Automated Light Intensity Monitoring System

A Project Report

Submitted in partial fulfilment of the
Requirement for the award of degree of the
BACHELOR OF SCIENCE (INFORMATION TECHNOLOGY)

By
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Seat Number: 49

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DEPARTMENT OF INFORMATION TECHNOLOGY

CERTIFICATE

This is to certify that the project entitled, **"Automated Light Intensity Monitoring System"**, is bonafied work of **Ms. Ankita Mukund Panpatil** bearing Seat.No: **49** submitted in partial fulfilment of their requirements for the award of degree of BACHELOR OF SCIENCE in INFORMATIONTECHNOLOGY from University of Mumbai.

Internal Guide **Coordinator**

External Examiner

Date: **College Seal**

ABSTRACT

IoT (Internet of Things) is poised to transform the real world objects into intelligent virtual objects in the near future. As sensing, communication, and control become ever more complex today, this technology is applied in transforming the Internet into a fully integrated ecosystem. IoT is the next revolutionary technology in transforming the Internet into a fully integrated future ready Internet. IoT allows people and things to be connected at any time, any place, with anything and anyone, by using any path/network and any service. The advances in computer hardware, embedded system devices, networking devices, display devices, control devices, software enhancements, etc. have hugely supported IoT to grow rapidly. The main objective of this project discusses actual implementation of IoT based monitoring system and its associated peripheral devices/equipment's for parameters like temperature and power supply etc. using appropriate sensors. The main utility of the work presented, is in 24x7 monitoring of remotely located devices where it is impractical to monitor manually with direct physical presence. The implementation has been done using an integrated IoT device BOLT IoT.

With advancement of Automation technology, life is getting simpler and easier in all aspects. In today's world Automatic systems are being preferred over manual system. With the rapid increase in the number of users of internet over the past decade has made Internet a part and parcel of life, and IoT is the latest and emerging internet technology. Internet of things is a growing network of everyday object-from industrial machine to consumer goods that can share information and complete tasks while you are busy with other activities. Wireless Automated Light Monitoring System (WALMS) using IoT is a system that uses computers or mobile devices to control basic home functions and features automatically through internet from anywhere around the world, an automated home is sometimes called a smart home. It is meant to save the electric power and human energy. The Automated Light Monitoring System differs from other system by allowing the user to operate the system from anywhere around the world through internet connection.

ACKNOWLEDGEMENT

It gives me great pleasure to present this project report on " **Automated Light Intensity Monitoring System** ". It's a great pleasure and moment of immense satisfaction for me to express my profound gratitude to my Project Guide, **Prof. Babitha Kurup** whose constant encouragement enabled me to work enthusiastically. Her perpetual motivation, patience and excellent expertise in discussion during progress of the project report work have benefited me to an extent, which is beyond expression. I am highly indebted to his invaluable guidance and ever-ready support in the successful completion of this project report in time. Working under his guidance has been a fruitful and unforgettable experience.

I would like to thank all people who contributed to the successful completion of the project.I would like to thank our principal **Dr. Lata Menon** & Department Coordinator **Mr. Deepesh Jagdale** for their support.

I would also like to thank entire Information Technology department of **Pillai H.O.C College of Arts, Science & Commerce** and all Library staffs for their corporation, which helped me to complete this project report.

Last but not the least I would also wish to thank all teaching and non-teaching staff and my friends; it is really impossible to repay the debt of all people who have directly or indirectly helped me for performing the project.

Ankita Mukund Panpatil

DECLARATION

I hereby declare that the project entitled, **"Automated Light Intensity Monitoring System"** done at **Pillai HOC College of Arts, Science & Commerce**, has not been in any case duplicated to submit to any other university for the award of any degree. To the best of my knowledge other than me, no one has submitted to any other university.

The project is done in partial fulfilment of the requirements for the award of degree of **BACHELOR OF SCIENCE (INFORMATION TECHNOLOGY)** to be submitted as final semester project as part of our curriculum.

Ankita Mukund Panpatil

Table of Contents

Chapter 1

INTRODUCTION

Internet of Things (IoT) is a small electronic device which senses and collects data from around the world and shares this data with backend applications. It communicates with any object, environment, and infrastructure. Nowadays every person is connected with many social media communication networks like Facebook, Whatsapp, Twitter, YouTube, Google+, LinkedIn, Google class, classmates, messenger, Wechat, Qchat, Viber, Snapchat, etc. Communication is a very important part of IoT. The idea of IoT is quite useful for real-world applications and services. A few examples of the application of IoT technology are: Putting on the lights automatically on sensing the human activity, Similarly AC and all other devices need to run in an environment and be switched off based on certain event or trigger. Thus an IoT is basically a framework where the devices are connected to the internet for the purpose of monitoring and control. [2] The First time IoT became popular and made its mark was in the year 1999 when Kevin Ashton applied it for auto-ID. This was a big year for IoT. In 2005 the IoT, combined with ICT technologies, was applied to virtually connect any object at any time and place. IoT applications picked up during 2008 – 2009 with the growth of smart tablet, mobile, PC and other devices connected through the internet. The development of IPv6 helped to reduce the scarcity of public IP address space which was essentially required for the growth of IoT.

1. 1 Background

Homes of the 21st century will become more and more self-controlled and automated due to the comfort it provides, especially when employed in a private home. Automated Light Monitoring System is a means that allow users to control electric appliances of varying kind. Many existing, well-established Automated Light Monitoring System are based on wired communication. This does not pose a problem until the system is planned well in advance and installed during the physical construction of the building. But for already existing buildings the implementation cost goes very high.

Features:

- Intensity Control
- Voice Control
- Control via Smartphone
- Light Scheduler
- Mood Lighting
- Smart Lighting

1.2 Objective

The aim for this project is to design a Automated Light Monitoring System which targets the energy saving and autonomous operation on economical affordable for residential and commercial.

Objectives of this project are to:

- Build an energy saving Automated Light Monitoring System with integrated sensors and controllers
- Design a Automated Light Monitoring System with modular approach design, which makes the system scalability and expandability.
- Design a Automated Light Monitoring System which compatibility and scalability with other commercial product and automation system, which might include more than lighting systems.

1.3 Scope, Purpose and Applicability

1.3.1 Scope:

It's the technology of today which is touching and transforming every aspect of our real life. IoT has given a concept of Machine to-Machine (M2M) communication. Some of the companies are implementing strategy to capitalize on the Internet of Things so that you can just stop your business and start making it thrives. IoT is going to have huge impact on Automated Light Monitoring System and building automation system where every convenience will be taken care of by the interconnected devices on IoT. It is also deployed on large scale for example in Song do, South Africa, the first of it sown kind fully equipped and wired smart city is near to completion (known as Ubiquitous City).

With the personal electronics good connected to Internet will enable us to “author” our lives. In medical science field, IoT has given a privilege to devices and system to sense for coming disease and to prevent it, forge. It can make a person healthier with wearable’s that can predict heart attack and cardio vascular strokes. As per a report consumer will start initiating the usage of IoT in a better way during 2015 and onwards compared to past usage. It is expected that IoT products with interoperable capability will dominate the market. Awareness of IoT products is also vital for market penetration along with security features. Even very few Americans are aware of the usage of these products. As per a study of Consumer Electronics Association and Parks Associates found only 10% of the household in USA fully understood the usage of these products.

1.3.2 Purpose:

A Automated Light Monitoring System is an intelligent network-based lighting control solution that incorporates communication between various system inputs and outputs related to lighting control with the use of one or more central computing devices. Lighting control systems are widely used on both indoor and outdoor lighting of commercial, industrial, and residential spaces. Lighting control systems serve to provide the right amount of light where and when it is needed. Lighting control systems are employed to maximize the energy savings from the lighting system, satisfy building codes, or comply with green building and energy conservation programs. Lighting control systems are often referred to under the term Smart Lighting.

1.3.3 Applicability:

Automated Light Monitoring System is a lighting technology designed for energy efficiency, convenience and security. This may include high efficiency fixtures and automated controls that make adjustments based on conditions such as occupancy or daylight availability. Lighting is the deliberate application of light to achieve some aesthetic or practical effect (e.g. illumination of a security breach). It includes task lighting, accent lighting, and general lighting. Lights can be used to dissuade those from areas they should not be. A security breach, for example, is an event that could trigger floodlights at the breach point.

1.4 Organization of Project Report

The report is composed of the following sections:

Chapter 1: Introduction

This chapter gives a short summary and outlines the objectives of the project.

Chapter 2: Survey of Technologies

This chapter explains the comparison between the technologies used in this project.

Chapter 3: Requirements and Analysis

This chapter contains the details about what are the basic requirements for the project implementation.

Chapter 4: System Design

This chapter presents different UML diagrams of an implemented system like Data flow Diagram, Use case Diagram, Sequence Diagram, Class diagram, Activity Diagram and Entity Relationship Diagram.

Chapter 5: Implementation and testing

This chapter presents the actual implementation of the project.

Chapter 6: Result and Discussion

This chapter shows result of implementation of project.

Chapter 7: Conclusion

This chapter shows the overall overview of project.

Chapter 8: References and Bibliography

This chapters shows the references and useful website of project.

1.5 Conclusion

In this chapter we have studied about what this project is, in short. Introduction to this project that is what is the purpose, scope, applicability and introduction to the project is given.

The Automated Light Monitoring System using Internet of Things has been experimentally proven to work satisfactorily by connecting simple appliances to it and the appliances were successfully controlled remotely through internet. The designed system not only monitors the sensor data, like temperature, gas, light, motion sensors, but also actuates a process according to the requirement, for example switching on the light when it gets dark. It also stores the sensor parameters in the cloud (Gmail) in a timely manner. This will help the user to analyse the condition of various parameters in the home anytime anywhere.

Chapter 2

SURVEY OF TECHNOLOGIES

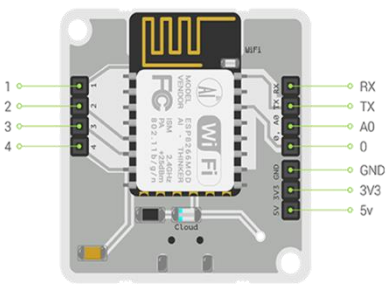
2.1 Description of comparative study of different technologies

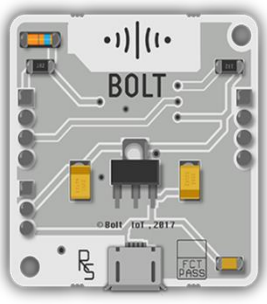
Bolt IoT Bolt WiFi Module

Application of Internet of Things is an emerging domain, which makes common objects to connected objects. In recent few years Internet of Things is making its way into industry applications. In this project Bolt IoT kit based system is planned to real time control the basic appliances in Industry. This system provides real time access of basic industry appliances such as Fans, Tube Lights etc .

Bolt IoT kit has in built microcontroller having input and output ports. The output port is connected to the relay which further gets connected to targeted appliances . Bolt IoT kit connected to internet via Inbuilt WiFi module. With the help of Bolt Cloud Service the webpage is created in Python language and accordingly the current status of appliances is shown there. With the help of Graphical User Interface one can change the ON/OFF condition ,which will trigger the relay and device connected to that relay.

- Our IoT Platform Bolt, enables enterprise and makers to easily and quickly build IoT products. Bolt comes with a WiFi /GSM Chip and a cloud platform which helps the enterprise connect their products to the Internet.
- The chip connects to the cloud out of the box. The Bolt cloud helps users control and monitor the products over the internet, create personalized dashboards to visualise the data, monitor the device health etc.
- With Bolt the companies can build scalable IoT prototypes in just a days time. Bolt Platform takes care of analytics, visualisation, network connectivity, storage, security and scalability, so that the developers can focus on the end application.





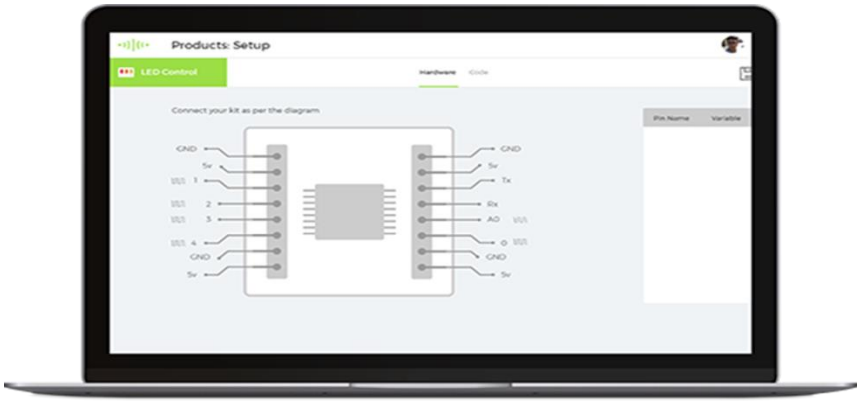
USB-A to Mini-USB Cable

The term USB stands for "Universal Serial Bus". USB cable assemblies are some of the most popular cable types available, used mostly to connect computers to peripheral devices such as cameras, camcorders, printers, scanners, and more.

- USB cables are "Hot Pluggable", in other words you can connect and disconnect the cables while the computer is running without fear of freezing the computer.
- USB cables are fast, transferring up to 480Mbps. Compare that to serial communication which transfers data at about 20Kbps.
- USB cables carry power as well as signals. This allows for "USB powered" gadgets as well as recharging batteries in cameras and other USB peripherals.
- USB cables are designed with several distinct connector types, making it easy to identify which plug goes into the computer and which plug goes into the peripheral device.
- USB cables are a universal standard and are fairly easy to find and to afford

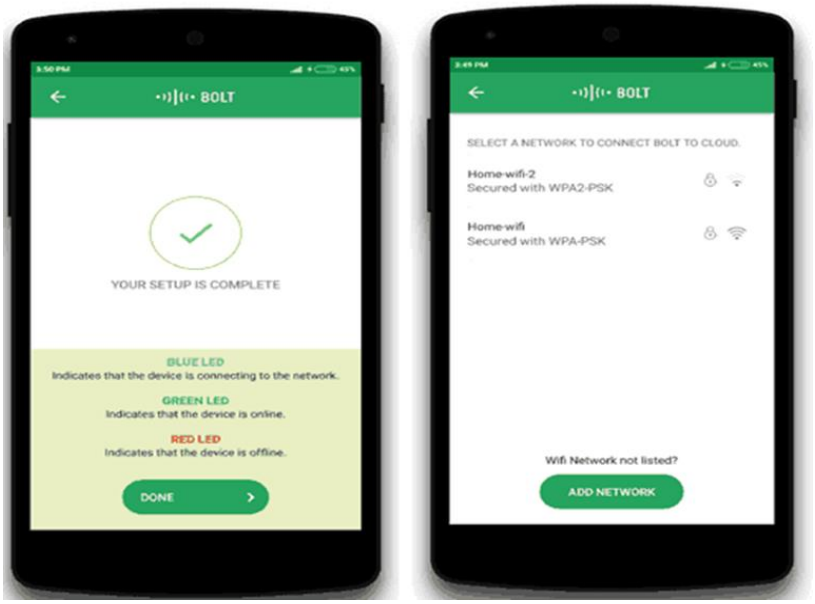
IoT cloud

An IoT system requires a hardware as well as a cloud. Bolt cloud is a server which lets you communicate with your Bolt WiFi module over the internet. It offers features like receiving and storing the data collected by Bolt Modules, Storing the data, Analysing it via Data visualisation and Machine Learning as well as it lets your program your Bolt modules.



Bolt IoT Mobile App

For connecting the Bolt to your cloud account, the Bolt IoT Mobile App is available for download on the Android Play store and iOS App Store. It is not available for other mobile OS such as Windows since the number of users of these Mobile OS is very low. Search for "Bolt IoT" on the App Store. Once you have downloaded the app, use the same username and password that you used for creating your Bolt Cloud account to log in to the app. There aren't any physical On or Off button on the Bolt WiFi Module. To power it on, just plug in the Micro USB Power Adaptor and Blue LED will start blinking showing that it is on. Once you power on the Bolt WiFi Module, it will start its local WiFi Hotspot. You need NOT know the password of this Hotspot. Just open the Bolt IoT mobile app and follow the instructions in the App to set it up.



Android iOS

1 x LDR (2 legged devicewith a red wave pattern disk on top)

LDRs (light-dependent resistors) are used to detect light levels, for example, in automatic security lights. Their resistance decreases as the light intensity increases:

- in the dark and at low light levels, the resistance of an LDR is high and little current can flow through it.
- in bright light, the resistance of an LDR is low and more current can flow through it.

1 x 10k Ohm Resistor (brown black orange color code)

The ohm is defined as an electrical resistance between two points of a conductor when a constant potential difference of one volt, applied to these points, produces in the conductor a current of one ampere, the conductor not being the seat of any electromotive force.

JavaScript

JavaScript is a text-based programming language used both on the client-side and server-side that allows you to make web pages interactive. Where HTML and CSS are languages that give structure and style to web pages, JavaScript gives web pages interactive elements that engage a user.

JavaScript is a programming language commonly used in web development. It was originally developed by Netscape as a means to add dynamic and interactive elements to websites. Like server-side scripting languages, such as PHP and ASP, JavaScript code can be inserted anywhere within the HTML of a webpage.

2.2 Conclusion

In this chapter comparison between the technology used in this project and other technologies are shown.

A network is the most critical component of any ICT infrastructure which is live 24x7 and to monitor it through physical human intervention is not feasible when the scale is large. Therefore, the IoT applications for monitoring temperature, motion, fire, uplink status, security can be of great utility for detecting any issue and raising alerts through SMS and email thereby coming to know quickly about the problem occurring on a remote site without delay and then act according to the need. This can also lead to saving in Power by switching off the device remotely when not in use, by Power ON/OFF application.

Chapter 3

REQUIREMENT ANALYSIS

3.1 Problem Statement

Automated Light Monitoring System face four main challenges, these are high cost of ownership, inflexibility, poor manageability, and difficulty in achieving security. The main objectives of this project is to design and implement a Automated Light Monitoring System using IoT that is capable of controlling and automating most of the house appliances through an easy manageable web interface. The proposed system has a great flexibility by using Wi-Fi technology to interconnect its distributed sensors to home automation server. This will decrease the deployment cost and will increase the ability of upgrading, and system reconfiguration.

3.2 Requirement Specification

Today, we are increasingly talking about creating 'Smart Homes'. Smart homes can mean different things to different people. A builder might say that he is offering a 'Smart Home' to a prospective buyer if the IP video door phone that he is installing can also be viewed over a smart phone. For an architect, a 'Smart Home' could be one, where lighting controls that can be activated manually, on a time clock, remotely or from a house- for one room or for the entire house. A system integrator, selling AV systems could say that he has designed a smart home, where the home owner can view any media content stored in the cloud or locally in the home from anywhere in the home.

So who is right? Or rather, what is the correct meaning of a smart home? For me, there is no right or wrong. A Smart home can be one or all of these things. All of the above could comprise what we call Smart Home technology. One thing however should be common. Whatever technology is used to make a smart home should enhance the user and the home owner experience, making life more convenient and enjoyable!

3.3 Hardware Requirement

Bolt WiFi Module	3.3V
1 x LDR	(2 legged devicewith a red wave pattern disk on top)
USB Cable	5V
1 x 10k Ohm Resistor	(brown black orange color code)

3.4 Software Requirement

OPERATING SYSTEM	WINDOWS 7 OR ABOVE
TECHNOLOGY	JavaScript
BROWSERS	GOOGLE CHROME
EDITOR	Cloud.boltiot.com

3.5 Conclusion

In conclusion, this chapter states the various hardware and software requirements along with the requirement specifications.

Chapter 4

SYSTEM DESIGN

4.1 Data Flow Diagram:

A **Data Flow Diagram** (**DFD**) is a graphical representation of the "flow" of data through an information system. DFDs can also be used for the visualization of data processing (structured design).Often they are a preliminary step used to create an overview of the system which can later be elaborated. A DFD shows what kinds of information will be input to and output from the system, where the data will come from and go to, and where the data will be stored.

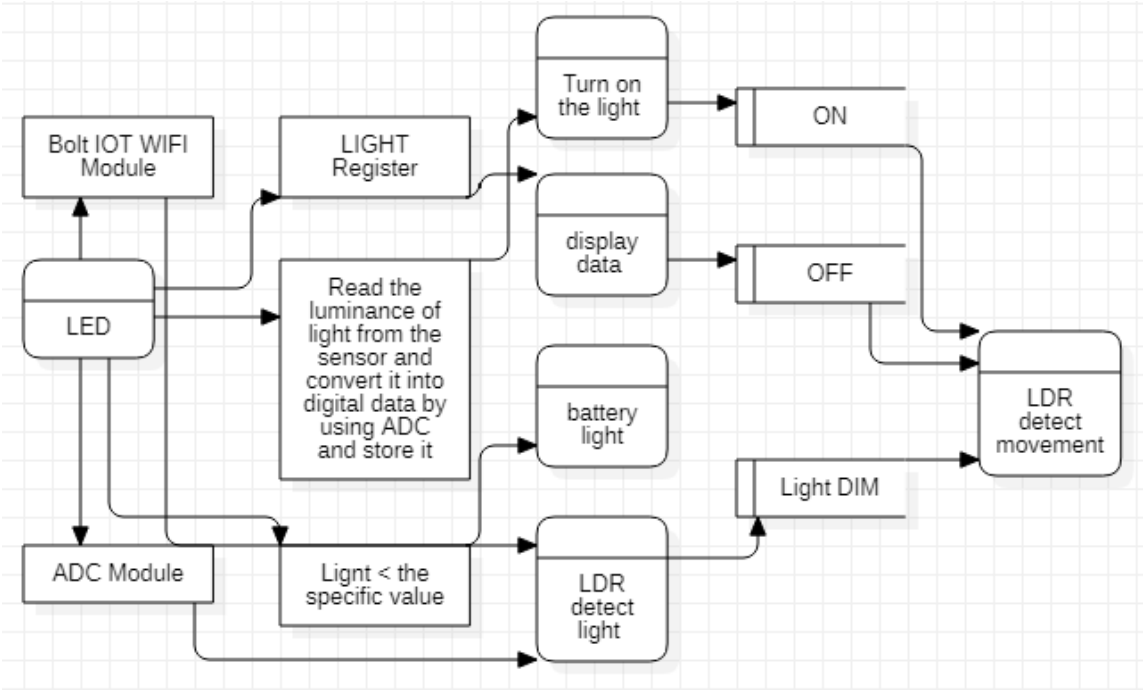


Figure 4.1 Data Flow Diagram

4.2 Use Case Diagram:

A **Use Case Diagram** in the Unified Modelling Language (UML) is a type of behavioural diagram defined by and created from a Use-case analysis. Its purpose is to present a graphical overview of the functionality provided by a system in terms of actors.

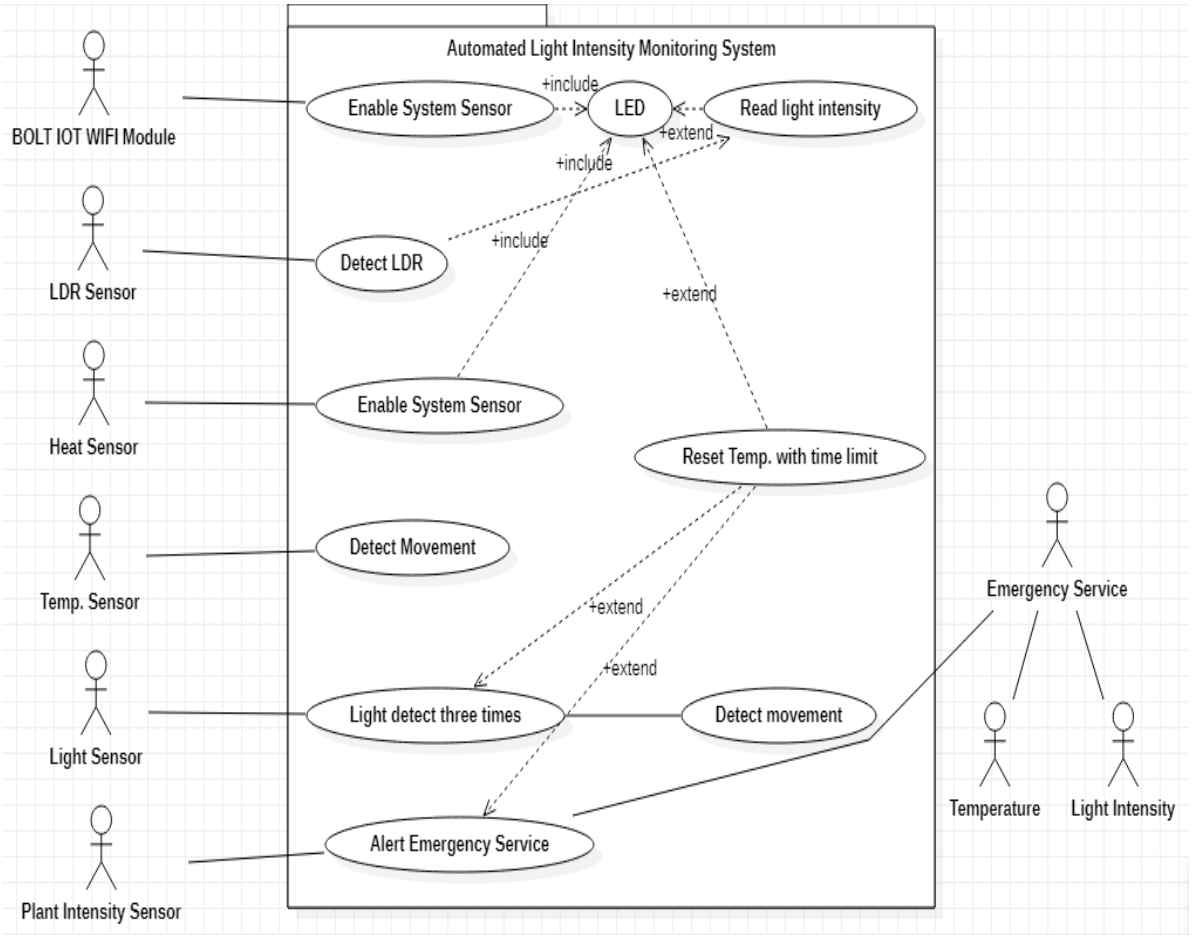


Figure 4.2 Use Case Diagram

4.3 Sequence Diagram:

A **Sequence Diagram** shows object interactions arranged in time sequence. It depicts the objects and classes involved in the scenario and the sequence of messages exchanged between the objects needed to carry out the functionality of the scenario. Sequence diagrams are typically associated with use case realizations in the Logical View of the system under development. Sequence diagrams are sometimes called event diagrams or event scenarios.

A sequence diagram shows, as parallel vertical lines (lifelines), different processes or objects that live simultaneously, and, as horizontal arrows, the messages exchanged between them, in the order in which they occur. This allows the specification of simple runtime scenarios in a graphical manner.

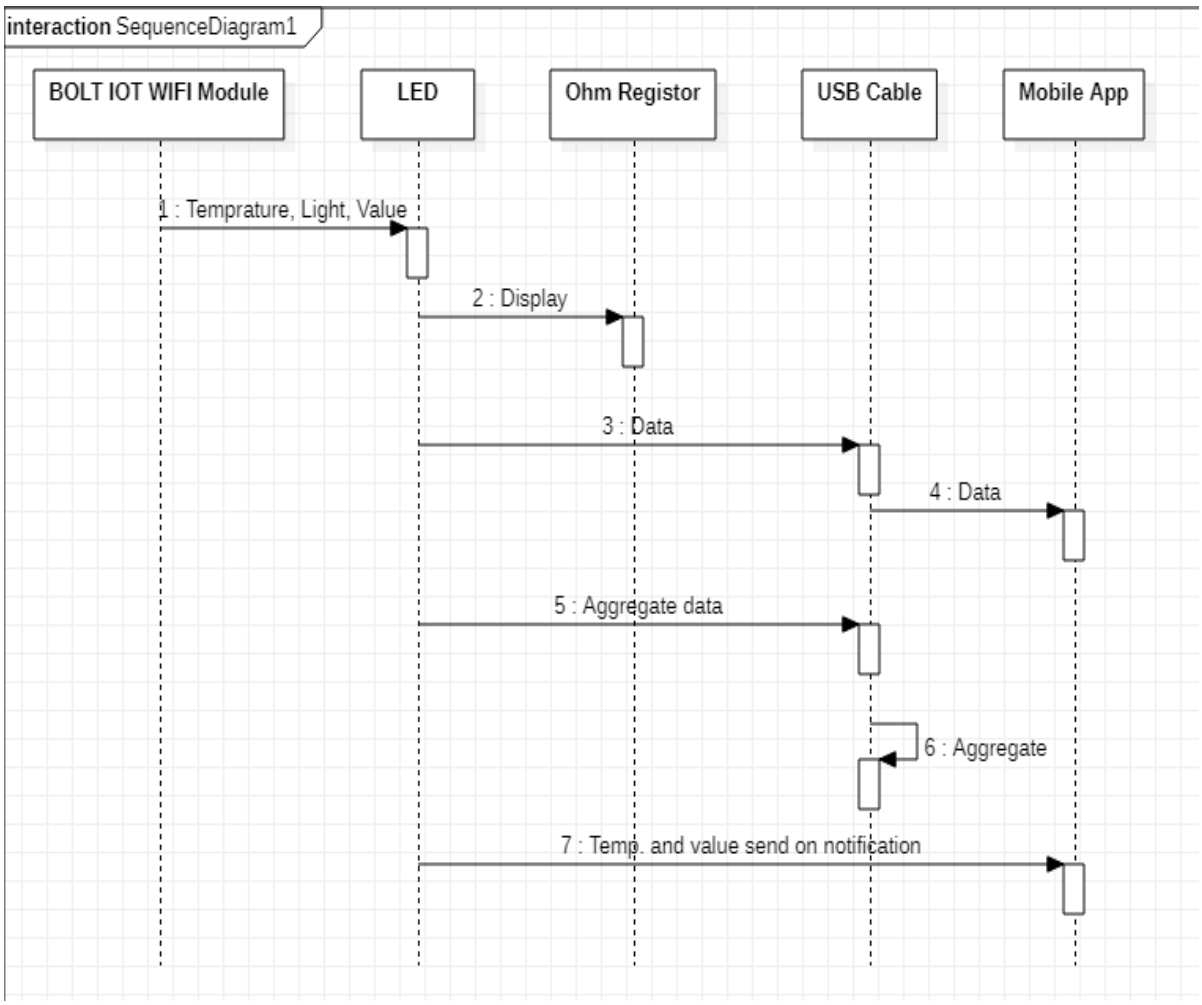


Figure 4.3 Sequence Diagram

4.4 Class Diagram:

A **Class Diagram** in the Unified Modelling Language (UML) is a type of static structure diagram that describes the structure of a system by showing the system's classes, their attributes, and the relationships between the classes. The class diagram is the main building block of object oriented modelling. It is used both for general conceptual modelling of the systematic of the application, and for detailed modelling translating the models into programming code.

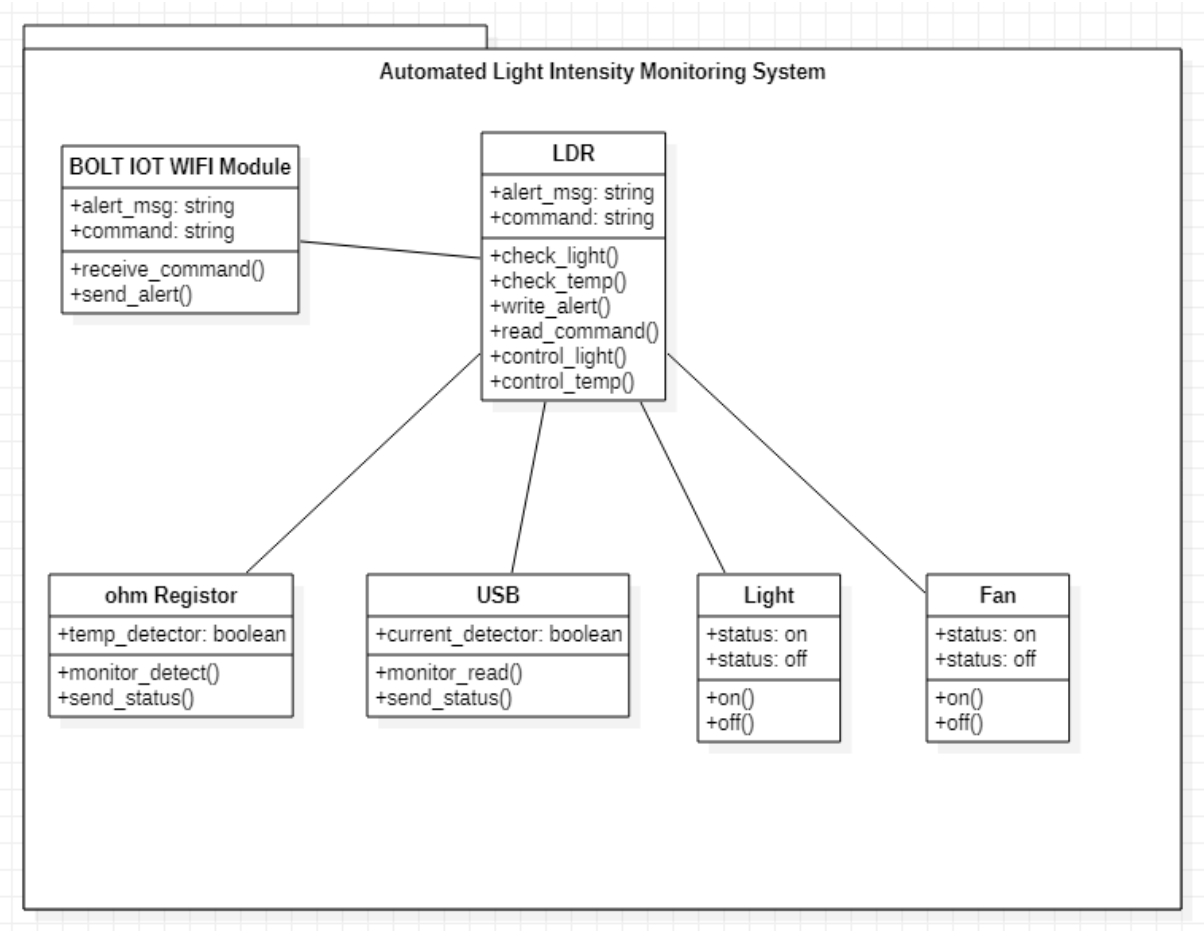


Figure 4.4 Class Diagram

4.5 Activity Diagram:

Activity Diagram is another important diagram in UML to describe the dynamic aspects of the system. Activity diagram is basically a flowchart to represent the flow from one activity to another activity. The activity can be described as an operation of the system. The control flow is drawn from one operation to another. This flow can be sequential, branched, or concurrent. Activity diagrams deal with all type of flow control by using different elements such as fork, join, etc.

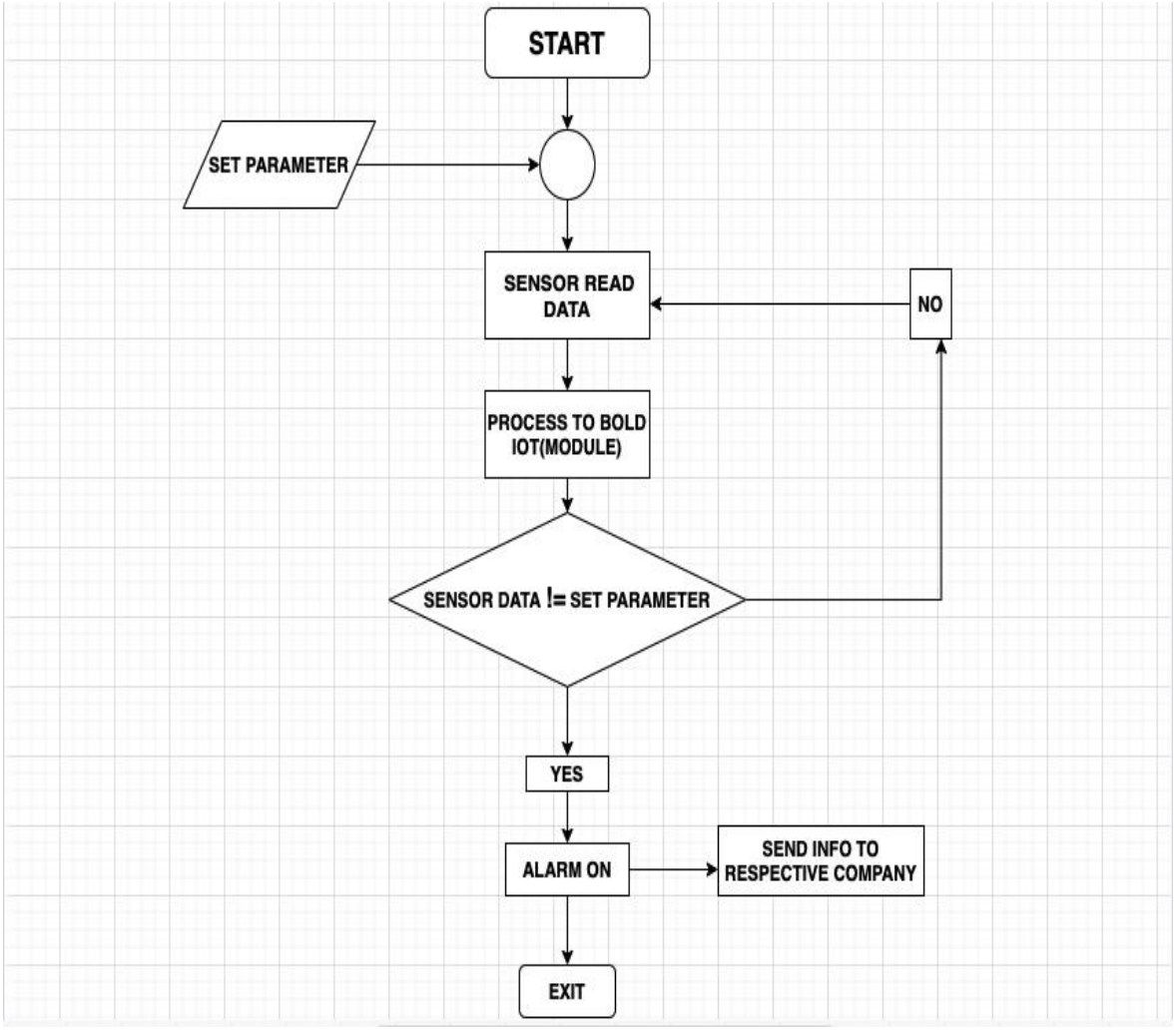


Figure 4.5 Activity Diagram

4.6 Entity Relationship Diagram:

An **Entity-Relationship Diagram (ERD)** is a data modelling technique that graphically illustrates an information system's entities and the relationships between those entities. An ERD is a conceptual and representational model of data used to represent the entity framework infrastructure. The elements of an ERD are Entities, Relationships and Attributes.

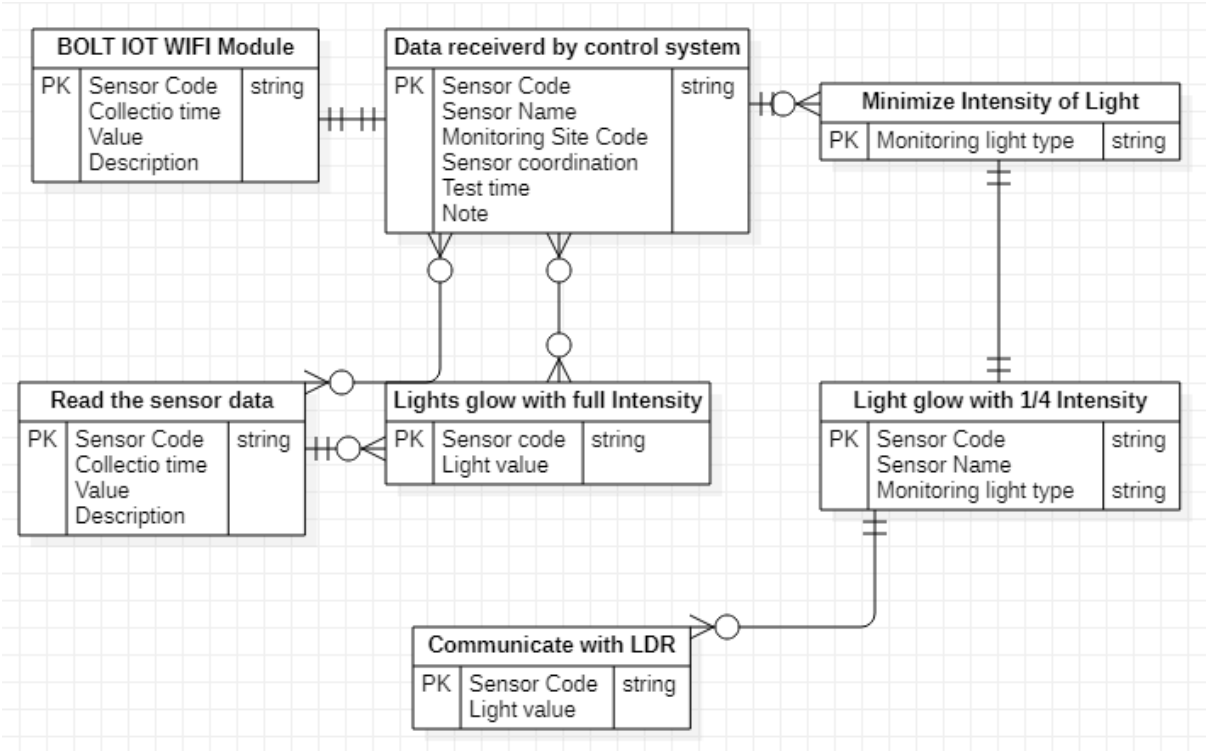


Figure 4.6 Entity-Relationship (ER) Diagram

4.7 Conclusion

This chapter concludes all the diagrams that defines the process of this project and shows diagrammatical representation of the overall project.

Chapter 5

IMPLEMENTATION AND TESTING

5.1 Coding

Program Name: light.js

Gauge Chart :

Gauge chart (also known as dial chart or speedometer chart) uses a single needle to show information as a reading on a dial. On the gauge chart, the value for the needle is read on a colored data range. This chart type is often used in executive dashboard reports to show key business indicators. It's a great tool to help visualize percentages, as well as other fixed-range amounts for end users.

```
setChartLibrary("google-chart");
setChartTitle('Gauge Chart');
setChartType('gauge');
setAxisName('light');
setDimensions(400, 400);
setMaxValue(1023);
plotChart('light');
setChartLibrary("google-chart");
setChartTitle('Gauge Chart');
setChartType('gauge');
setAxisName('light');
setDimensions(400, 400);
setMaxValue(1023);
plotChart('light');
setGreen(250, 500);
setYellow(501, 725);
setRed(726, 1023);
```

Line Graph :

A line graph is a graphical display of information that changes continuously over time. A line graph may also be referred to a line chart. Within a line graph, there are points connecting the data to show a continuous change. The lines in a line graph can descend and ascend based on the data. We can use a line graph to compare different events, situations, and information.

Note: Choose the file extension as js.

```
setChartLibrary('google-chart');
setChartTitle(light');
setChartType('lineGraph');
```

```
setAxisName('X-Axis Name','Y-axis Name');
plotChart('time_stamp',’Light_Monitor');
```

Bar Graph :

A bar chart is a pictorial representation of grouped data with rectangular bars with lengths proportional to the values that they represent. The bars can be plotted vertically or horizontally.

```
setChartLibrary('google-chart');
setChartTitle('Your Graph Title');
setChartType('barGraph');
setAxisName('X-Axis Name','Y-axis Name');
plotChart('time_stamp','your_variable_name');
```

Scatter Graph :

Scatter charts are used to plot data points on a horizontal and a vertical axis in the attempt to show how much one variable is affected by another. Each row in the data table is represented by a marker whose position depends on its values in the columns set on the X and Y axes.

```
setChartLibrary('google-chart');
setChartTitle('Your Graph Title');
setChartType('scatterGraph');
setAxisName('X-Axis Name','Y-axis Name');
plotChart('time_stamp','your_variable_name');
```

Area Graph :

An area chart or area graph displays graphically quantitative data. It is based on the line chart. The area between axis and line are commonly emphasized with colors, textures, and hatchings.

```
setChartLibrary('google-chart');
setChartTitle('Your Graph Title');
setChartType('areaGraph');
setAxisName('X-Axis Name','Y-axis Name');
plotChart('time_stamp','your_variable_name');
```

Table Chart :

For a simple tabular representation, you can choose table chart.

```
setChartLibrary('google-chart');
setChartTitle('Your Graph Title');
setChartType('tableGraph');
setAxisName('X-Axis Name','Y-axis Name');
```

```
plotChart('time_stamp','your_variable_name');
```

Stepped Graph :

A Step chart is a Line chart that does not use the shortest distance to connect two data points. Instead, it uses vertical and horizontal lines to connect the data points in a series forming a step-like progression. The vertical parts of a Step chart denote changes in the data and their magnitude. The horizontal parts of a Step chart denote the constancy of the data.

```
setChartLibrary('google-chart');
setChartTitle('Your Graph Title');
setChartType('steppedGraph');
setAxisName('time_stamp','light_data','temp');
plotChart('time_stamp','light_data','temp');
```

Histogram Graph :

A histogram is a graphical representation of continuous numerical data in form of bars where the x-axis displays ranges of data sets and the y-axis represent frequency.

```
setChartLibrary('google-chart');
setChartTitle('Your Graph Title');
setChartType('histogramGraph');
setAxisName('X-Axis Name','Y-axis Name');
plotChart('time_stamp','your_variable_name');
```

Multiple Graph :

You can now plot multiple graphs via the product code. You can also plot multiple variables on each graph.

```
var lineGraph = new boltGraph();
lineGraph.setChartType("lineGraph");
lineGraph.setAxisName('X-Axis Name','Y-axis Name');
lineGraph.plotChart('time_stamp','var1');
var barGraph = new boltGraph();
barGraph.setChartType("barGraph");
barGraph.setAxisName('X-Axis Name','Y-axis Name');
barGraph.plotChart('time_stamp','var6');
```

5.2 Modification and Improvements

- Easily access to the website.
- User friendly Dashboard.

- Parents Monitoring System.
- We can use this system for Plant Monitoring.
- We can use this system in pharmaceutical company to take the temperature of medicines.

5.3 Conclusion

Here all the coding which is needed for our project and modification part is done.

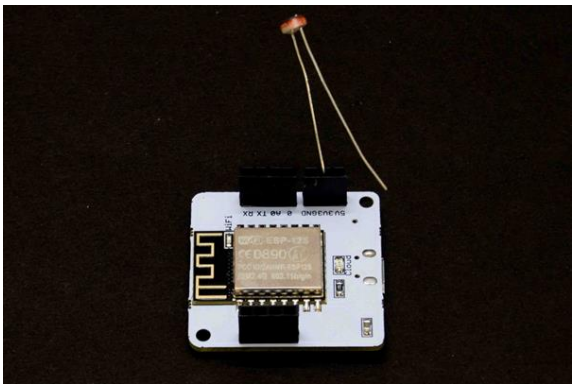
Chapter 6

RESULT AND DISCUSSION

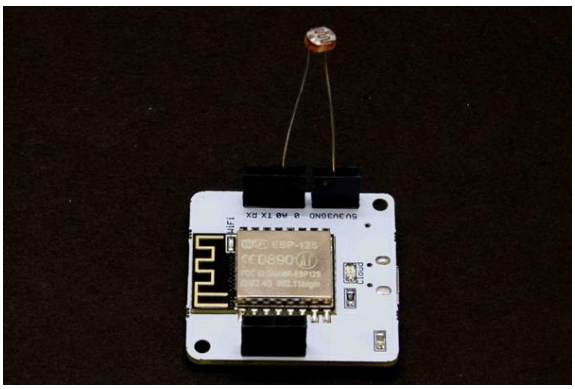
6.1 Test reports

Steps for building the project :

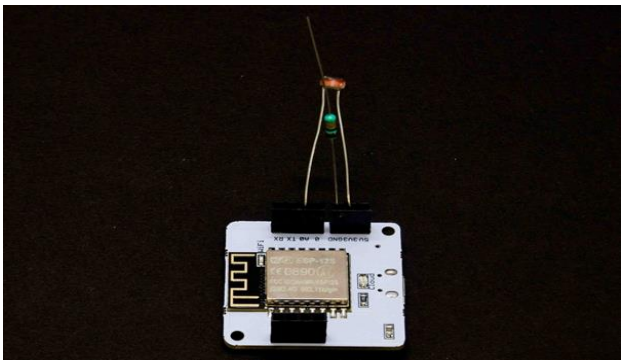
Step 1: Insert one lead of the LDR into the Bolt Module's 3v3 Pin.



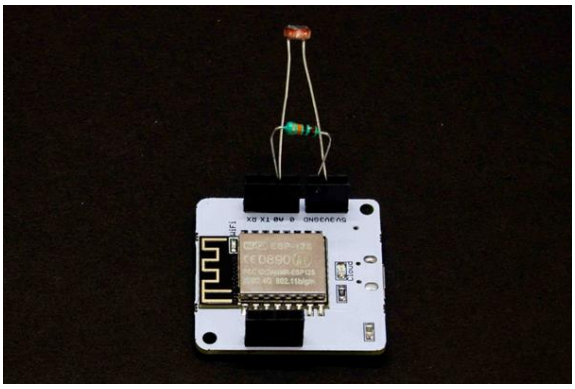
Step 2: Insert other lead of the LDR into the A0 pin



Step 3: Insert one leg of the 10k Ohm resistor into the GND pin

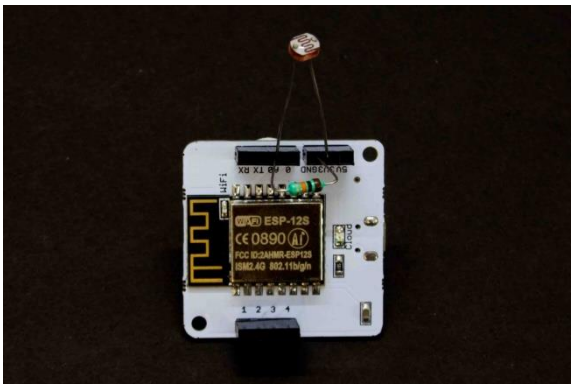


Step 4: Insert the other leg of the resistor also into the A0 pin



Warning!! Make sure that at no point do the 3.3V (or even 5V) and GND pins or wires coming out of them touch each other. If you short power to Ground without a resistor even accidentally, the current drawn might be high enough to destroy the Bolt module

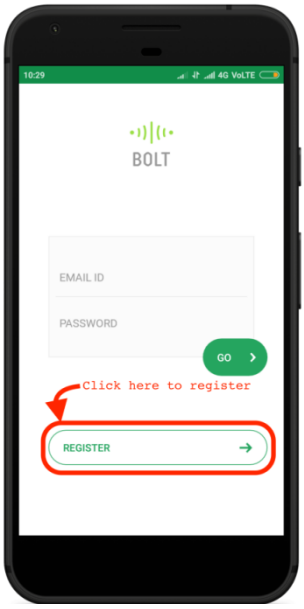
Thus, we are effectively measuring the voltage across the 10k Ohm Resistor and the final circuit should look like the image below:



Creating an account :

You will need to create an account on the Bolt Cloud to control the Bolt device.

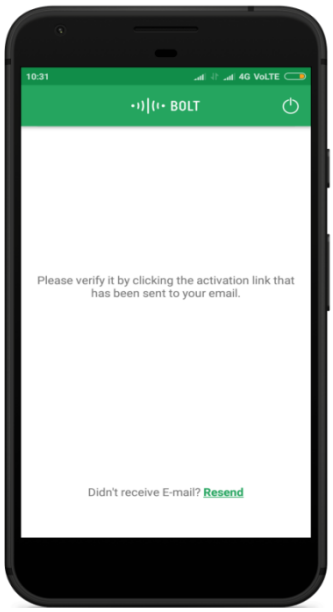
Step1: Open the Bolt App and click on 'REGISTER' to create a new account.



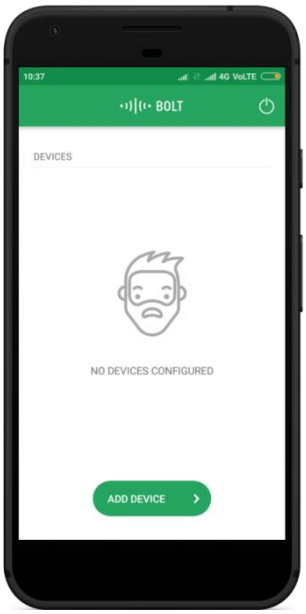
Step2: Fill all the required details and agree to the terms and conditions. Finally, click on 'CREATE A NEW ACCOUNT' to create your free account.

You will now receive an email on the email ID that you had given to verify your account. This is to verify that you are an actual human and not a robot.

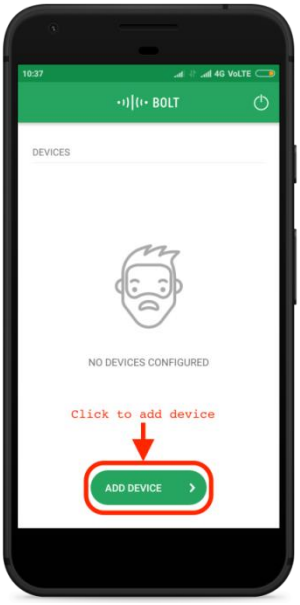
Follow the instructions in the email to activate your Bolt Cloud account. Now, pull down on the screen using your fingers to refresh the mobile App screen which looks something like this below,



Step3: Congratulations, you have activated your account. You will then be greeted with a screen that says that you don't have any Bolts Modules linked to your account.



Step4 : Now, click on the 'ADD DEVICE' button to setup your Bolt device with your WiFi network.

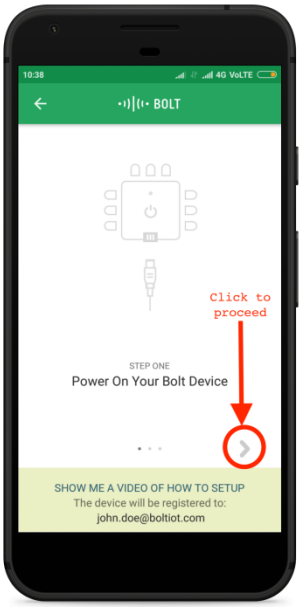


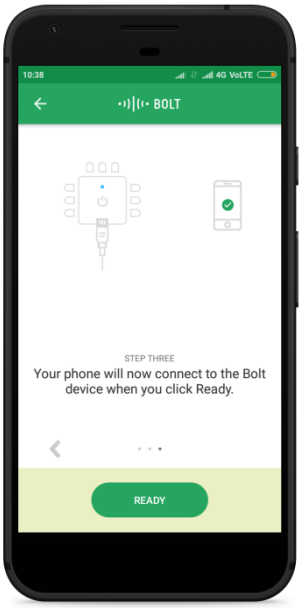
Power ON the Bolt device by inserting the Micro USB cable into the USB port provided on the Bolt and connecting the other end of the cable to the Android charger or to your laptop.

Once you have powered ON the Bolt device, blue LED on the Bolt will begin to blink slowly and the green LED will be OFF.

When the blue LED blinks slowly, it means that the Bolt is now transmitting its own WiFi hotspot network and is ready to be setup via the Bolt IoT App on your phone.

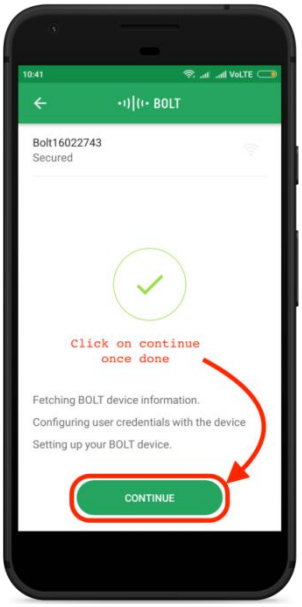
Step 5: Click on the '>' symbol on the app to progress further.





For Android Only: Before proceeding further, kindly switch OFF your mobile data and switch ON the location service in your mobile if not already and click on the "READY" button. This is required only in the Android App due to APIs by Google. We do not collect or store any of your location data.

If the Bolt has been detected by the App, it will show a screen similar to the one below. The blue LED on the Bolt will now blink fast. This means that it is under the setup process. To proceed, click on 'CONTINUE'.

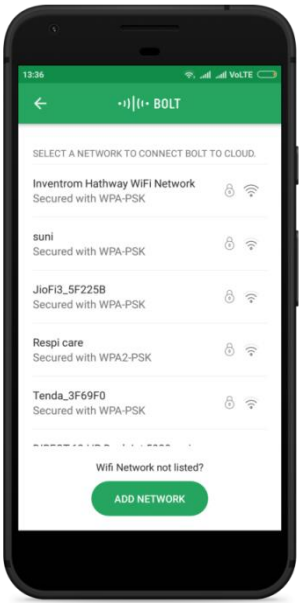


The password for the WiFi hotspot transmitted by the Bolt WiFi Module is: bolt1234
While setting up with the Android mobile app, your mobile phone will automatically connect to the hotspot when you click next. On an iOS, you will have to connect to the Hotspot by going to your Setting -> WIFi.

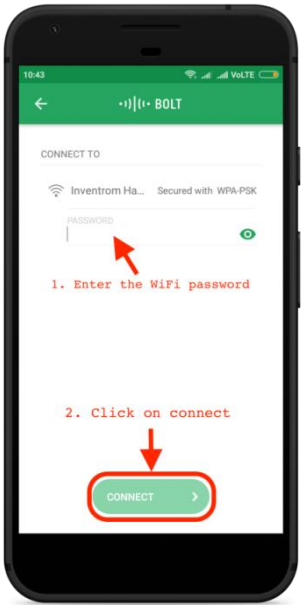
Now, we will need to tell the Bolt which WiFi network it has to connect to.

NOTE: The Bolt WiFi module cannot detect 5 GHz based WiFi networks and will not be able to connect to it.

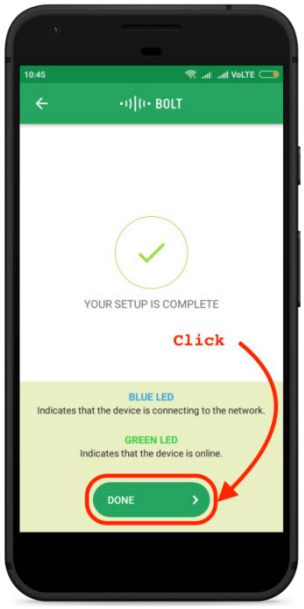
Select the WiFi network to which Bolt has to be connected. You can click on the WiFi name to choose the WiFi network to connect to.



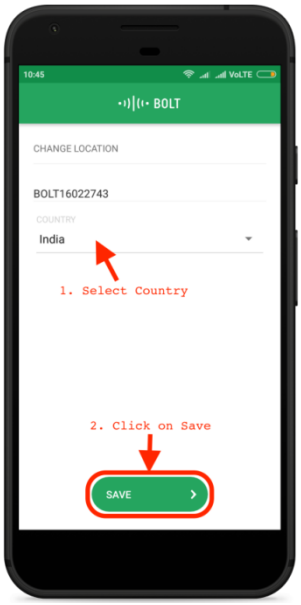
Step 6: Enter the password of the WiFi network you had chosen in the previous screen.



The App will now send the WiFi credentials to the Bolt WiFi Module.

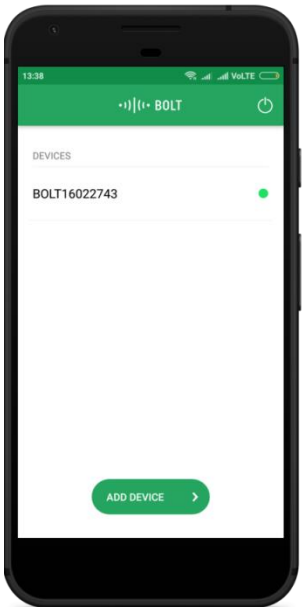


Step7 : Now, click on 'DONE' and in the next screen, select your Country and click on 'SAVE' to complete the final step of the setup.



If everything has gone according to plan, the Bolt device will now restart automatically. The blue and green LED on the Bolt device will now be glowing steadily.

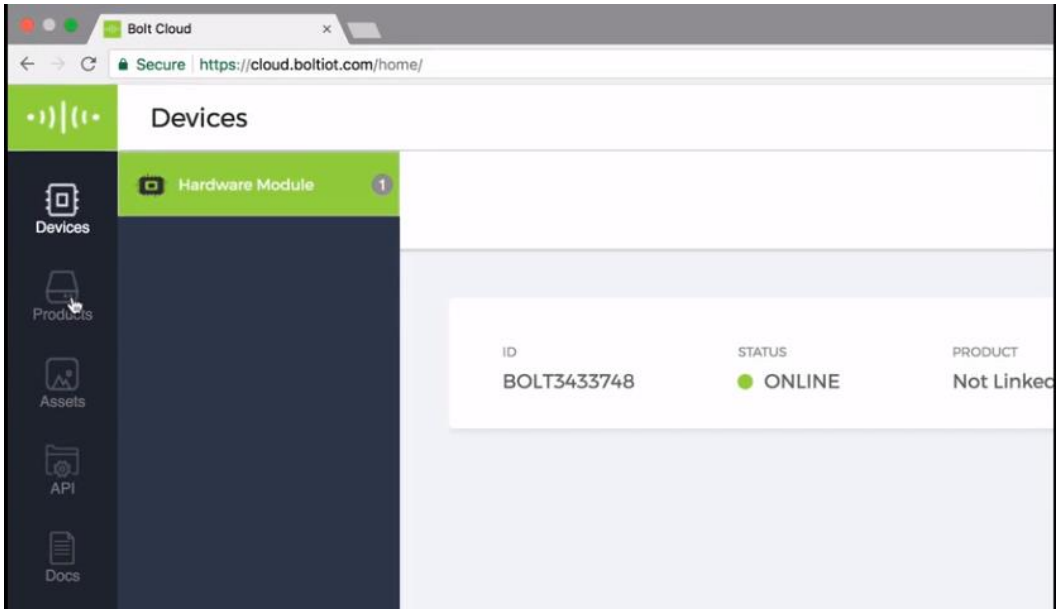
If the Bolt was able to connect to the WiFi network and is connected to the cloud, a green dot will appear beside the Bolt's device ID as shown below.



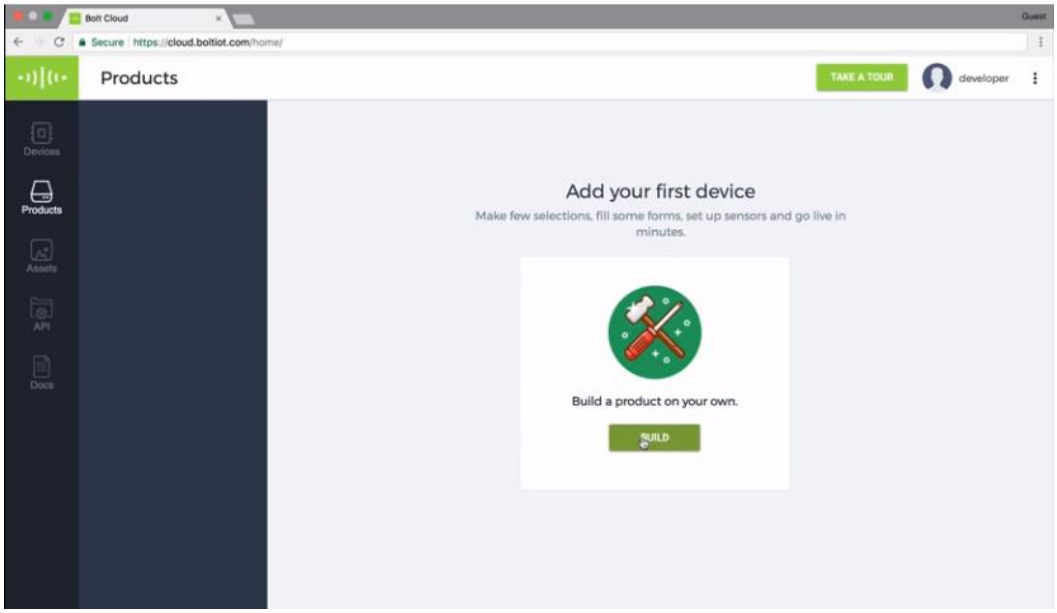
Creating product on Cloud :

step 1: Login to Bolt Cloud (cloud.bolt.iot.com) Login with your bolt Mail ID.

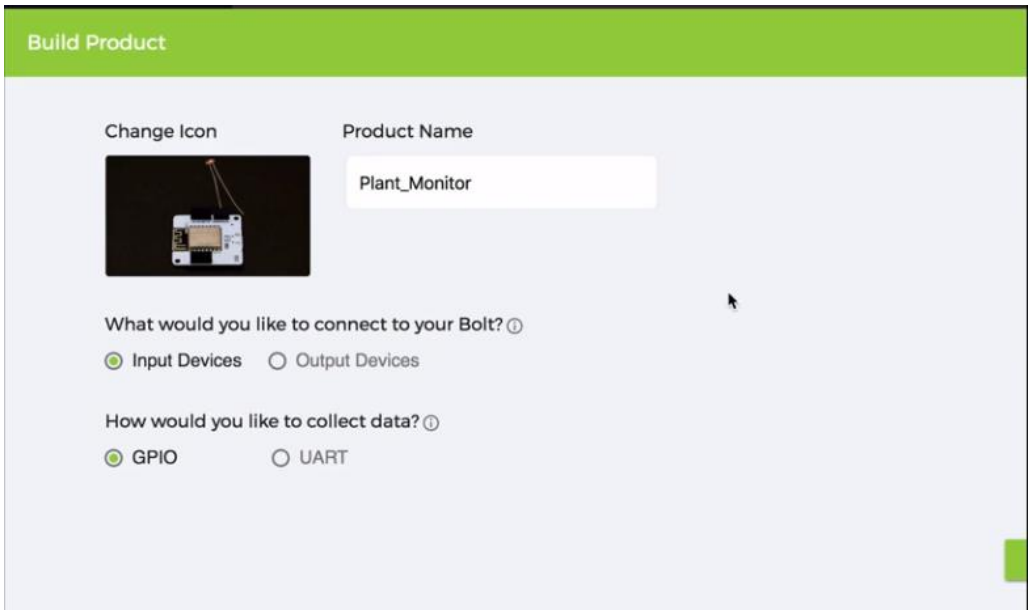
step 2 : Create product. Click on Product tab.



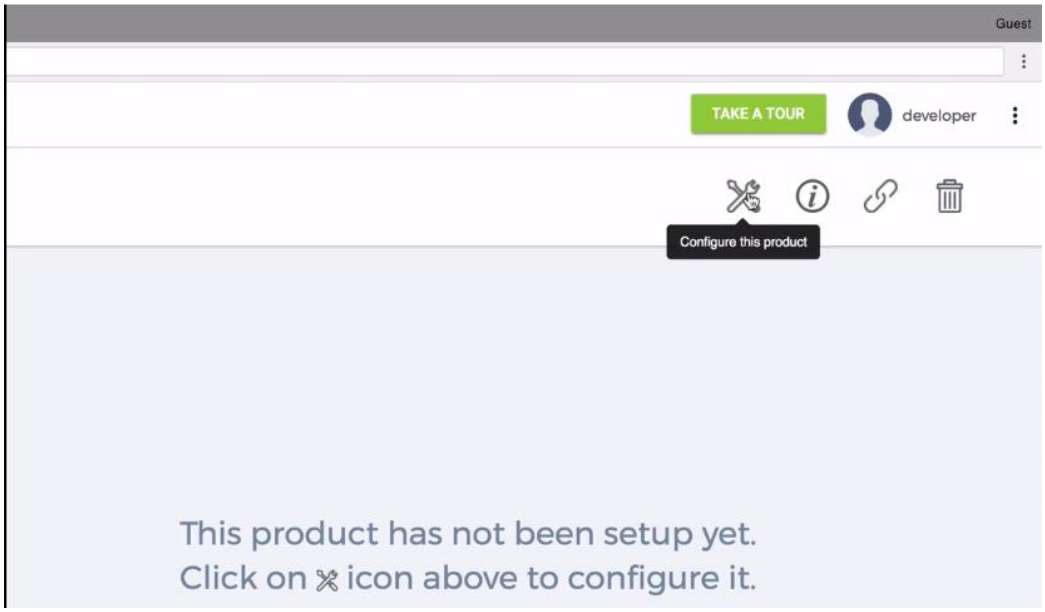
step 3 : click on build product.



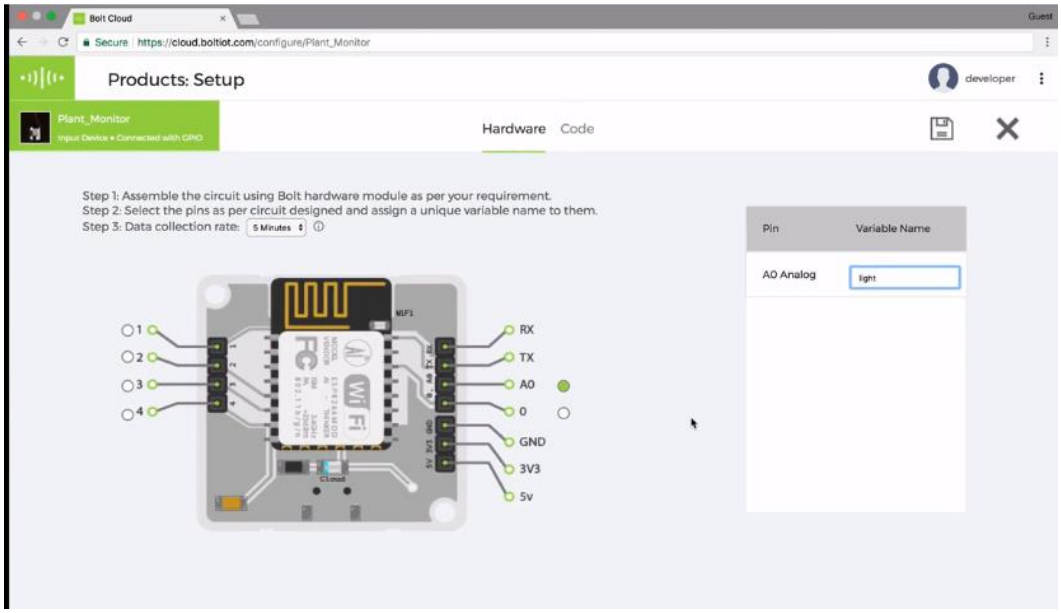
step 4 : give suitable name and add image then done. (Replace Plant_Monitor to Light_Monitor)



step 5 : click on configure icon.



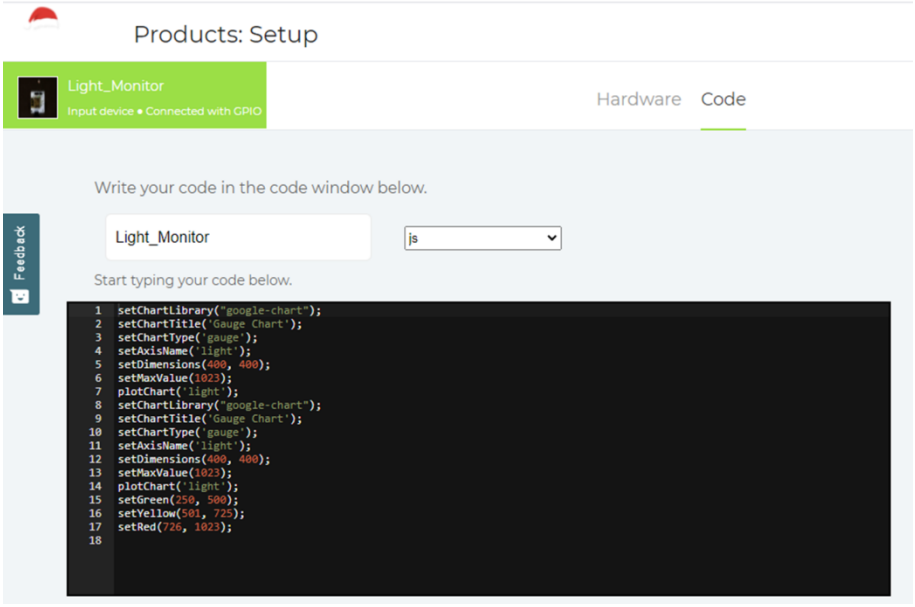
step 6 : select pin A0, select data collection rate as 5min and variable name : light



Note : Variable name can only contain lowercase alphanumeric characters and underscore and should start with an alphabet.

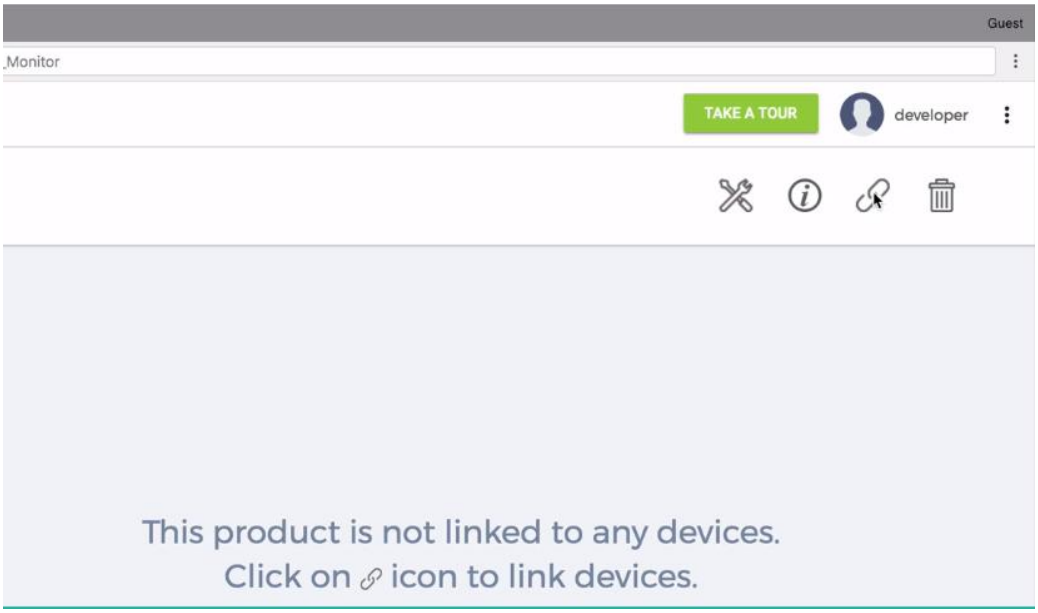
Pin	Variable Name
A0 Analog	light

step 7 : Go to code tab, Give name as Light_Monitor and save extension as js and write code given below: then save and closed the window.

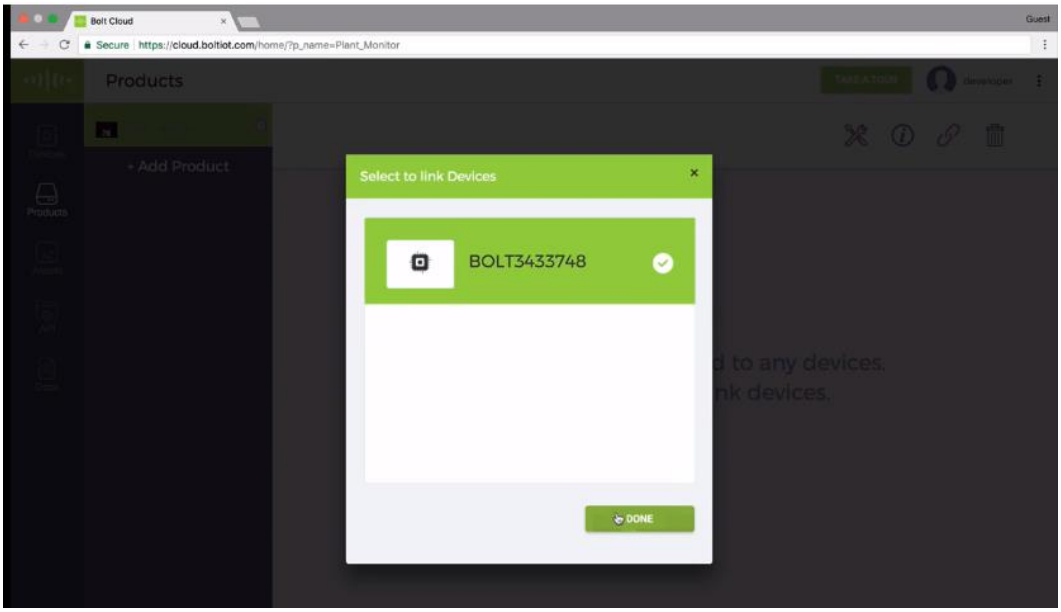


Linking product to device :

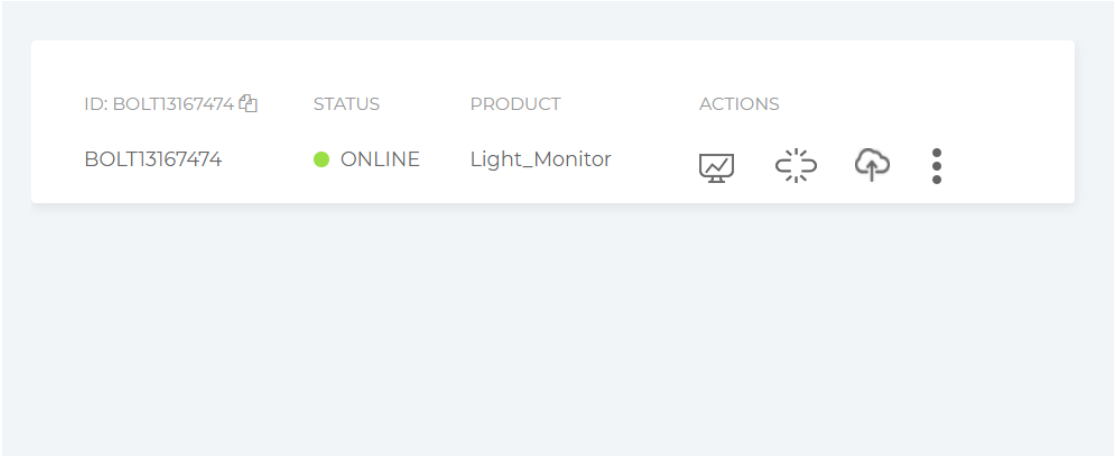
step 1 : Click on the link button.



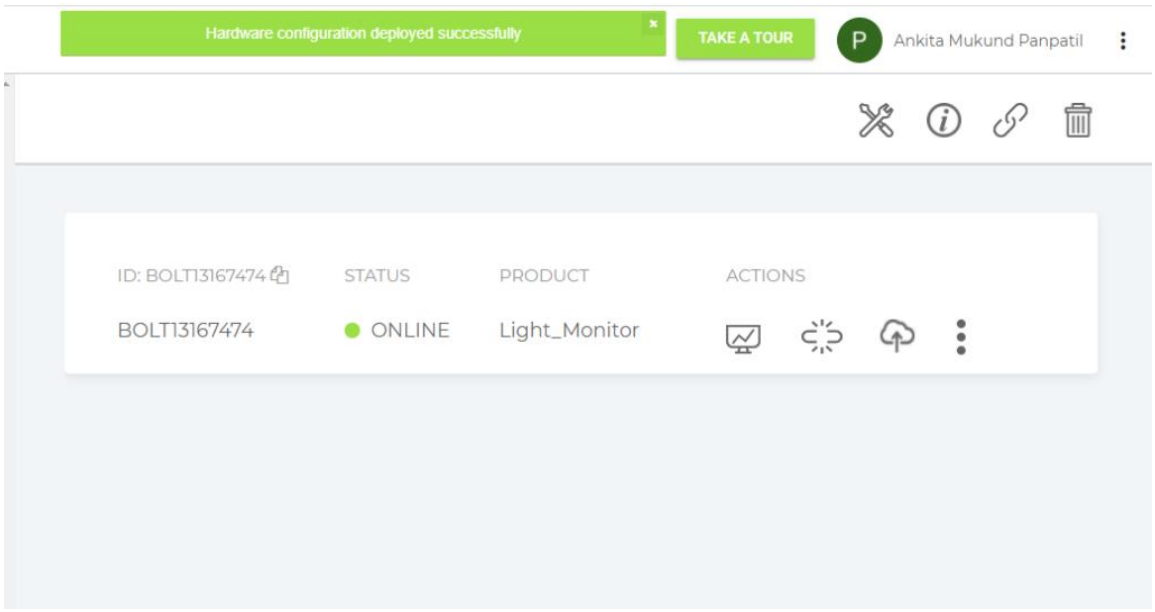
step 2 : Then connect your hardware setup with power supply and select your bolt linked device and done.



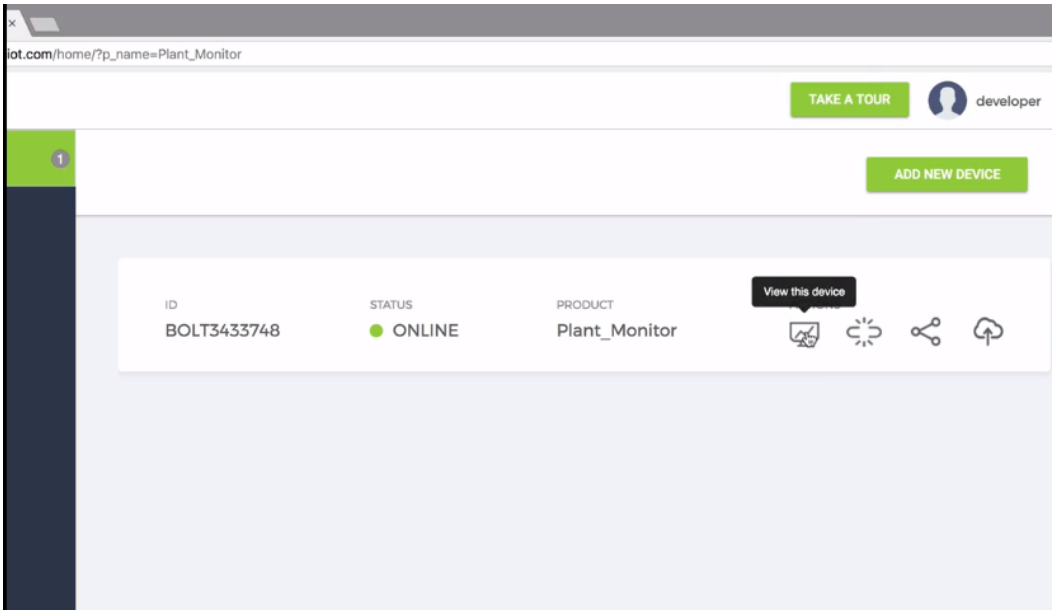
step 3 : Go to device page and click on deploy configuration button.



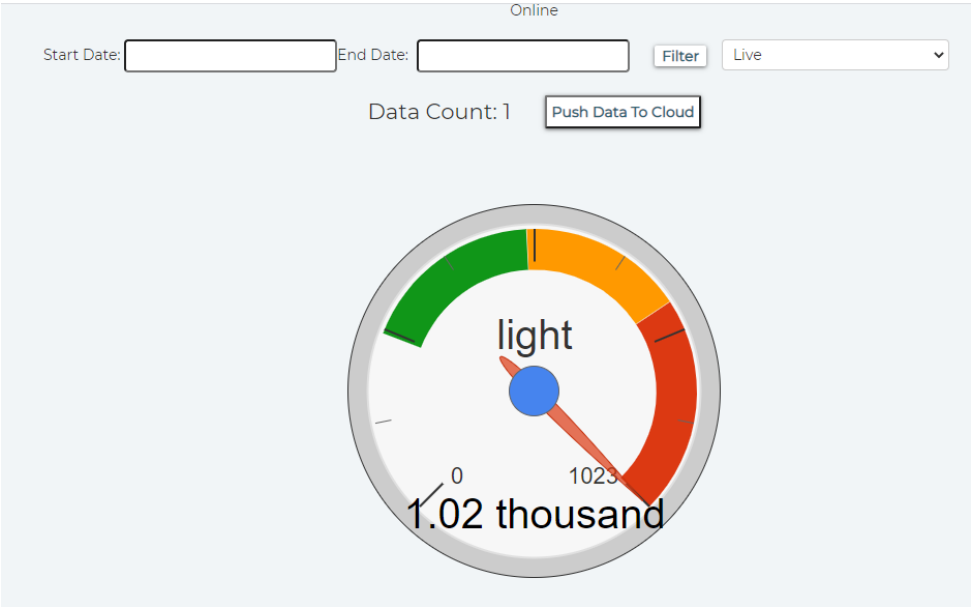
step 4 : If your hardware connection is right it will give you messages. (Hardware configuration deployed successfully)



step 5 : Click on view device icon.



step 6 : Then this page will open. this is the output.(Please click on deploy configuration icon every 5 min to get output)



6.2 Conclusion

In this we have places our project's screenshots from which the guide must easily understand that how my actual project looks like.

Chapter 7

CONCLUSION

7.1 Summary of Project

This project is based on the principle that whenever the light falling on the sensor changes, the resistance of sensor changes which is then converted into a change in voltage. The ADC pin on Bolt WiFi Module converted this analog voltage level into digital values which are shown on the graphs.

We connect the LDR between 5v pin and the analog input pin (A0), so that when light intensity increases, the resistance of LDR decreases so the voltage across the LDR decreases and as a result, the voltage on the analog input pin increases.

This means that as the light intensity increases, the voltage on the analog input pin also increases. The Bolt then converts that the voltage a 10 bit (10 places in binary number system) digital value that varies from 0-1024 (0 to 2 raised to 10).

This digital data is then sent to the cloud where it is plotted for visual representation.

7.2 Learning Experience

It was a great experience to design and implement the **Automated Light Intensity Monitoring System** by using Javascript and to work on its documentation. While working on this project, I have learned many things especially how to apply to concepts of Javascript into real life problems. It helped me learning working in different environments and increased my interest in this very field.

7.3 Future Enhancement

We all know that plants require sunlight for their healthy growth. However, at times we may not be able to keep a track of it or maybe we are not sure if our plants are getting enough sunlight.

In this project, we will build a system so that we could monitor the light our plants get and send the data to Bolt Cloud.

At the end of the project, we will be able to collect the values indicating intensity the of the light and plot them over a line graph.

7.4 Conclusion

Here we have concluded our project report by giving summary of project which gives the learning experience to the students and also decided the future work of the project.

Chapter 8

REFERENCES AND BIBLIOGRAPHY

8.1 Book Referred

Sr.No	Type	Description
1.	Book Name: Author Name:	Bolt Bolt

8.2 Web References

- https://docs.boltiot.com/docs/setting-up-the-bolt-wifi-module
- https://hackster.imgix.net/uploads/attachments/525577/unbox_bXyv68384x.gif?auto=compress&w=680&h=510&fit=max&fm=mp4
- https://youtu.be/7ztf21CNWqE
- https://docs.boltiot.com/docs/so-what-is-bolt-iot

8.3 Conclusion

Here we have named the useful books and websites which I have used in my project for reference purpose.