K.D. POLYTECHNIC

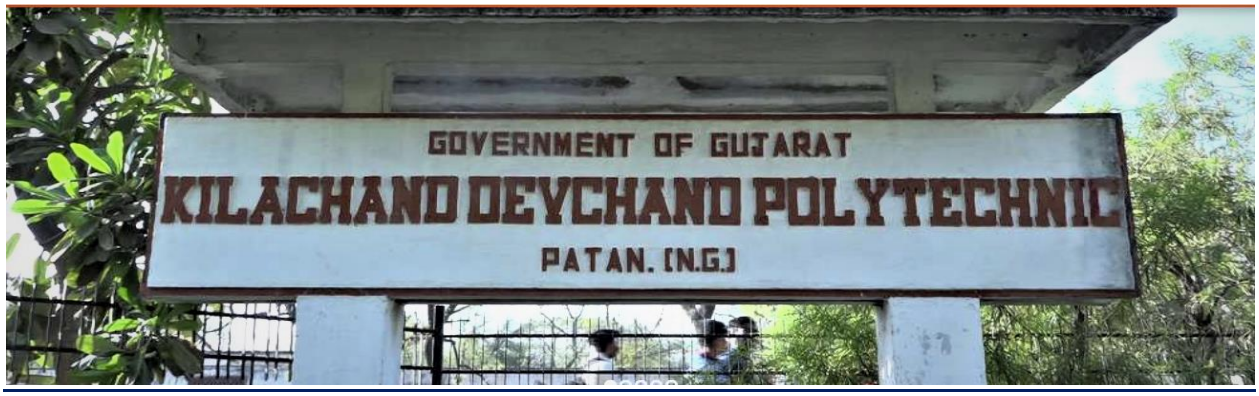
PATAN

DIPLOMA IN COMPUTER ENGINEERING

YEAR: 2021

SEMESTER: 6th

PROJECT REPORT



PROJECT TITLE: IoT Based Automated Street Light System

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A PROJECT REPORT ON

"IoT Based Automated Street Light System"

AT

K. D. POLYTECHNIC PATAN

Internal Guide:

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Submitted To

Department of Computer Engineering

K. D. Polytechnic, Patan

CERTIFICATE

TO WHOM SO EVER IT CONCERN IT MAY CONCERN

This is to certify that students PRASHANT RAJPUT (176310307535), HIMNANDINI SHARMA (186310307107), ALIJAFAR SUNASARA (186310307115) of Diploma Semester-V (Computer Engineering) have completed **Part-II UDP Project (3360707) work** titled "IoT BASED AUTOMATED STREET LIGHT SYSTEM" satisfactorily in final fulfillment of the UDP work which is prerequisite to complete Diploma Engineering.

College Project Guide:

Mr. M.R. THAKKAR SIR

Head of Computer Department:

ACKNOWLEDGEMENT

This project work has been the most practical and exciting part of our learning experience, which would be an asset for us and for our future career. It has prepared us to apply our self-better to become a good professional.

No System is created by an individual. Many people have helped to create this system. And each of their contribution has been valuable. Proper organization of concept and analysis of the system is due to keen interest and helping hand of our teachers and colleagues. We take this opportunity to acknowledge their support.

Our first thanks go to "K.D. Polytechnic - CE Department" – which has part of final semester. Without this we could not have the practical use of what we studied during our last two years of curriculum.

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We would like to thanks the entire staff for giving us help and co-operation during our Project Period.

Last, but not the at least, we would like to acknowledge our parents for their moral support through the entire project duration. And to all those people who have directly or indirectly helped us in completion of the project.

PRASHANT RAJPUT

HIMNANDINI SHARMA

ALIJAFAR SUNASARA

Abstract

The aim of automated street light system using IOT is the conservation of energy by reducing electricity wastage as well as to reduce the manpower. Streetlights are the elemental part of any city since it facilitates better night visions, secure roads, and exposure to public areas but it consumes a quite large proportion of electricity. In the manual street light system lights its powered from sunset to sunrise with maximum intensity even when there is sufficient light available. This energy wastage can be avoided by switching off lights automatically. The saved energy can be efficiently utilized for other purposes like residential, commercial, transportation etc.

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1.1 Overview of Project

1.2 Scope of Project

1.3 Purpose of Project

1.4 Modules of Project

1.1 Overview of Project

- The "IoT Based Automated Street Light System" is use to sense the natural light and set itself intensity as per need.
- We can make "IoT Based Automated Street Light System" web application for database manage.
- Operators can operate street lights web application they can only show current status and ON/OFF Street light.

1.2 Scope of Project

- Generally, In Today's Street Light System They Can Manually or Automatically ON and OFF but It Should Done with Particular Time.
- In Manual ON and OFF Street Light System, It Should Be Time Consuming and In Automatic Street Light System It Is More Power Consuming and Also Not Reliable.
- In Iot Based Automated Street Light System We Should Glow Street Light Intensity and Also Turn ON and OFF According to Sun Light So It Consume Less Power and It Is Reliable Then Current Street Light System.
- We Should Also ON and OFF Any Particular Street Light Using Mobile Application So It Should Less Time Consuming Then Current Street Light System

1.3 Purpose of Project

We have all heard that knowledge is power. Each project provides knowledge to the learners. The purpose of this project is to provide some functionality such as –

- Time Saving,
- Electricity Power Saving
- Reliable
- Wireless Control Street Lights

1.4 Modules of Project

Users of This System: -

- Admin

Admin Activity: -

- Admin Can Store the Records in Database.
- Admin Can Access the Database of street light management system.
- Admin can add new area for street light.
- Admin can also add new street lights for particular area
- Admin can also on/off street lights wirelessly

CHAPTER 2: - PROJECT PLANNING

2.1 PROJECT FLOW

2.2 ALL ACTIVITY TIMELINE CHART

2.1 Project Flow

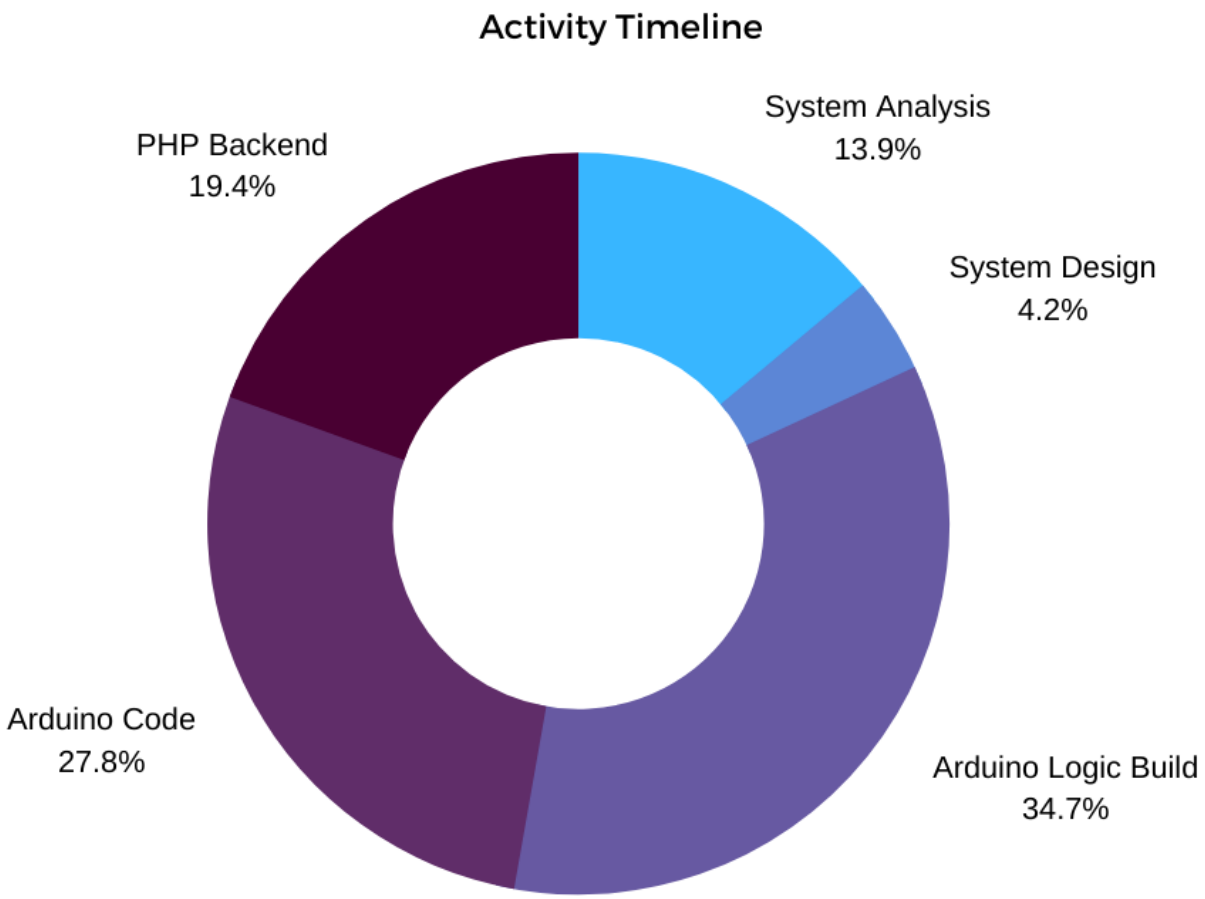
The main flow of the entire training session can be broken down into the following parts:

1. Learning the technology to be used:
   This includes a study of the features of Arduino and PCB (Printer Circuit Board).
   This includes a study of the features of PHP, HTML, CSS and Bootstrap.
2. Developing sample applications:
   This includes the usage of Arduino and the user controls (Standard Common Controls, ON or OFF Control) provided by it with the IoT Based Street Light Automated System App as the code-behind language.
   And Admin Can Manage the Database of Street light Automation system.
3. Analysis & Research into our Project:
   An intensive study of previous version of social sites was carried out to understand the features provided by it. Lists of most common and likely features were noted down as the initial Requirement Specification document discussed in the next section.
4. UML Diagram to specify the System Design:
   The use-case diagram, class diagram, activity diagram was prepared to get better picture of what was to be developed.
5. Preparing the Design Document:
   The first stage design document was prepared documenting all the work done before the coding phase begins. A strict adherence to the design document was followed at later stage of development so that our project doesn't divert from its path to the final goal.
6. Assembling and Coding Arduino:
   Assemble all the parts to Arduino Like LDR Sensor, Male to Female Jumper Wire, Resistors, ESP8266 Wi-Fi Module, LED, Breadboard.
   After that start coding in Arduino IDE and upload code into Arduino Board.
7. Design Software for Arduino Controls:

   Admin can turn ON and OFF lights. It will show the current status of lights and shows which light is working properly or not.

8. Preparing the final project document:
   All the work done till now was documented in a single project document at which you are looking at.

2.2 All Activity Timeline Chart



CHAPTER 3: - REQUIREMENT ANALYSIS

3.1 Hardware and Software Requirement

3.1 Hardware And Software Requirement

3.1.1. Hardware Requirements (Minimum Requirement)

- Arduino UNO 5v Power Supply
- ESP WIFI Module
- LDR Sensor
- LED Light
- Ohm Resistors
- Minimum RAM: - 4GB
- Hard Disk: - 128 GB
- Processor: - Intel Pentium 4(1.50 GHZ) or above

3.1.2. Software Requirements (Minimum Requirement)

- Arduino Programming
- Android 5 Or Above
- 50mb Space
- Front Design: HTML, CSS
- Front-End Language: PHP
- Back-End: PHP
- Back-End Connectivity: MYSQL

CHAPTER 4: -SYSTEM DESIGN

4.1 Data Flow Diagram

4.2 E – R Diagram

4.3 Data Dictionary

4.4 Use Case Diagram

4.5 SnapShots

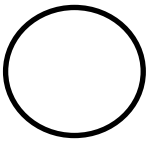
4.1 Data Flow Diagram

- **Theory**

The data flow diagrams are pictorial or graphical representation of the outline of the system study. The data flow diagram covers all the processes and data storage area which takes place during any transaction in the system. The data flow diagrams are functionally divided into context level, First level and Second level data flow diagrams.

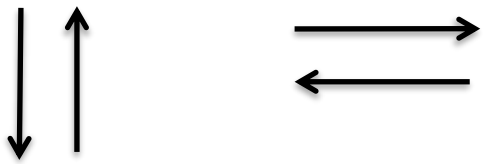
Symbols Used in Dfds:

(1) Process: Here flow of data is transformed. E.g. Charge Calculations, etc**.**



(2) External Entity: A source or destination of data which is external to the system. E.g. Customer etc**.**

(3) Data flow: It is packet of data. It may be in the form of document, letter etc.



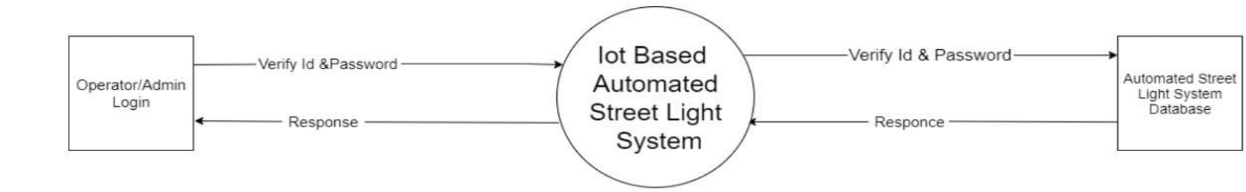
(4) Data store: Any store data but with no reference to the physical method of storing**.**

4.1.1 Context Diagram –Level 0

A context diagram is a top level (also known as "Level 0") data flow diagram. It only contains only one process node ("Process 0") that shows the function of the entire system in relationship to external entities.

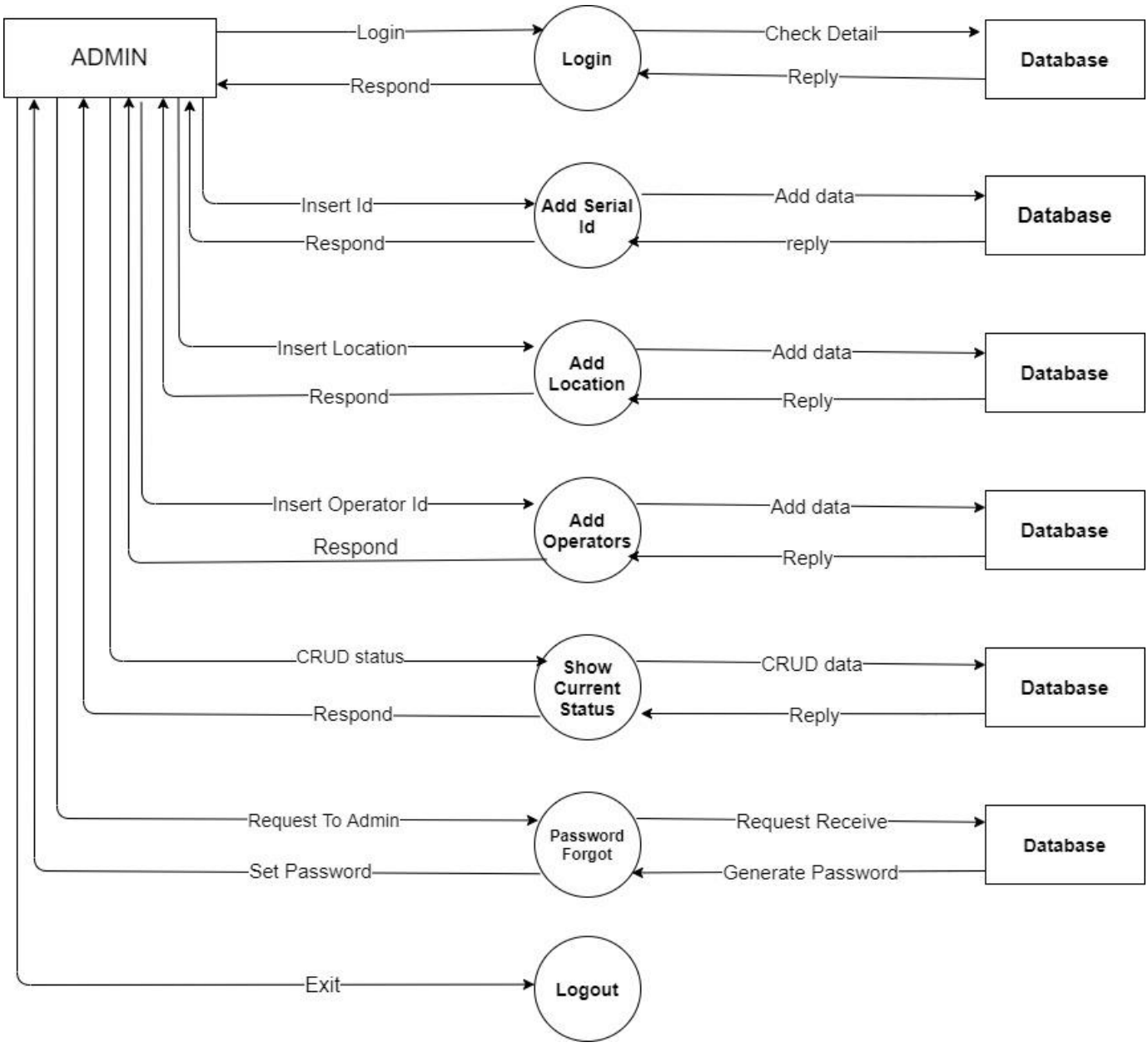
There should not be detailed description of process in context diagram.

Don’t Show the Data Store and Output in Context Level Diagram and Entities are finalized in this level after that we can’t add new entities in level 1 and level-2.



4.1.1 Dfd Level-0

4.1.2 DFD Level 1



4.3 DFD LEVEL-1 FOR ADMIN

4.2 E R Diagram

- **Theory**

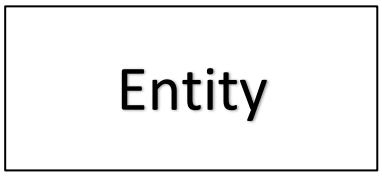
An entity relationship diagram (ERD) shows the relationships of entity sets stored in a database. An entity in this context is an object, a component of data. An entity set is a collection of similar entities. These entities can have attributes that define its properties.by defining the entities, their attributes, and showing the relationships between them, an ER diagram illustrates the logical structure of databases.

ER diagrams are used to sketch out the design of a database.

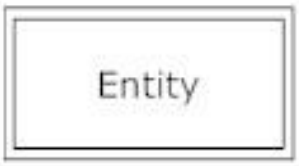
Entity Relationship Diagram Symbols

An ER diagram is a means of visualizing how the information, a system produces is related. There are five main components of an ERD:

- Entities: which are represented by rectangles. An entity is an object or concept about which you want to store information.

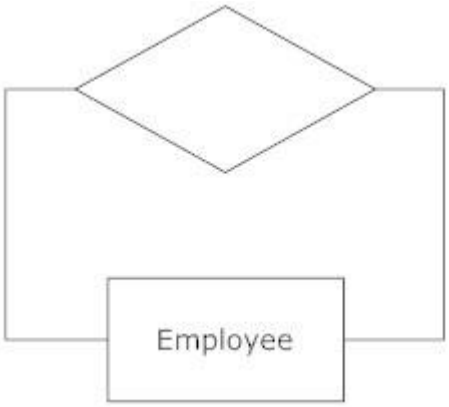


- A weak entity is an entity that must defined by a foreign key relationship with another entity as it cannot be uniquely identified by its own attributes



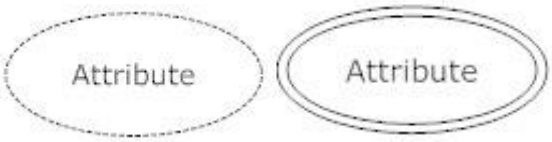
- Actions, which are represented by diamond shapes, show how two entities share information in the database.

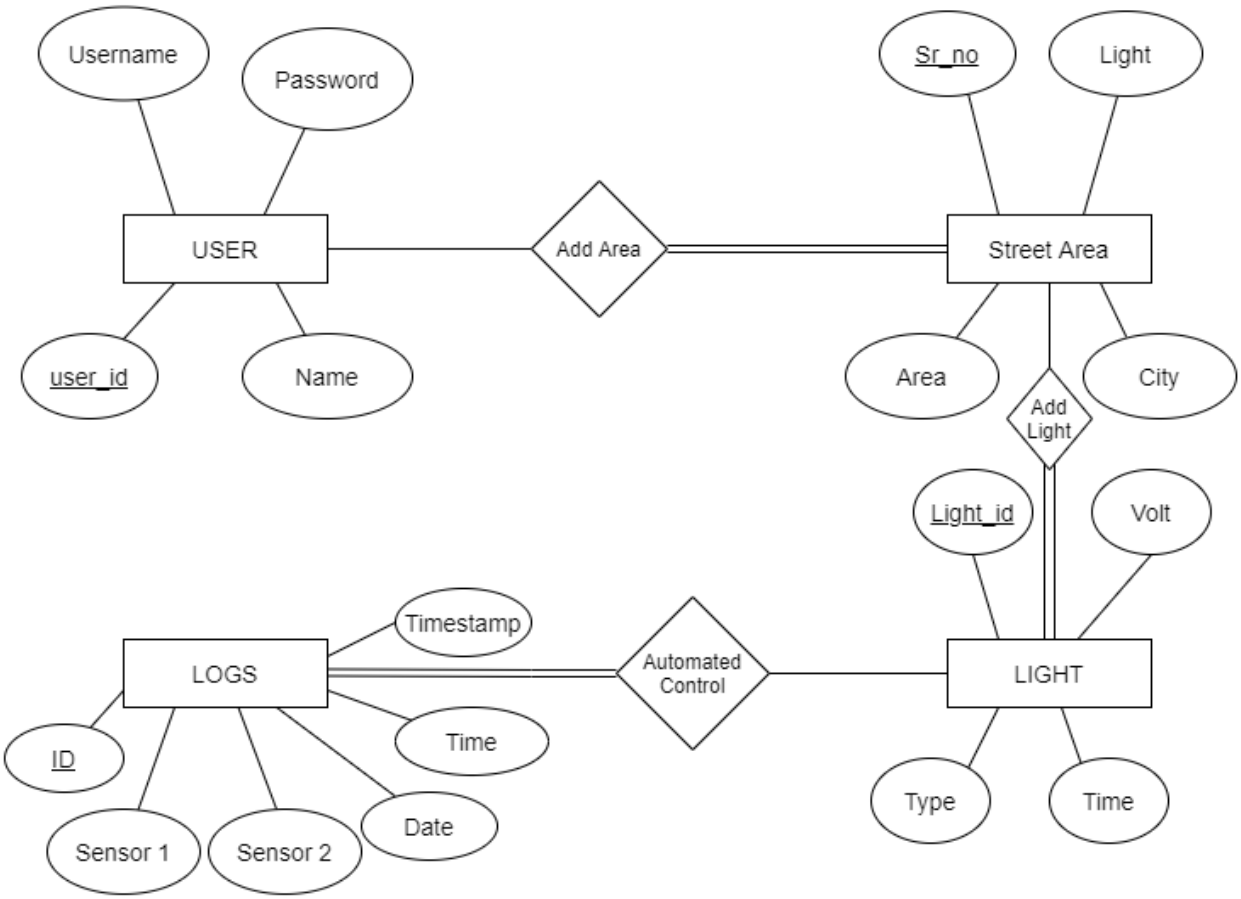
- In some cases, entities can be self-linked. For example, employees can supervise other employees



- Attributes, which are represented by ovals. A key attribute is the unique, distinguishing characteristic of the entity. For example, an employee's social security number might be the employee's key attribute.

- A multi valued attribute can have more than one value. For example, an employee entity can have multiple skill values. A derived attribute is based on another attribute. For example, an employee's monthly salary is based on the employee's annual salary.





4.2.1 E-R Diagram of System

4.3 Data Dictionary:

4.3.1 Home

Name	Data Type	Size	Key	Description
CITY	VARCHAR	50	NONE	STREET LIGHTS CITY
AREA	VARCHAR	50	NONE	STREET LIGHTS AREA
LIGHTS	INT	20	NONE	NUMBER OF LIGHTS
SR_NO	INT	12	PRIMARY	SERIAL NUMBER

4.3.2 Lights

Name	Data Type	Size	Key	Description
LIGHT_ID	INT	12	UNIQUE	LIGHTS IS
TYPE	VARCHAR	30	NONE	LIGHT'S TYPE/CATEGORY
VOLT	INT	20	NONE	STREET LIGHT'S VOLT
TIME	CURRENT_TIME_STAMP	-	NONE	CURRENT TIME UPDATED

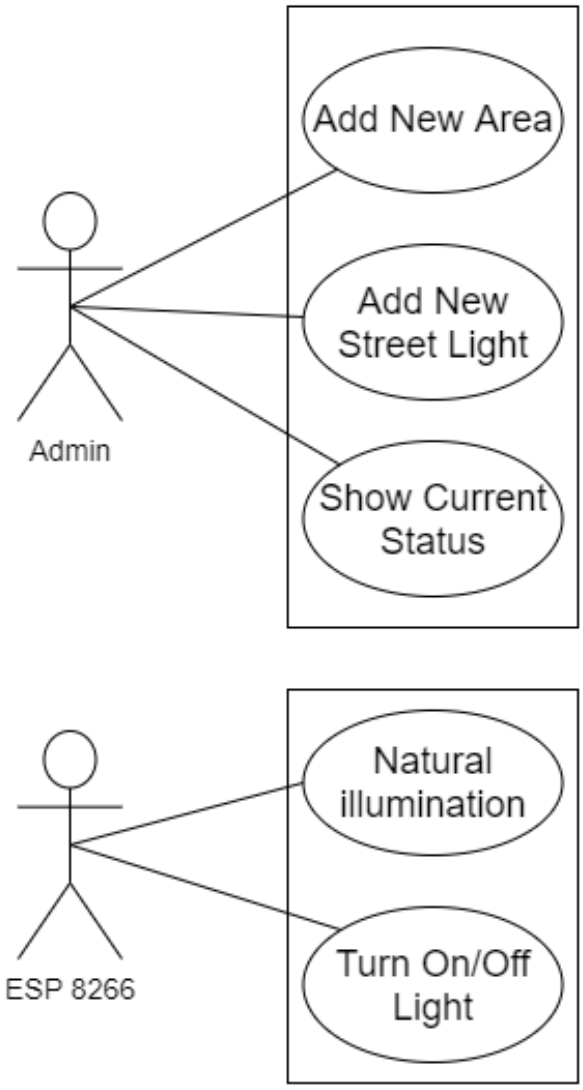
4.3.3 Logs

Name	Data Type	Size	Key	Description
ID	INT	6	UNIQUE	LIGHT'S ID
SENSOR1	VARCHAR	30	NONE	LIGHT'S LDR VALUE
SENSOR2	INT	30	NONE	LIGHT'S OUTPU VALUE
DATE	DATE	-	NONE	CURRENT DATE
TIME	TIME	-	NONE	CURRENT TIME
TIMSTAMP	CURRENT_TIME_STAMP	-	NONE	CURRENT TIME AND DATE

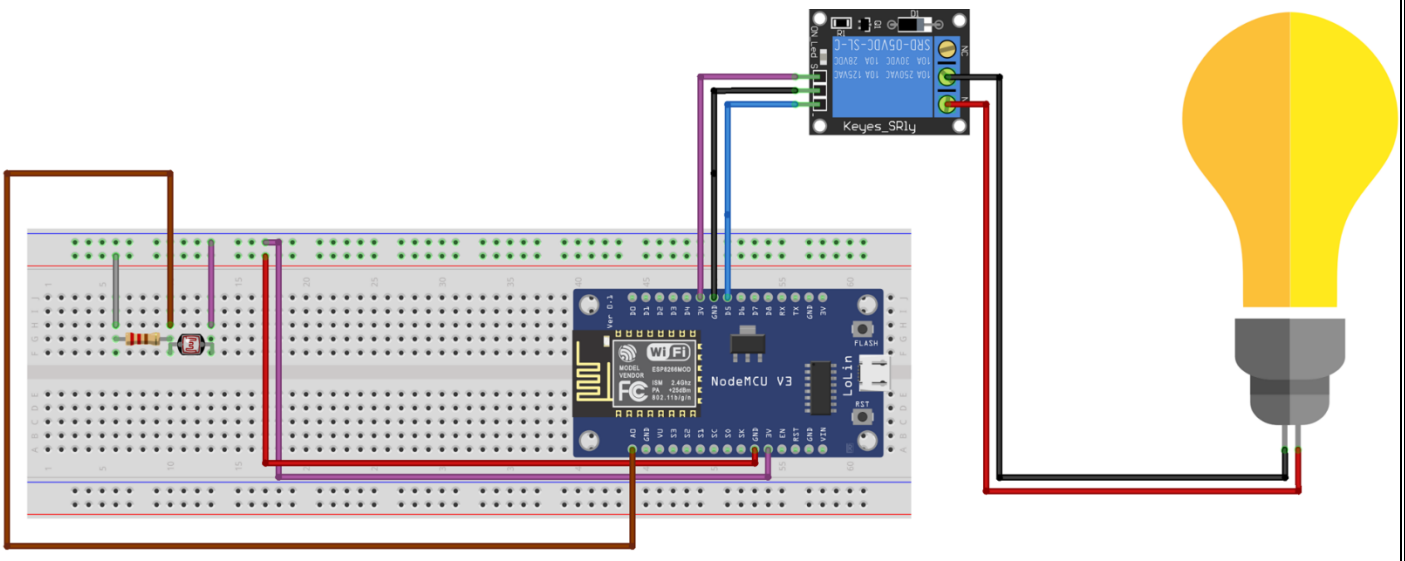
4.3.4 Users

Name	Data Type	Size	Key	Description
USER_ID	INT	11	PRIMARY	USER ID
USERNAME	VARCHAR	50	NONE	USER NAME
PASSWORD	INT	50	NONE	USER'S PASSWORD
NAME	DATE	50	NONE	USER'S NAME

4.4 Use Case Diagram: -

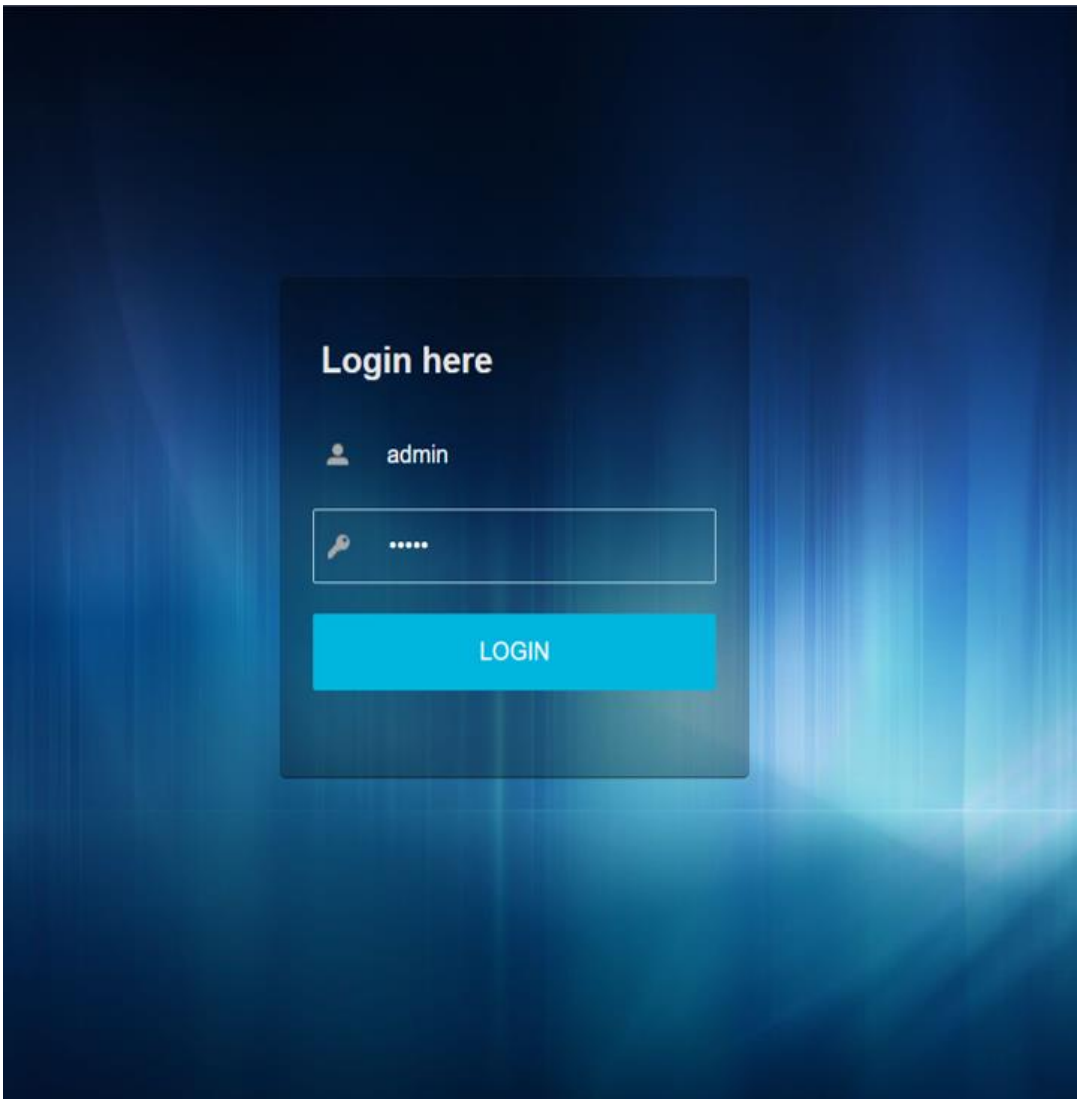


4.5 Circuit Diagram

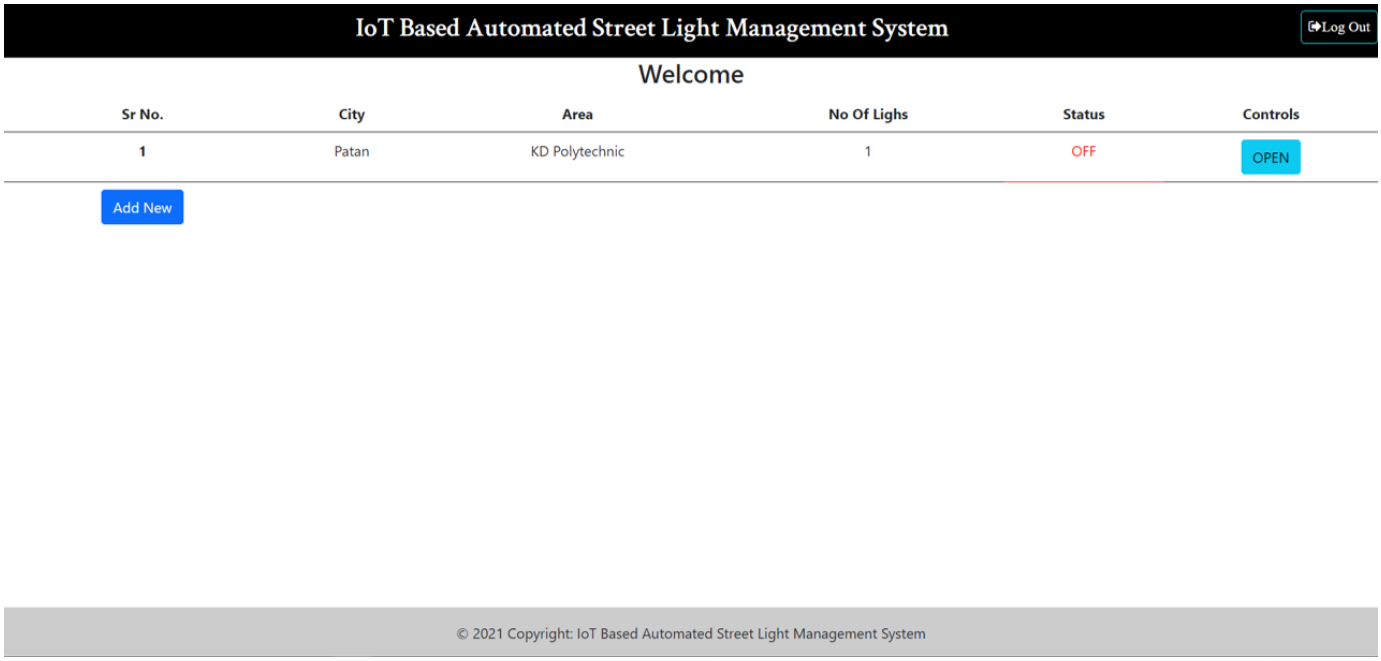


4.6 Snap Shots

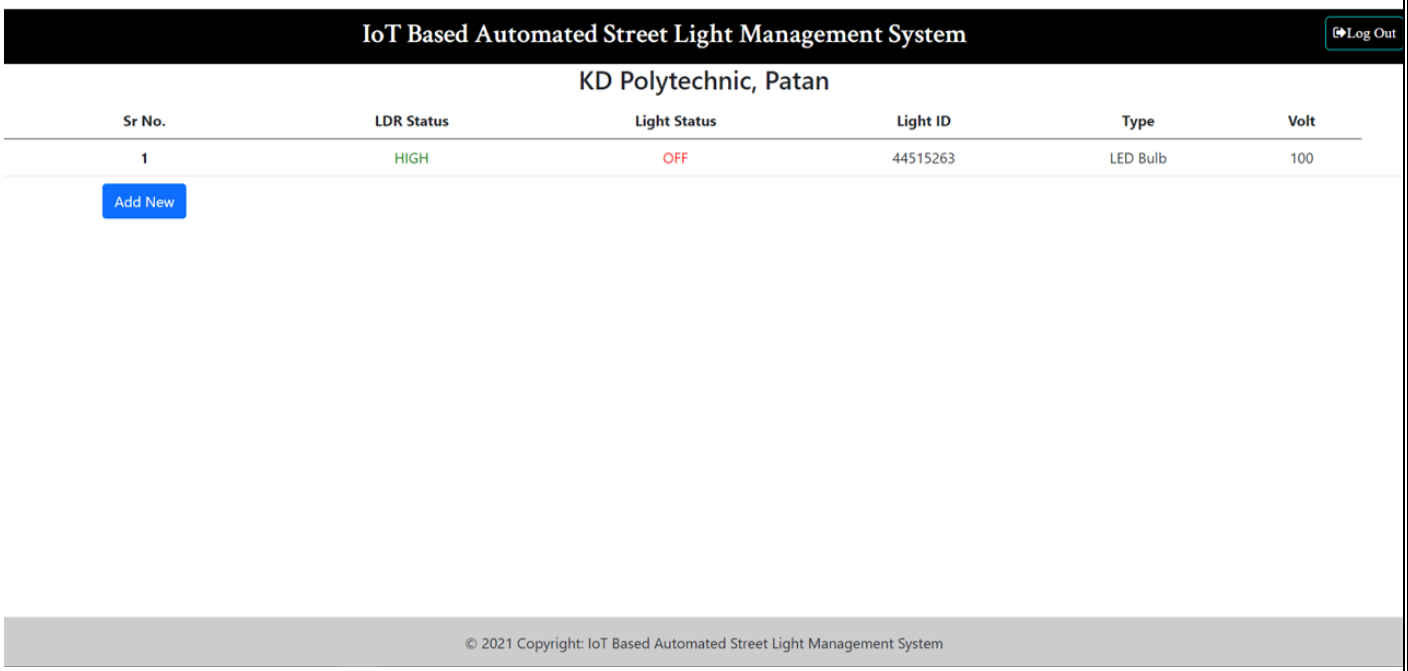
4.6.1 Login Page



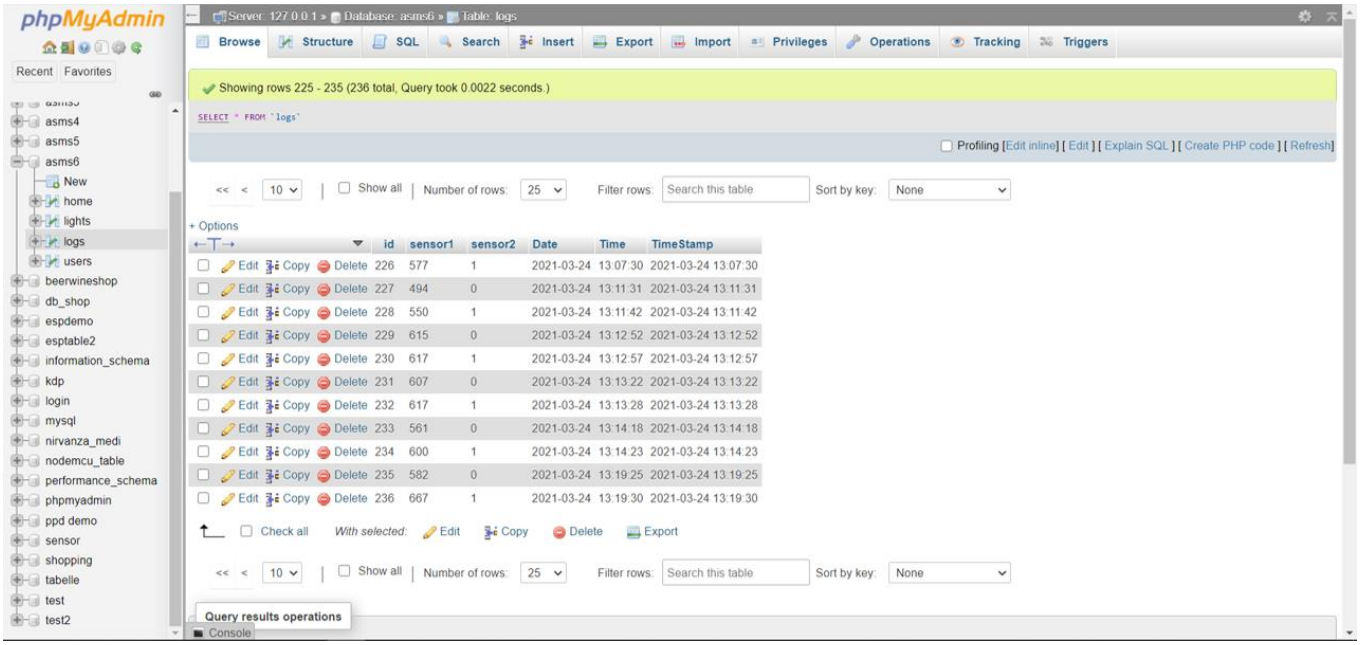
4.6.2 Welcome Page



4.6.3 Area Page



4.6.4 Records That Fetch from ESP 8266



CHAPTER 5: - CONCLUSION AND FUTURE SCOPE

5.1 Conclusion

5.2 Future Scope

5.3 Limitations

5.1 Conclusion:

After partially completion of project, we can conclude following points:

- It can reduce the wastage of electricity.
- Ultimately can conserve some of the natural resources from completely getting vanished.
- This project of automatic street lights is a cost effective, practical, ecofriendly and the safest way to save energy.
- It clearly tackles the two problems that world is facing today, saving of energy and also disposal of incandescent lamps, very efficiently.
- Initial cost and maintenance can be the drawbacks of this project. Keeping in view the long-term benefits and the initial cost would -never be a problem as the investment return time is very less. The project has scope in various other applications like for providing lighting in industries, campuses and parking lots of huge shopping malls. This can also be used for surveillance in corporate campuses and industries.

5.2 Future Scope

We will add some new features to our project after the success of our upcoming project and some of the new upcoming features can be following:

- If the system has traffic speed sensors, then this information could be used to manage traffic speed ma the dimming of the streetlights if the average traffic.
- Speed is too fast during evening and night hours. This could be used to light dimming of street lights. The level of dimming would be imperceptible to motorists but they would slow down trigger a regardless slows traffic but is not noticeable to motorist.
- As it is a Street Light system, it is commonly used in the areas having low or no light where the light can be conserved.
- When a vehicle or a person meet with an accident street light remains on, a system can be introduced to inform the respective authorities.

5.3 Limitations

- The automatic street light system requires a higher initial investment in comparison to conventional street lights.
- Earlier Failure of certain electronics drivers, and high replacement costs.
- Risk of theft of the automatic street light system is relatively higher since they are non-weird & are much expensive.
- Dust or moisture can be making our system less responsive.
- Heating problem could be occurred.
- High temperature causes problems to Arduino UNO And Other Components like sensors or resistors.
- Wi-Fi module could be less responsive in monsoon.
- Hard to troubleshoot if Arduino UNO damages.

CHAPTER 6: - TESTING

6.1 Testing

6.1.1 Login Page Testing

Test Case ID: Function 1
Test Priority: Medium
Module Name: Login Page
Test Title: Verify Credential with valid username and password
Description: Test Log in Page

Step	Test Step	Test Data	Expected Result	Actual Result	Status	Notes
1	Navigate Login Page	Username and Password	Login And redirect to homepage	Login to homepage result	PASS	
2	Provide valid id	User id	Input username required	Input Username	PASS	
3	Provide valid password	Password	Input hidden password	Input password	PASS	
4	Login Button	Click	Homepage redirection	Click to login	PASS	If correct credential it'll redirect to homepage else refresh page

6.1.2 Home Page Testing

Test Case ID: Function 2
Test Priority: High
Module Name: Home Page
Test Title: Add Area for street Light
Description: add area for street light and show status of area that lights are on or off

Step	Test Step	Test Data	Expected Result	Actual Result	Status	Notes
1	Street Area	Area	Fetch Area from Record	Area display from database	PASS	
2	Number of lights	Lights	Number of lights fetch from database	Number of lights display from database	PASS	
3	Status	Area's street light status	On/off	On/off	PASS	Shows Current status of particular area
4	Open button	Click	Redirect details of area	Click to redirect area details	PASS	

6.1.3 Lights

Test Case ID: Function 3
Test Priority: High
Module Name: Lights Page
Test Title: Area Lights
Description: show particular area's number of street lights

Step	Test Step	Test Data	Expected Result	Actual Result	Status	Notes
1	LDR Status	Get input from LDR Sensor (Node MCU)	Low/High	Low/High	PASS	Detect Natural Illumination
2	Light Status	Set Output to the Relay (Node MCU)	ON/OFF	ON/OFF	PASS	ON/OFF Light
3	Light ID	street light's Id	Unique ID	Unique ID	PASS	
4	Type	Light category	Category	Category	PASS	
5	Volt	Light's voltage	Voltage of Light	Voltage of Light	PASS	

7.0 Bibliography

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https://www.electronicshub.org/

THANK YOU