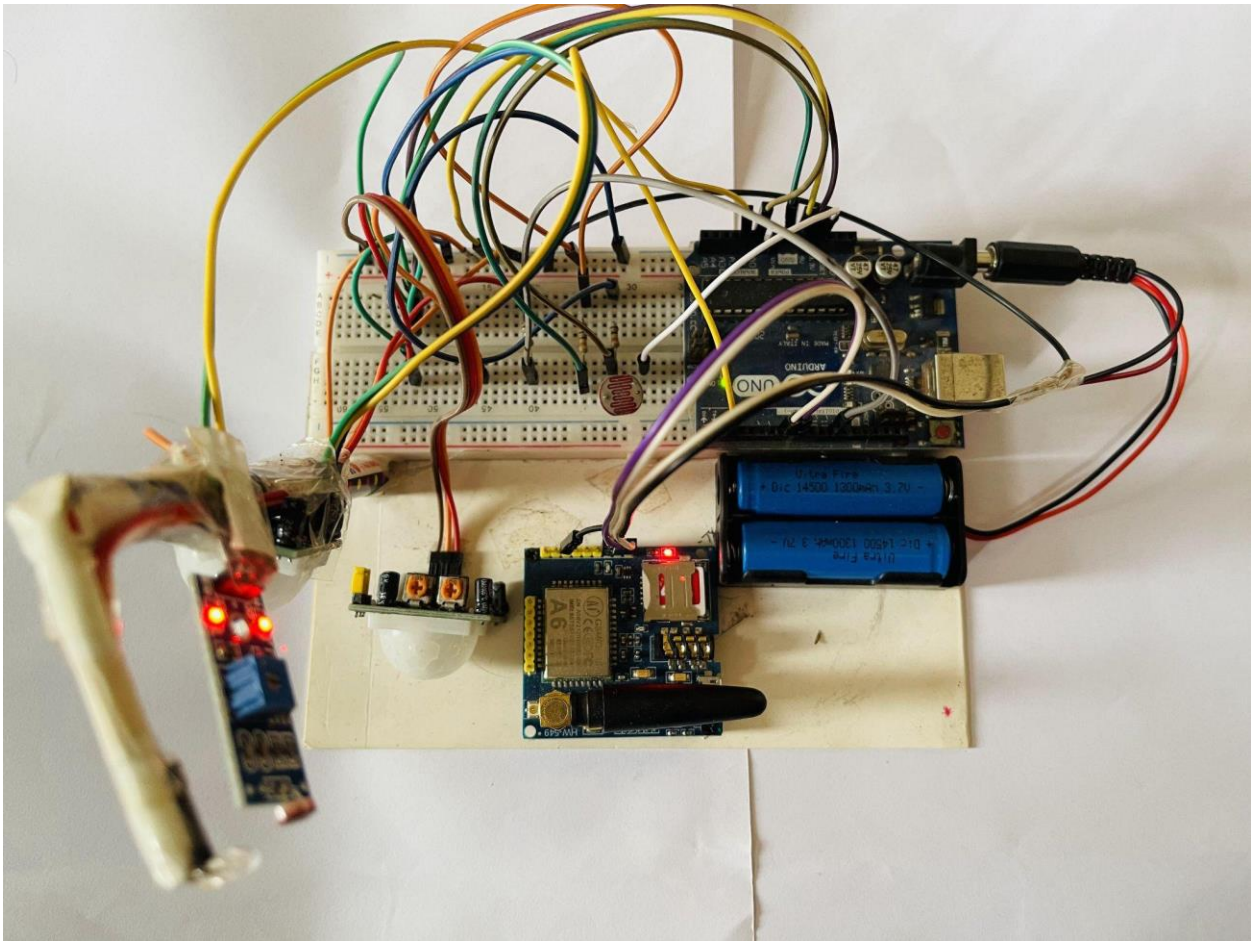


Figure 3.3: Hardware prototype.

# CHAPTER 4

# DESIGN SPECIFICATION

## 4.1 Front-End Design

Front-End design is used to interact with the non-technical user. We use React, a JavaScript library to implement the whole project. We create some declarative pages to visualize the whole structure. The system is divided into 2 different apps. Those are,

a. Admin App

b. User App

## Admin App

### 4.1.1 Admin App: Log In

As the super admin has the maximum power of managing the whole system, they must be authenticated properly. Log-in Activity will allow only the super admin to log in except that no other person will be able to pass this step.

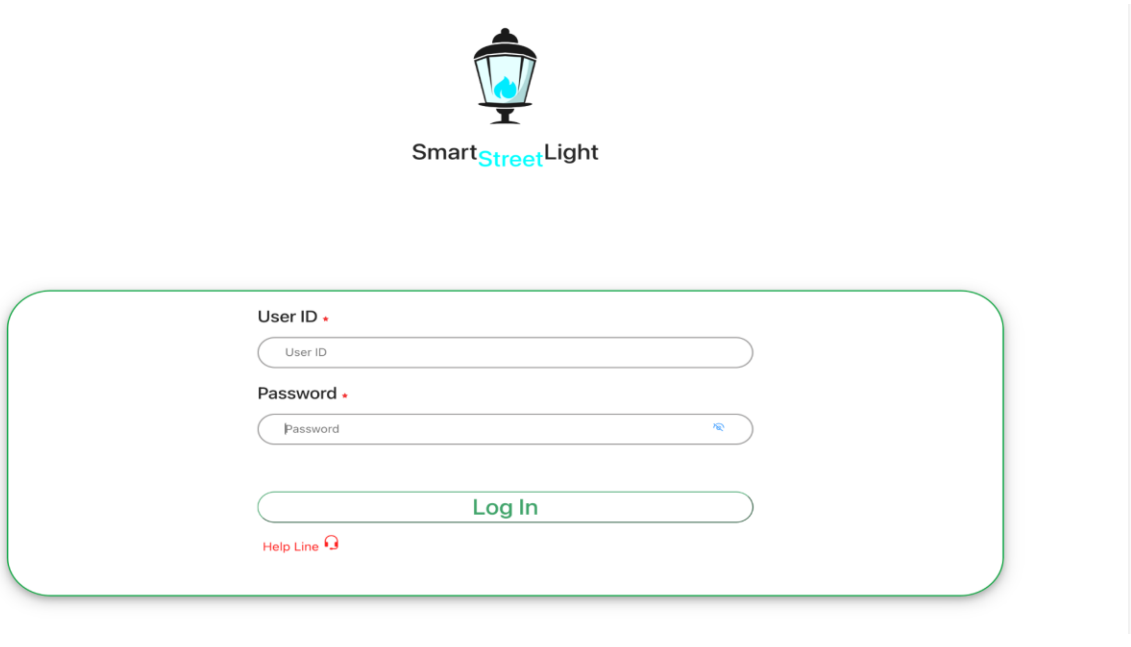



Figure 4.1: Admin App: Log In.

### 4.1.2 Admin App: Street Light

Street light performance can be seen from this page. Admin panel can delete and add Street lights if desired.

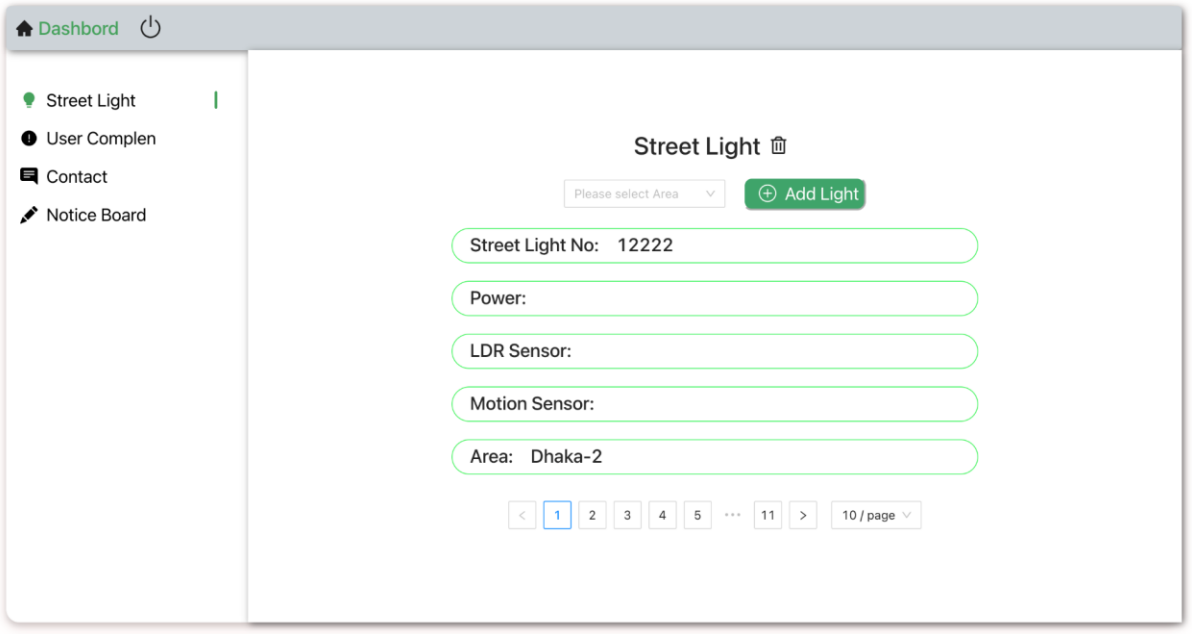



Figure 4.2: Admin App: Street Light.

### 4.1.3 Admin App: User Complain

Admin panel can observe every authentication related to any issue of any user. And also, the admin panel can delete any complaint if desired.

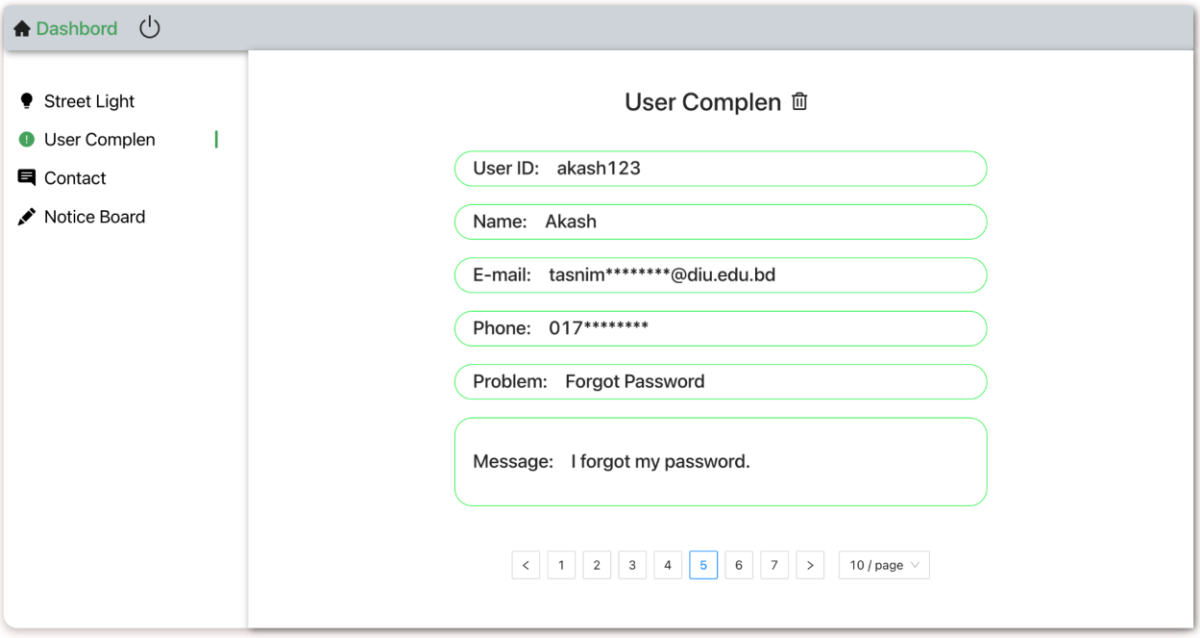



Figure 4.3: Admin App: User Complen.

### 4.1.4 Admin App: Contact Us

Any user can message from the website. If they face any problems or if they want to send a message. And also the admin panel has the option to remove any message.

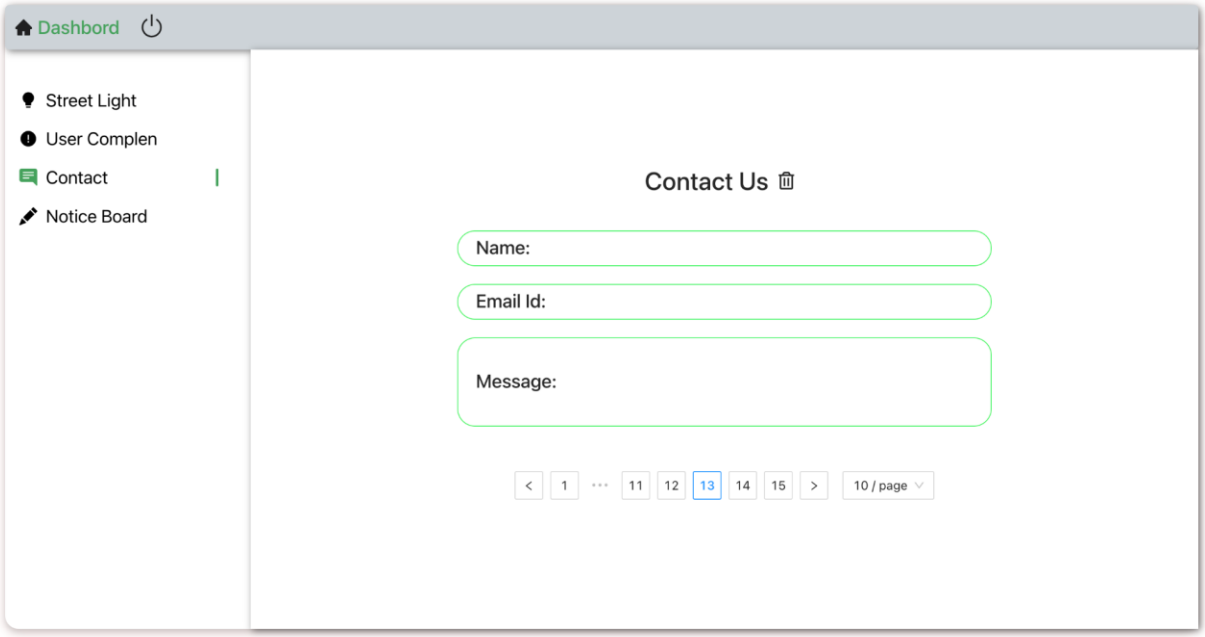



Figure 4.4: Admin App: Contact Us.

### 4.1.5 Admin App: Notice Board

The admin panel can send any notice to the website if they want. And they can delete it if they want.

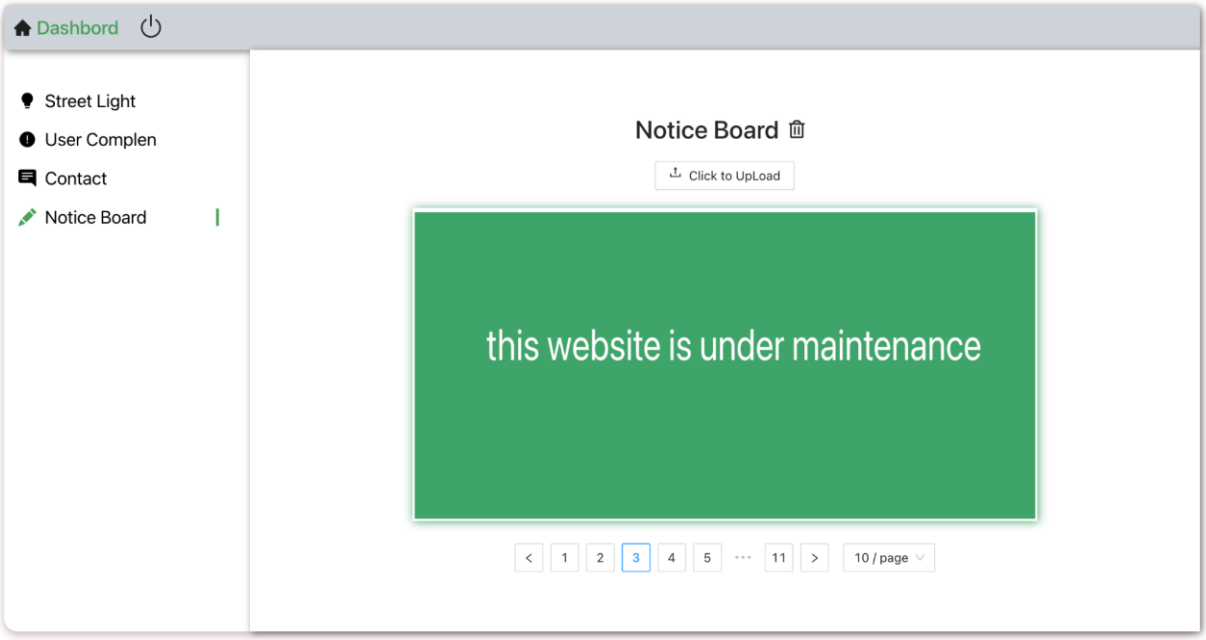



Figure 4.5: Admin App: Notice Board.

## User App

### 4.1.6 User App: Home

Home page is presenting whole system as an image slideshow with some text.

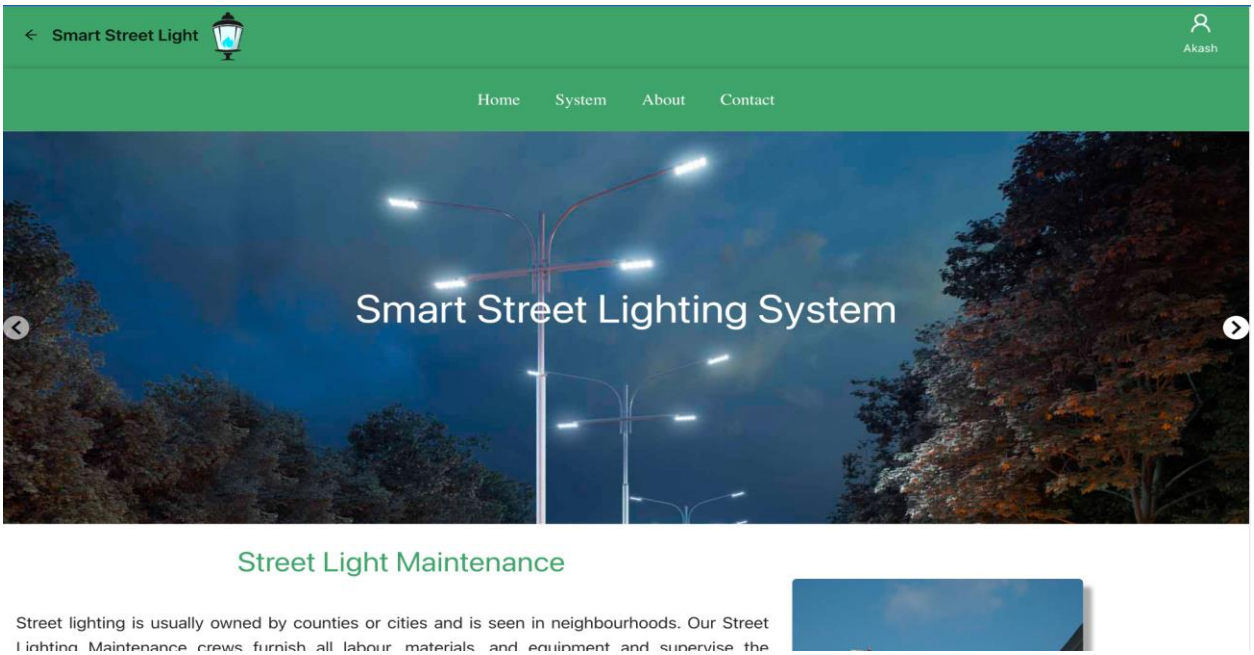



Figure 4.6: User App: Home.


Figure 4.7: User App: Home.

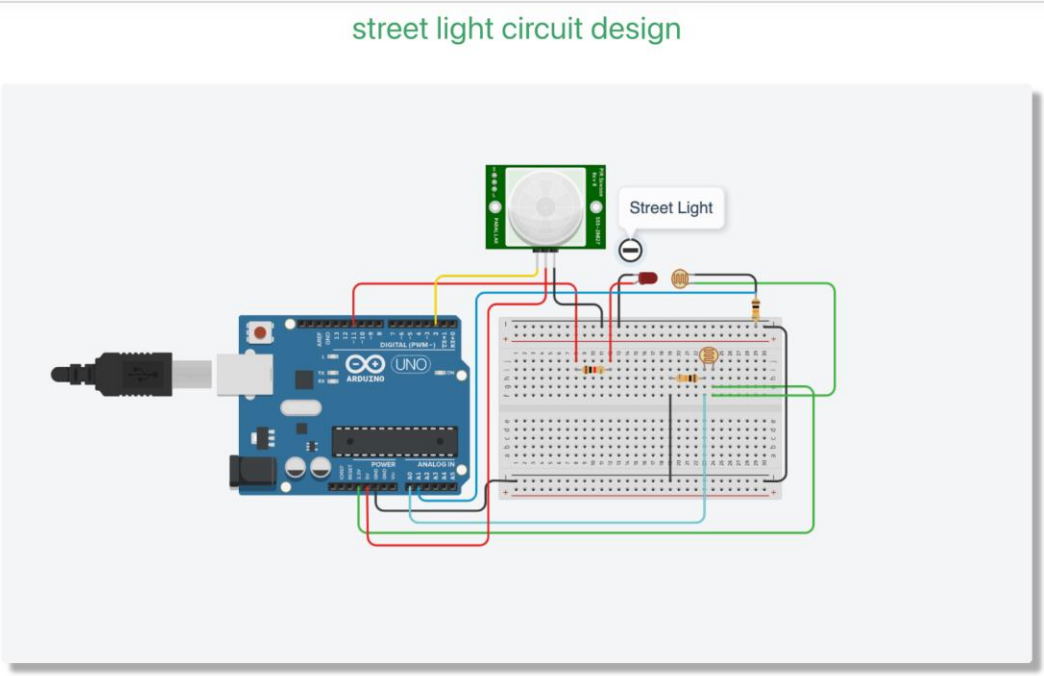



Figure 4.8: User App: Home.

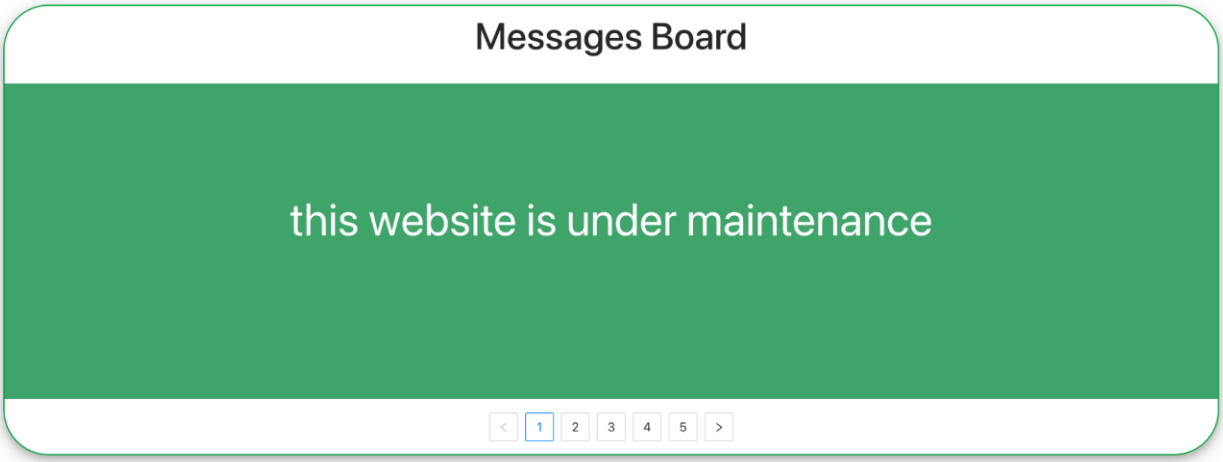



Figure 4.9: User App: Home.


Figure 4.10: User App: Home.

### 4.1.7 User App: System

The system has some carts that represent LED status, Motion sensor status. It has two functions UI that are Delete a light and turn of led system.

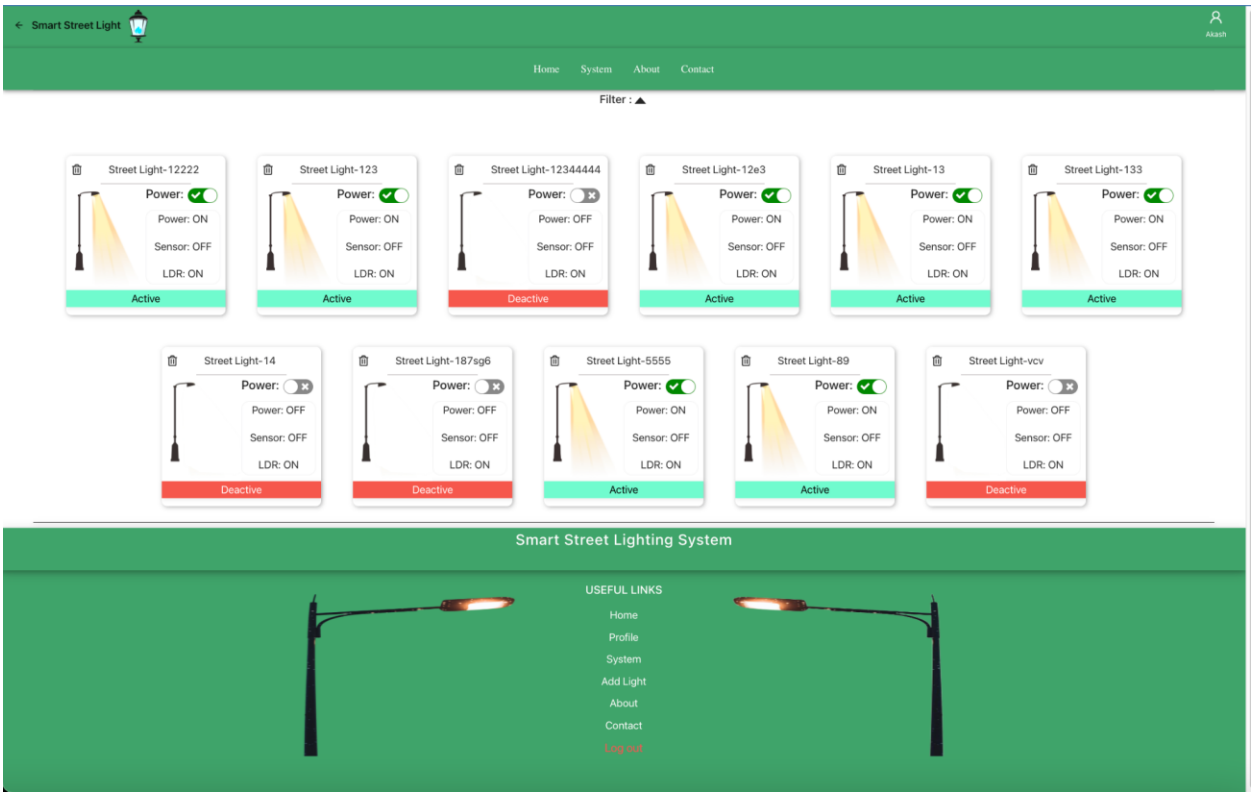



Figure 4.11: User App: System page.

### 4.1.8 User App: Add Light

This page declares the added Light and Area.

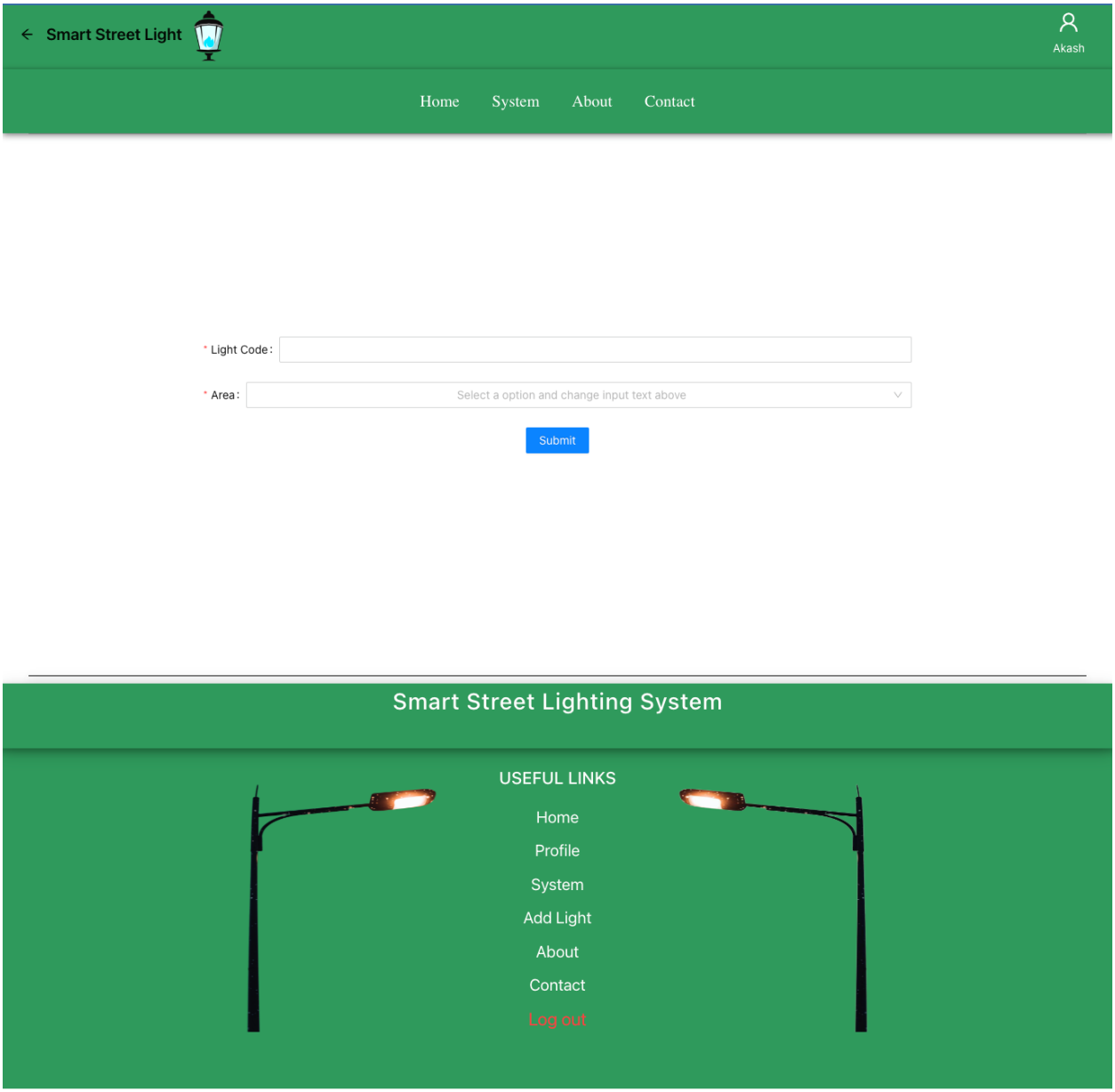



Figure 4.12: User App: Add Light page.

### 4.1.9 User App: Profile

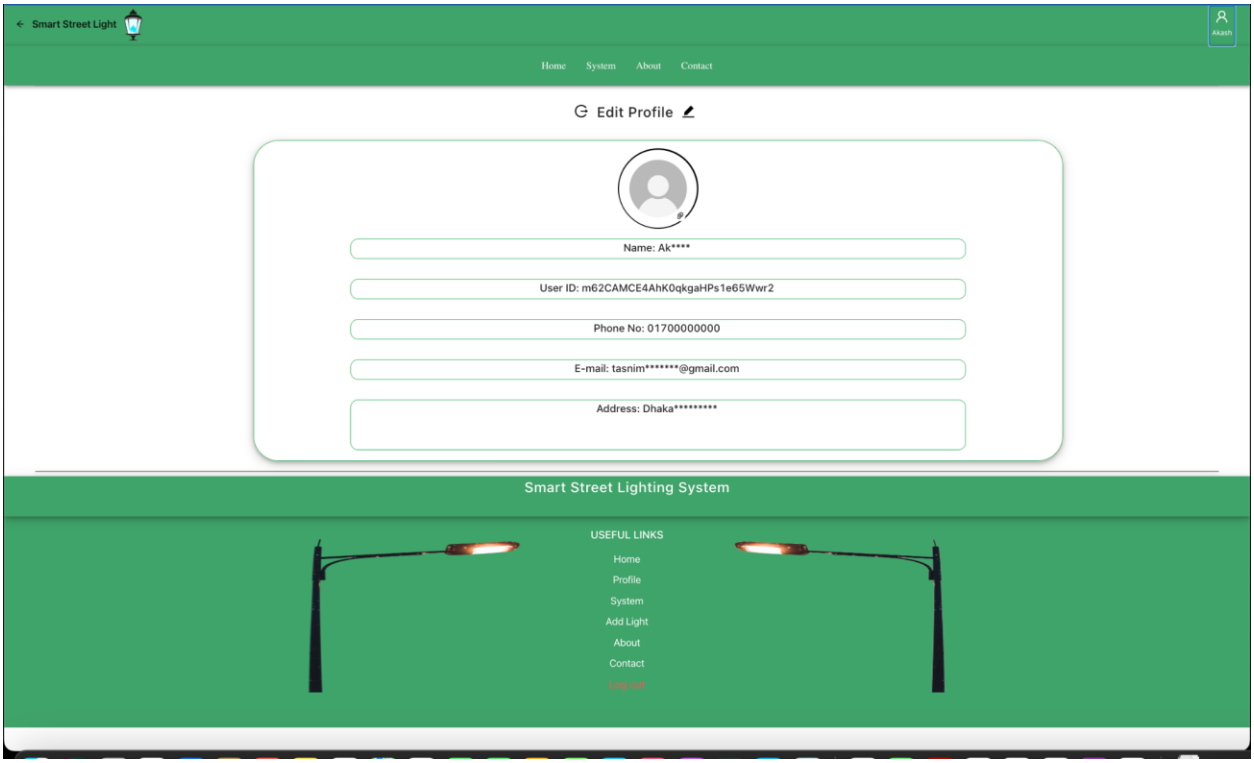



Figure 4.13: User App: Profile page.

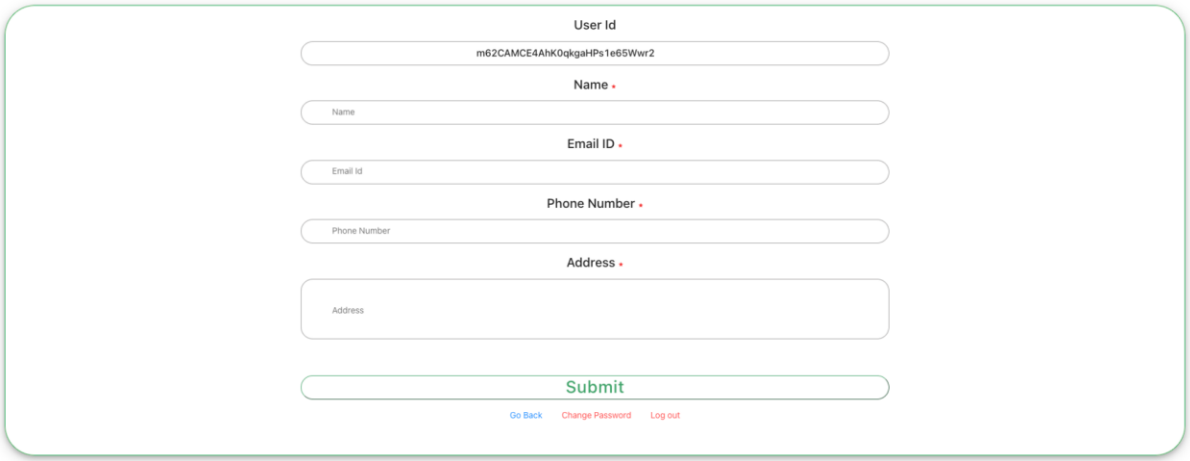



Figure 4.14: User App: Edit Profile page.

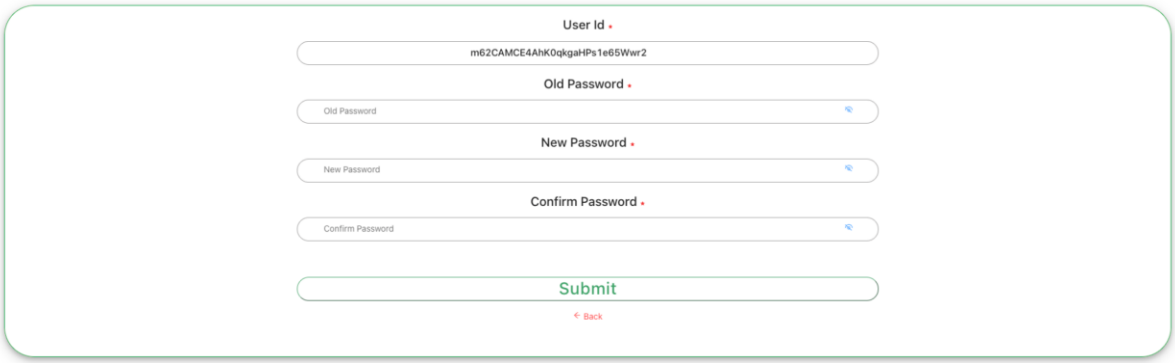



Figure 4.15: User App: ChangePassword page.

### 4.1.10 User App: Contact

This page is Contact page.


Figure 4.16: User App: Contact page.

**Websites:**

Smart Street Ligh of the Website, available at "https://smart-street-light-e3189.web.app"

## 4.2 Back End Design

A system's back end is its most critical element. In this project, we store sensor information in the Firebase database. Firebase Authentication system to sign up a user. An IoT device connected to a server has been presented already. The status of the device with a Unique id will be sent to the firebase server automatically when connected to the Wi-Fi. Most simply, the deception will automatically be shown on the User Interface. The authenticated user can operate the light from any device.

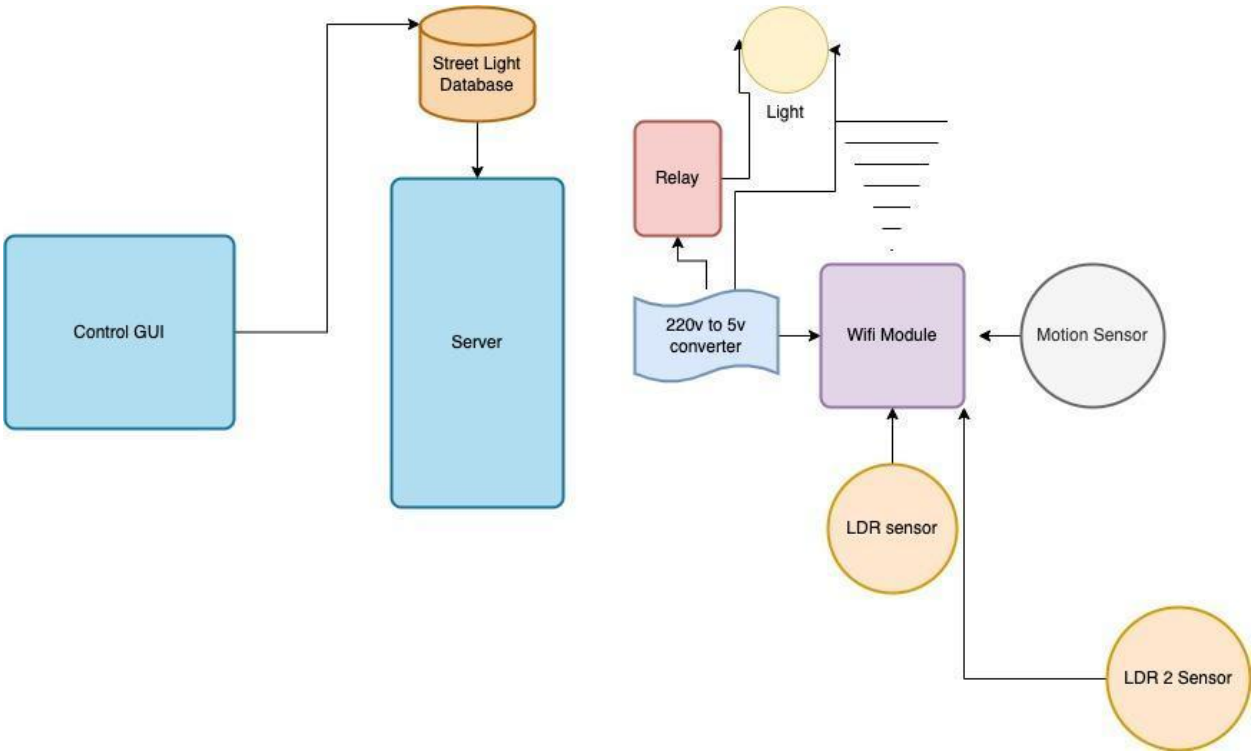



Figure 4.17: System Design.

## 4.3 Introduction Design and User Experience

Designs are easier to understand for non-technical users. Their landing page is showing the whole system. Everyone will simply understand the theme of the project. We use a system page where easily a user can view those light carts which are connected to Wi-Fi.

In a cart there is a switch button to stop the light another signal from the light will be shown on the cart also.

## 4.4 Implementation Requirements

To implement we have required follows

- UI Design
- Implement hole UI with React Components
- Installing Firebase to the system.
- Create an API that can be used to send data
- Implement IoT device to send light status to server

# CHAPTER 5

# IMPLEMENTATION AND TASTING

## 5.1 Implementation of Data Classes

Data classes are used to present the data flow of the application. Data Flows are presented below using Data Class Model:

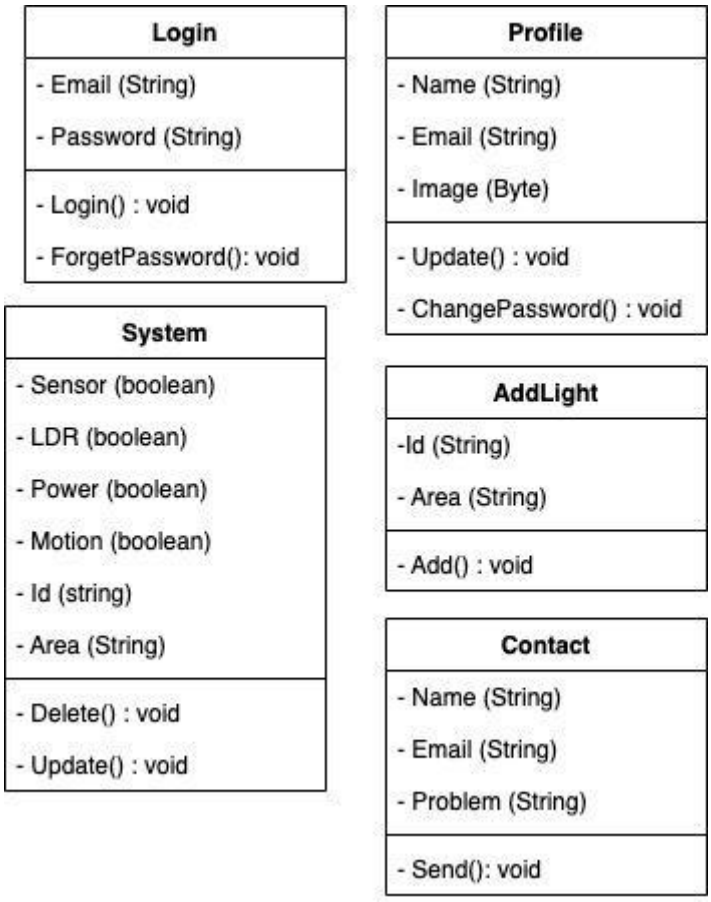



Figure 5.1: Data Class Model.

There are some functions presented in the Data Class Model. Those are used to control the system.

## 5.2 Implement of UI Design

UI is presenting on below- we used Adobe XD to implement UI for user control.

## 5.3 Testing Implementation

System testing was used two times to ensure our software quality. Software bugs sometimes get losses for Industry. For the first time, we use normal searching bugs which are target font end only. After that we test the whole backend to ensure that isn't it ok or not. We marked all bugs and created a test report.

## 5.4 Test Result and Reports

Fundamentals of evaluation programming. In this section, tests are performed. Through continuous testing, you can check the quality, functionality, and usability of the software before releasing it. There are different types of Web Application testing, such as home device testing, hardware testing, and device usability testing. To run a unit test on your home computer, just use Visual Studio Code and the JVM. These tests are used for code analysis (logical testing of raw Java code). Improve your testing skills by integrating testing tools like Mokito to build test apps for Web APIs.

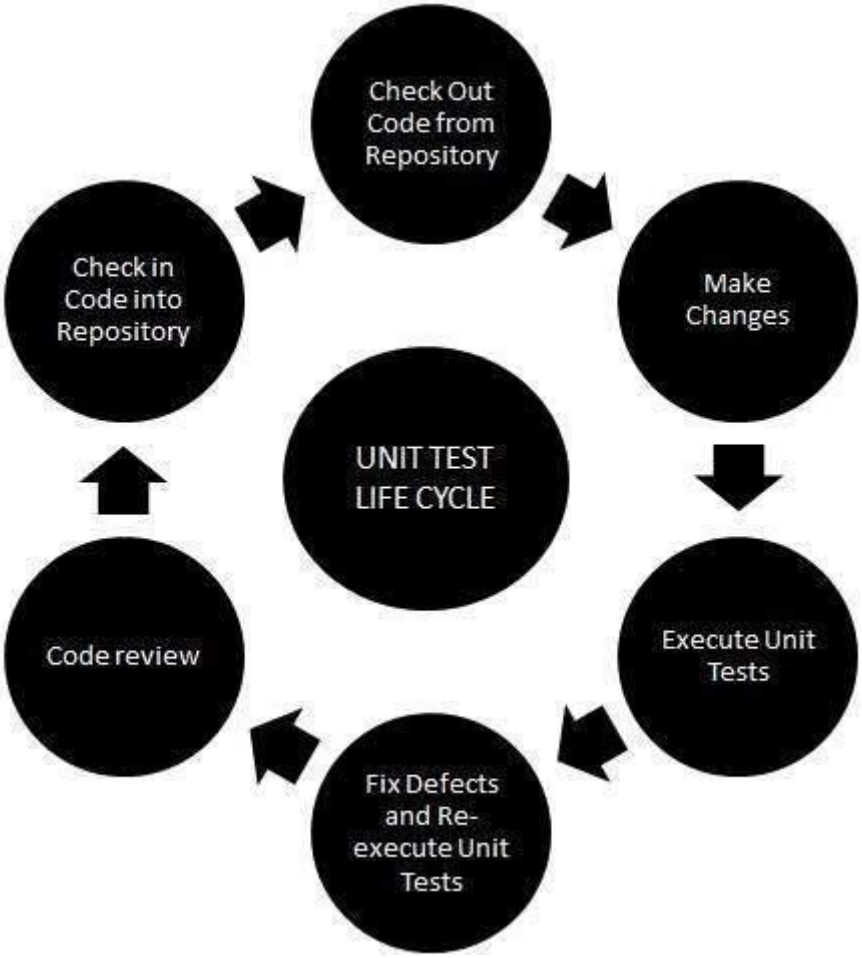



Figure 5.2: Unit Testing Diagram

# CHAPTER 6

# IMPACT ON SOCIETY, ENVIRONMENT AND SUSTAINABILITY

## 6.1 Impact on Society

A large number of Bangladeshi populations use highways for transport And Street lights are used on these highways. Through this project, the streetlights can be kept under constant supervision and if there is any problem with any street light, immediate live fixes can be made.

## 6.2 Impact on Environment

One of the major problems of Bangladesh is electricity shortage and through this project, we will be able to save electricity and prevent wastage of electricity. Through this project, we will be able to prevent a lot of electricity wastage**.**

## 6.3 Ethical Aspects

With the proper authority, the system will be monitored and maintained and the data which is being used is just the location of the street light. This must not harmful anyhow and authority will share its location by choice. That is why there is no ethical problem with this system.

## 6.4 Sustainability Plan

Our system is designed to check out street light locations which is why the necessity of our system is high. Except that this system can be used in traffic light systems also. Thus the system has been very sustainable and useful.

# CHAPTER 7

# CONCLUSION AND FUTURE SCOPE

## 7.1 Discussion and Conclusion

We finished this project with help of JS, Firebase, and many more. Users can take advantage of this site if they have a smartphone or any computer device. Users just need a device with a good internet connection. They can control street lights and their condition using this site. It's a very easy and user-friendly site to control and save energy.

## 7.2 Scope for Further Development

As this site is already a user-friendly and easy-to-use website to control street lights but in the time ahead, we will try to add more features to make this web easier to use or understand. And our very next plan is to make a mobile application so more users can connect easily and can save more power.

## REFERENCES


[1] Kumar, Manish, Ravinder Kumar, and R itula Thakur. "Zigbee Based Smart Street Light Control System Using Lab VIEW." Int. Journal of Innovative Research in Science, Engineering and Technology 5.4 (2016).

[2] Abhishek, M., K. Chetan, and K. Arun Kumar. "Design and implementation of traffic flowbased street light control system with effective utilization of solar energy." Int. J. Sci. Eng. Adv. Technol 3.9 (2015): 195 - 499.

[3] Mohamed, Samir A. Elsagheer. " Smart street lighting control and monitoring system for electrical power saving by using VANET." In t'l J. of Communications, Network and System Sciences 6.08 (2013): 351.

[4] Amin, Chaitanya, Paridhi Holani AshutoshNerkar, and Rahul Kaul. "GSM based autonomous street illumination system for efficient power management." International Journal of Engineering Trends and Technology 4.1 (2013): 54 - 60.

[5] K.Y.Rajput, GargeyeeKhatav, Monica Pujari and Priyanka Yadav" Intelligent Street Lighting System Using Gsm" International Journal of Engineering Science Invention Volume 2 Issue 3 , March, 2013.

[6] Ananth, A., Venkatesh, S.D., Kanimozhi, G., MohanBabu, P. and Arumugam, S.S., 2020. IOT based street lighting control system. *International Journal*, *8*(7).

[7] Dheena, PP Fathima, et al. "IOT based smart street light management system." *2017 IEEE international conference on circuits and systems (ICCS)*. IEEE, 2017.

**Plagiarism report:**

ORIGINALITY REPORT

| 26% | 24% | 4% | 18% |
|---|---|---|---|
| SIMILARITY INDEX | INTERNET SOURCES | PUBLICATIONS | STUDENT PAPERS |

PRIMARY SOURCES

| | | |
|---|---|---|
| 1 | dspace.daffodilvarsity.edu.bd:8080<br>Internet Source | 11% |
| 2 | Submitted to Daffodil International University<br>Student Paper | 5% |
| 3 | turcomat.org<br>Internet Source | 5% |
| 4 | Submitted to Jabatan Pendidikan Politeknik Dan Kolej Komuniti<br>Student Paper | 2% |
| 5 | Submitted to Alliance University<br>Student Paper | 1% |
| 6 | Submitted to CSU, San Jose State University<br>Student Paper | 1% |
| 7 | Submitted to University of Portsmouth<br>Student Paper | <1% |
| 8 | Submitted to Westcliff University<br>Student Paper | <1% |
| 9 | Dankan Gowda V, Falguni Bakshi, Gahana A, Anusha Babu Naik, Navya HG. "Covid-19 | <1% |

| | | |
|---|---|---|
| | Prevention Kit Based on an Infrared Touchless Thermometer and Distance Detector", 2021 5th International Conference on Electronics, Communication and Aerospace Technology (ICECA), 2021<br>Publication | |
| 10 | Submitted to SASTRA University<br>Student Paper | <1 % |
| 11 | Submitted to University of Kurdistan Hawler<br>Student Paper | <1 % |
| 12 | Submitted to Beirut Arab University<br>Student Paper | <1 % |
| 13 | pdfcoffee.com<br>Internet Source | <1 % |
| 14 | www.ijlera.com<br>Internet Source | <1 % |
| 15 | P. P. Fathima Dheena, Greema S. Raj, Gopika Dutt, S. Vinila Jinny. "IOT based smart street light management system", 2017 IEEE International Conference on Circuits and Systems (ICCS), 2017<br>Publication | <1 % |
| 16 | psasir.upm.edu.my<br>Internet Source | <1 % |
| 17 | www.irjmets.com<br>Internet Source | <1 % |