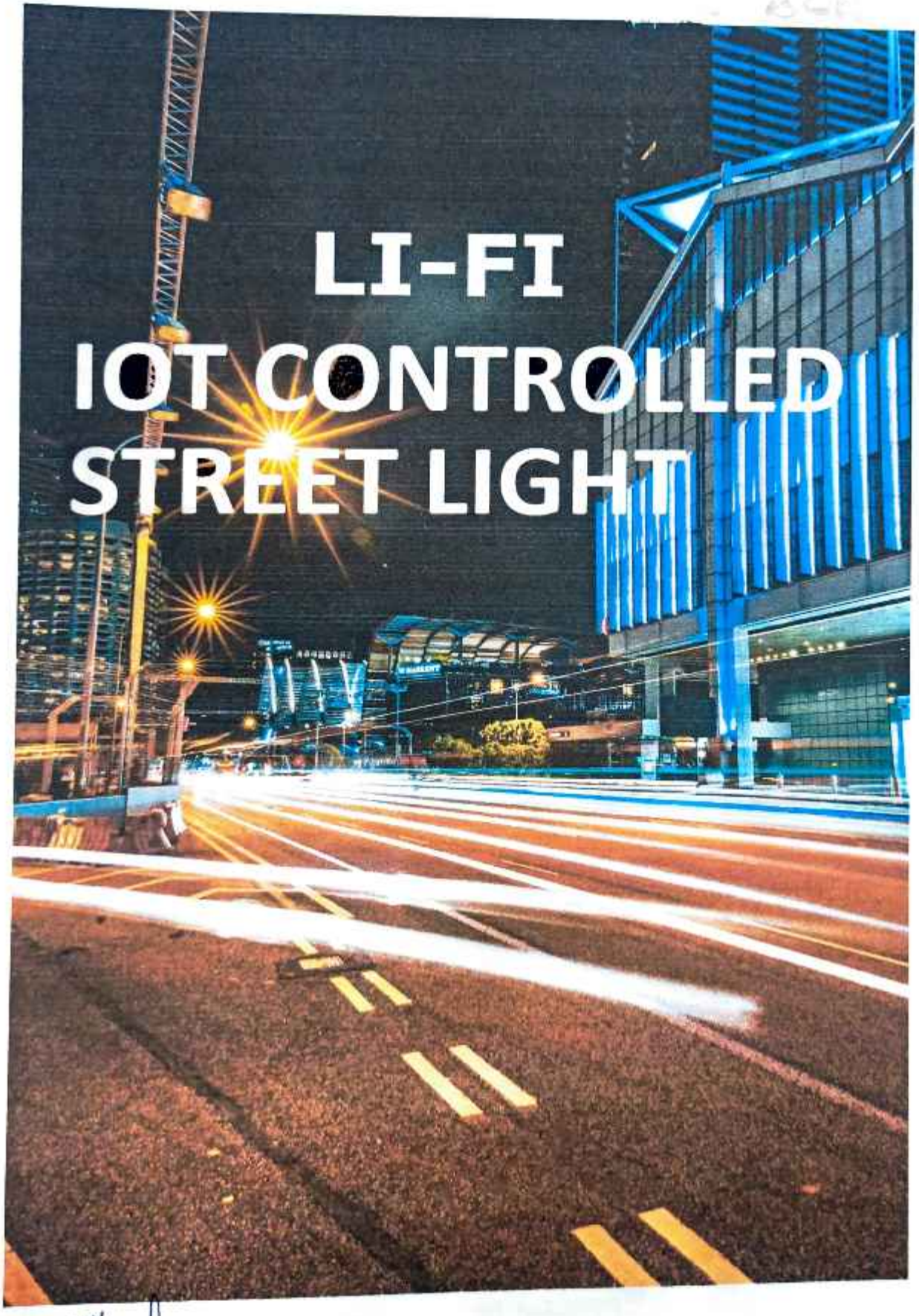

LI-FI
IOT CONTROLLED STREET LIGHT

A Project Report

Submitted to Goa University

In partial fulfilment of the requirements

For the degree of

Bachelor in Computer Applications (BCA)

By

Mast. Sandesh Patil

Miss. Sweeta Assotikar

Mast. Pankaj Falkar

Mast. Deepraj Naik

Miss. Shivraj Khatekar

Guided By

Ms. Nisha Sawant

LI-FI

IOT CONTROLLED STREET LIGHT

SPES Shri Gopal Gaonkar Memorial Goa Multi-Faculty College

Affiliated to Goa University

CERTIFICATE

This is to certify that the project on

"LI-FI

IOT CONTROLLED STREET LIGHT"

Has been successfully completed and submitted by

Mast. Sandesh Patil

Miss. Sweeta Assotikar

Mast. Pankaj Falkar

Mast. Deepraj Naik

Mast. Shivraj Khatekar

N.D. Sawant 17/02/2020

Mrs. Nisha Sawant

Internal Guide

22-02-20

Dr.Shaikh M. Parvez Al-Usmani

Principal

N.D. Sawant 17/02/2020

Mrs. Nisha Sawant

Project Co-ordinator

11/07/2020

External Rohan R. Kerkar

Examiner

SPES Shri Gopal Gaonkar Memorial Goa Multi-Faculty College

DECLARATION BY THE CANDIDATES

We declare that this project report have been prepared by us and to the best of our knowledge, it has not previously formed the basis for the award of any diploma or degree by this or any other university.

Roll no	Name	Signature
7330	Sandesh Patil	
7301	Sweeta Assotikar	
7324	Deepraj Naik	
7306	Pankaj Falkar	
7318	Shivraj Khatekar	

SPES Shri Gopal Gaonkar Memorial Goa Multi-Faculty College

Affiliated to Goa University

CERTIFICATE BY THE GUIDE

This is to certify that the project report is the record of the whole work done by the candidates themselves under my guidance during the period of study and that to the best of my knowledge; it has not previously formed the basis for the award of any diploma or degree by this on any other university.

Name of College: SPES Goa Multi-Faculty College

Programme: Bachelor in Computer Applications (BCA)

Academic Year: 2019-2020

Ms. Nisha Sawant

Project Guide

SPES Shri Gopal Gaonkar Memorial Goa Multi-Faculty College

DECLARATION BY THE CANDIDATES

We declare that this project report have been prepared by us and to the best of our knowledge, it has not previously formed the basis for the award of any diploma or degree by this or any other university.

Roll no	Name	Signature
7330	Sandesh Patil	
7301	Sweeta Assotikar	
7324	Deepraj Naik	
7306	Pankaj Falkar	
7318	Shivraj Khatekar	

ACKNOWLEDGEMENT

It is our immense pleasure to have worked on the project titled" **LI-FI (IOT Controlled Street Lights)**" . This project consumed huge amount of work, research and dedication. Implementation of this IoT based project would not have been possible if we did not have support of many individuals. Therefore, we would like to extend our sincere gratitude to all of them.

We would like to show our gratitude to our internal guide Mrs.Nisha Sawant for giving us guideline, motivation, inspiration for this project throughout numerous consultations and guiding us to make this project a success.

We are also grateful to Mrs. Nisha Sawant for provision of expertise and technical support in the implementation. Without her supervision, knowledge and experience, the project would lack in quality of outcomes, and thus her support has been essential.

Sincere gratitude to Miss. Chandrika Naik, Laboratory assistant, for her timely technical help whenever required.

Nevertheless, we express our sincere gratitude towards the Principal, staff members and colleagues for their kind co-operation, encouragement and valuable time in aiding us in various ways to help us in completion of this project. -The Project Team

Project Profile

Project Name	**LI-FI (IOT Controlled Street Lights)**
Objective	LI-FI (IOT Controlled Street Lights) can reduce energy consumption and maintenance costs and also helps to reduce activities up to certain limit.
Hardware Requirement	Arduino uno,ESP8266,LDR Sensor Relay Driver Modules, Bulb Holder, Wooden Chassis, USB to UART Cable, Connecting Wires, Screwdriver
Platform	IoT
Front End Back Tool	Arduino, ThingSpeak
Other Tool	Google Chrome, YouTube, Skyfilabs
Project Duration	1 Year
Internal Guide	Nisha Sawant

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INTRODUCTION

INTRODUCTION

Street light controllers are smarter versions of the mechanical or electronic timers previously used for street light ON-OFF operation. They come with energy conservation options like twilight saving, staggering or dimming. Also many street light controllers come with an astronomical clock for a particular location or a Global Positioning System (GPS) connection to give the best ON-OFF time and energy saving.

Automatic Street Light Control System is a simple and powerful concept, which uses transistor as a switch to switch ON and OFF the street light automatically. By using this system manual works are removed. It automatically switches ON lights when the sunlight goes below the visible region of our eyes. It automatically switches OFF lights under illumination by sunlight. This is done by a sensor called Light Dependant Resistor (LDR) which senses the light actually like our eyes.

By using this system,energy consumption is also reduced because now-a-days the manually operated street lights are not switched off properly even the sunlight comes and also not switched on earlier before sunset. In sunny and rainy days, ON time and OFF time differ significantly which is one of the major disadvantages of using timer circuits or manual.

This project exploits the working of a transistor in saturation region and cut-off region to switch ON and switch OFF the lights at appropriate time with the help of an electromagnetically operated switch.

A **streets light**, **lamppost**, **streets lamp**, **light standard**, or **lamp standard** is a raised source of light on the edge of a road or walkway, which is turned on or lit at a certain time every night. Modern lamps may also have light-sensitive photocells to turn them on at dusk, off at dawn, or activate automatically in dark weather. In older lighting this function would have been performed with the aid of a solar dial. It is not uncommon for street lights to be on poles which have wires strung between them, or mounted on utility poles.

This project exploits the working of a transistor in saturation region and cut-off region to switch ON and switch OFF the lights at appropriate time with the help of an electromagnetically operated switch

Automatic Streetlight needs no manual operation of switching ON and OFF. The system itself detects whether there is need for light or not. When darkness rises to a certain value

ANALYSIS

Project Description:

- **Arduino:** The digital and analog input/output pins equipped in this board can be interfaced to various expansion boards and other circuits. The Serial communication interface is a feature in this board, including USB which will be used to load the programs from computer

- **Breadboard**: A breadboard is a solderless device for temporary prototype with electronics and test circuit designs. Most electronic components in electronic circuits can be interconnected by inserting their leads or terminals into the holes and then making connections through wires where appropriate

- **Relay:** A relay is an electrically operated switch. It can handles the high power required to directly control an electric motor or other load is called relay or contactor.
- **LDR** : An LDR is a component that has a (variable) resistance that changes with the light intensity that falls upon it. It is made from semiconductor materials to enables them to have their light sensitive properties, many materials can be used, but one popular material for these photo resistors is cadmium supplied.

- **ThingSpeak** :Thing speak channel is researched based platform used to update the data on the channel and even can be download on the mobile application to monitor the current status of the application via the internet is connected.

- **ESP8266:** ESP8266 Wi-Fi module is generally used to establish the wireless communication between the devices. But this module is not capable of 5-3v logic shifting and will require an external logic converter.

OBJECTIVE

The objective for this project is to design a lighting system which targets the energy saving and autonomous operation on economical affordable for the streets and immediate remedy on complaints. The Energy Consumption of various services can be recorded and accounted. Build an energy saving lighting system with integrated sensors and controllers. Moreover, errors which occur due to manual operation can also be eliminated. As all the Street Lights can be switched ON/OFF through computer from central control station and no labour is required for switching ON/OFF. Doing all these in turn increases the performance and life of the lamps

SCOPE

Switch on and off automatically.

- Street light fault detection.
- Automatic switching off alternate lights during late night to limit the power consumption.
- The useful information is collected from the street light at the end of each day this information is stored in a database and based on this information charts are derived.
- Chart contains information like, Power consumption.

EXISTING SYSTEM :-

Street light is poorly designed and inadequately maintained, there are large number of burned out lamps which leads to insecurity. There is a complaint register in every zonal office street light section. It is being maintained by the line inspector. The complaint received from public, councillors and corporation officials either over phone is in person being recorded in the complaint register The complaint thus entered is being handed over to the fieldwork man so as to rectify the complaints. the field staff will have the rounds in the respective areas twice in a week and the complaints about non burning are also being attended then and there. But this is not the immediate remedy on complaints and has many disadvantages like the repair work takes days/even months instead of taking few hours which results in delay, telephone line may be busy, sometimes no response.

Proposed System: -

Since the HID lamps are not cost effective and not reliable, smart street light system has overcome by replacing the HID lamps with LED. Due to automation, power consumption and cost effectiveness in the present field of electronics and electrical related technologies, industry of street lighting systems are growing rapidly and going to complex with rapid growth of industry and cities. To control and maintain complex street lighting system more economically, various street light control systems are developed. These systems are developed to control and reduce energy consumption of a town's public lighting system using different technologies which uses IR motion sensors to detect the vehicle movement after which the street light begins to glow. As the vehicle moves, the street light that was glowing switches off and the following lights begins to glow.

Methodology:-

The Smart street light control system adopts a dynamic control methodology. According to the proposed plan, initially when it becomes dark, all the street lights automatically glow for a few seconds and switches off. But throughout the night, only one streetlights remains switched on for security concerns. When a vehicle passes by, a block of street lights glows and as the vehicle moves forward, the next block of lights starts glowing where the previous block switches off.

Benefits of Smart Lights: -

LED lights reach full brightness instantly - They do not require time to warm up, which makes them a flexible light source.

Far more environmentally friendly - They do not contain lead or mercury and do no mit any poisonous gases. They also give off less CO2 emissions.

Insects don't like LED lights - This is because they don't give of ultraviolet rays and they are sealed to protect against outdoor life.

Less glare - As they are directed at the road surface, they do not badly affect drivers vision.

Accurate colour rendering - LED street lighting produces more accurate colour rendering, making it easier for drivers, and others to recognise objects.

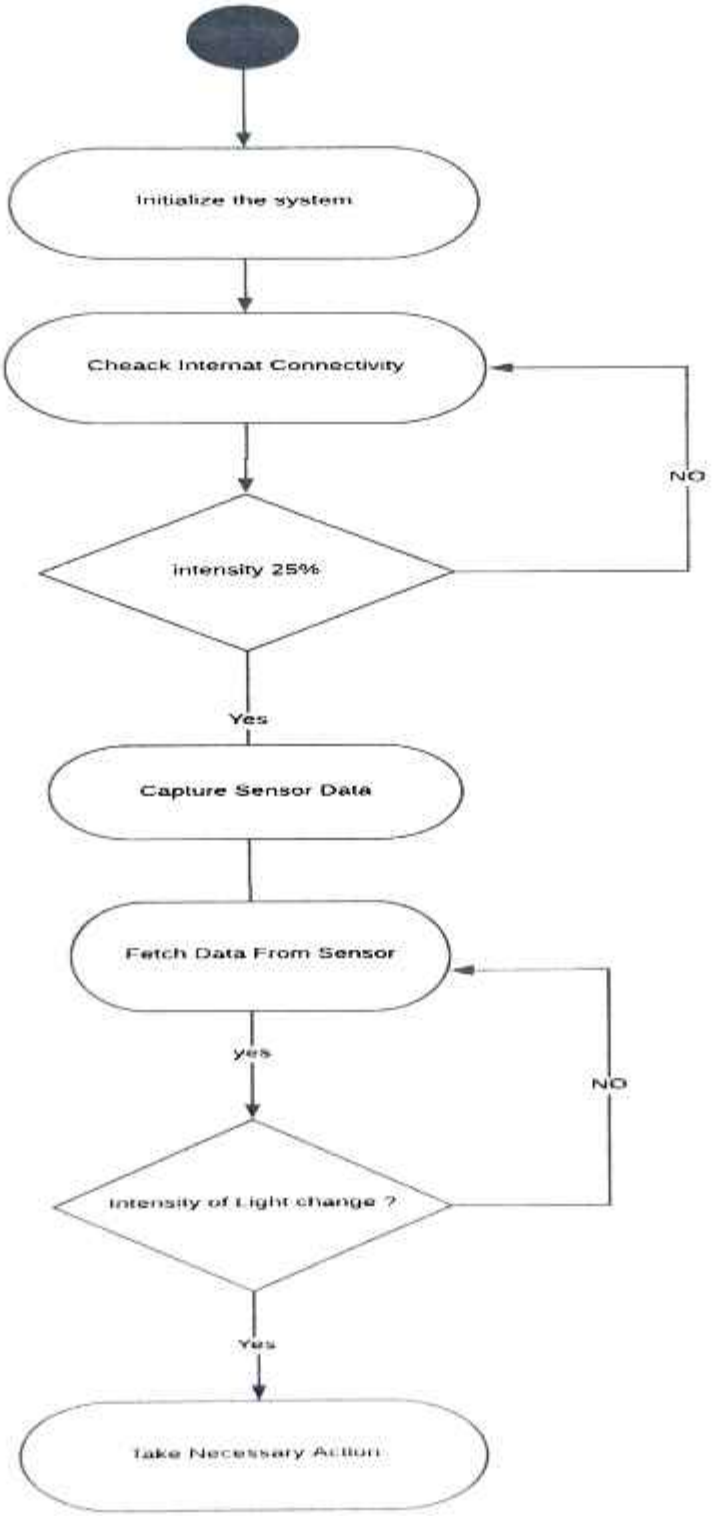
Higher light output - LED lights perform better at lower temperatures, which is beneficial over the winter months.

Can withstand most weather conditions - They are dustproof, waterproof and work in all temperatures.

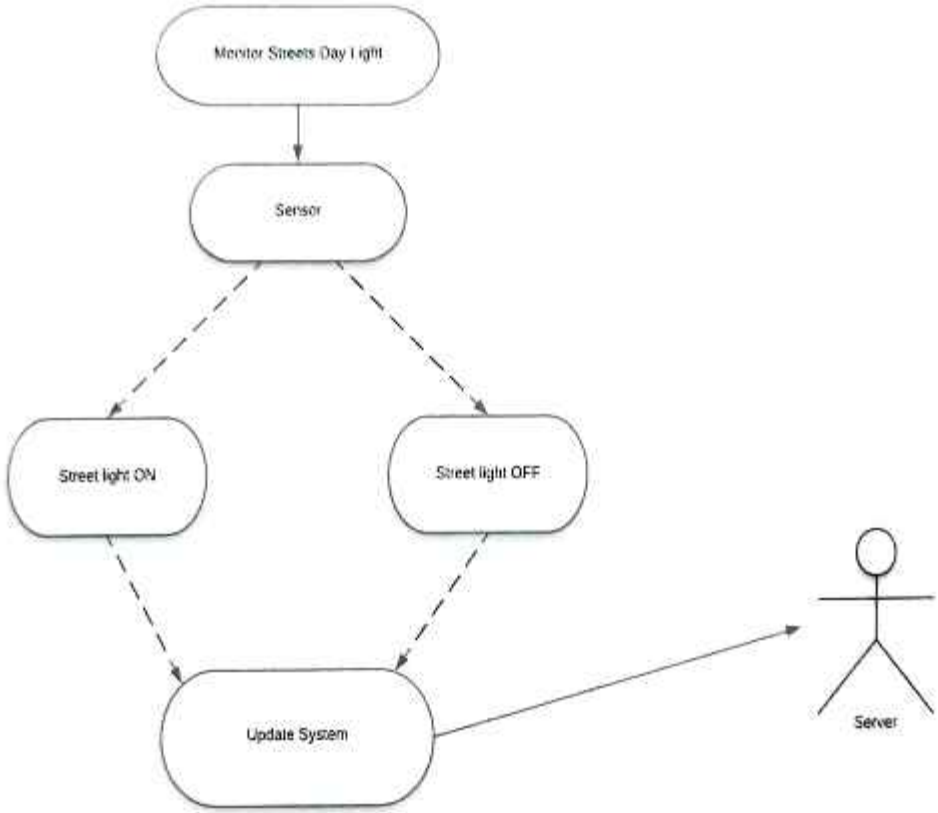
Reduced light pollution - LED street lights work in a way that means this does not happen.

Design

ACTIVITY DIAGRAM



USE CASE DIAGRAM



HARDWARE COMPONENTS:

Arduino

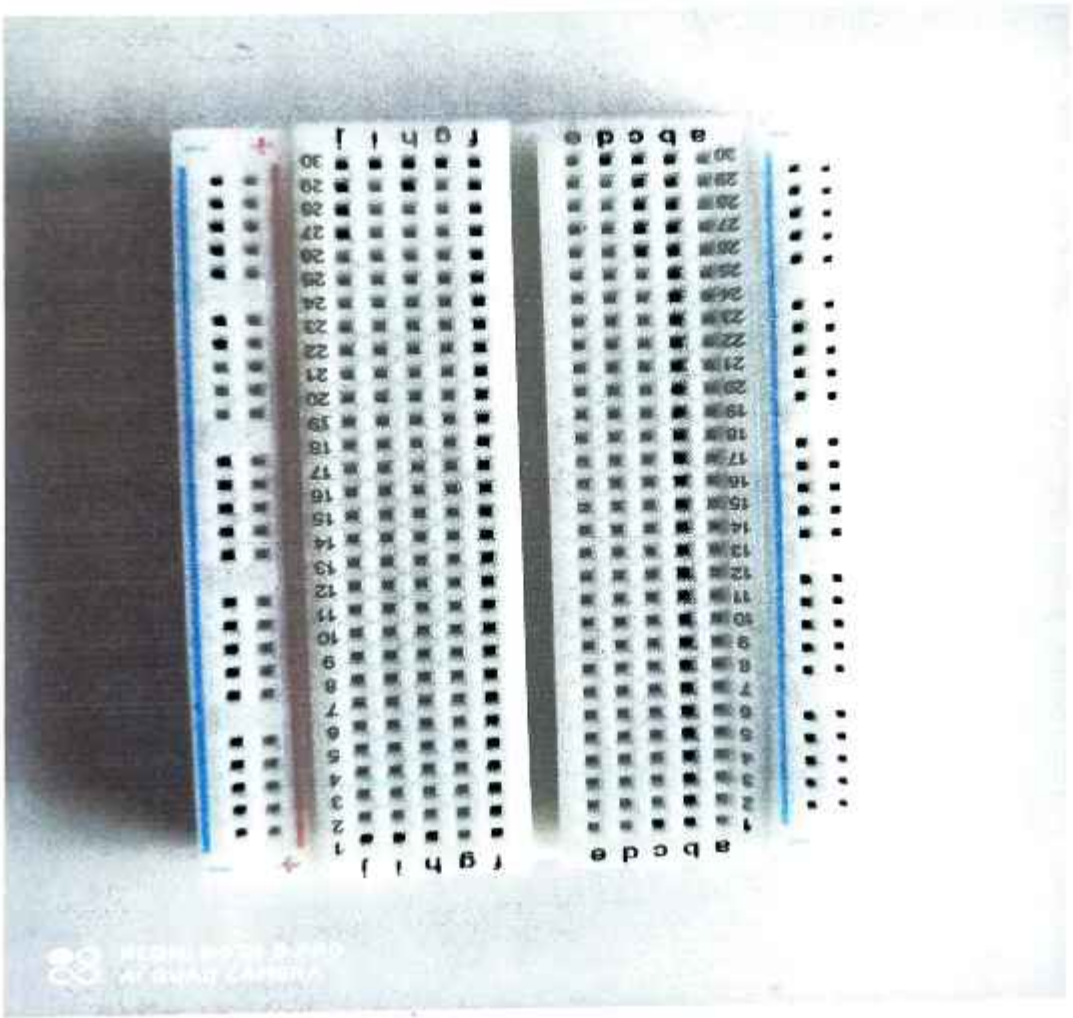
Microcontroller: ATmega328

Input Voltage (Recommended) : 7-12v

Digital I/O Pins : 14 (of which 6 provide PWM Output)

Analog Input Pins : 6

Breadboard



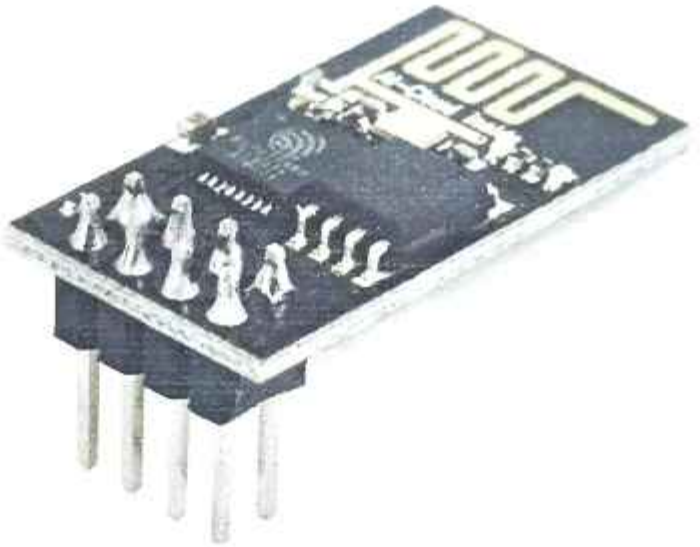
2 Distribution Strip,200 tie-points

630 tie-points in IC/circuit areas

Dimension :6.5*4.4*0.3 inch

Rating : 300/3 to 5Amps

ESP8266 module



802.11 b/g/n protocol

Wi-Fi Direct (P2P), soft-AP

Integrated TCP/IP protocol stack

Supports antenna diversity

LDR SENSOR

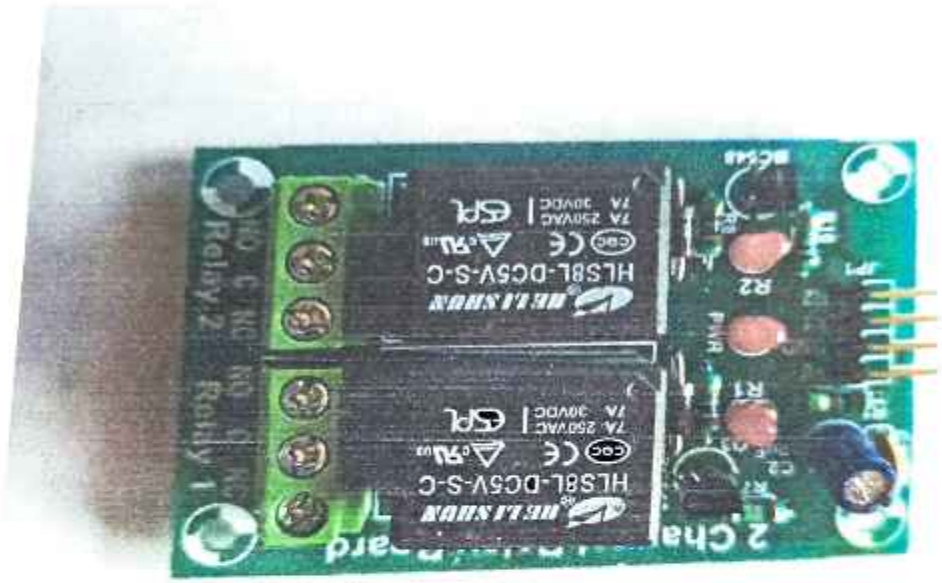
Can be used to sense light

Easy to use on breadboard or perf board

Easy to use with microcontrollers or even with normal Digital / analog IC

Small, cheap and easily available

RELAY



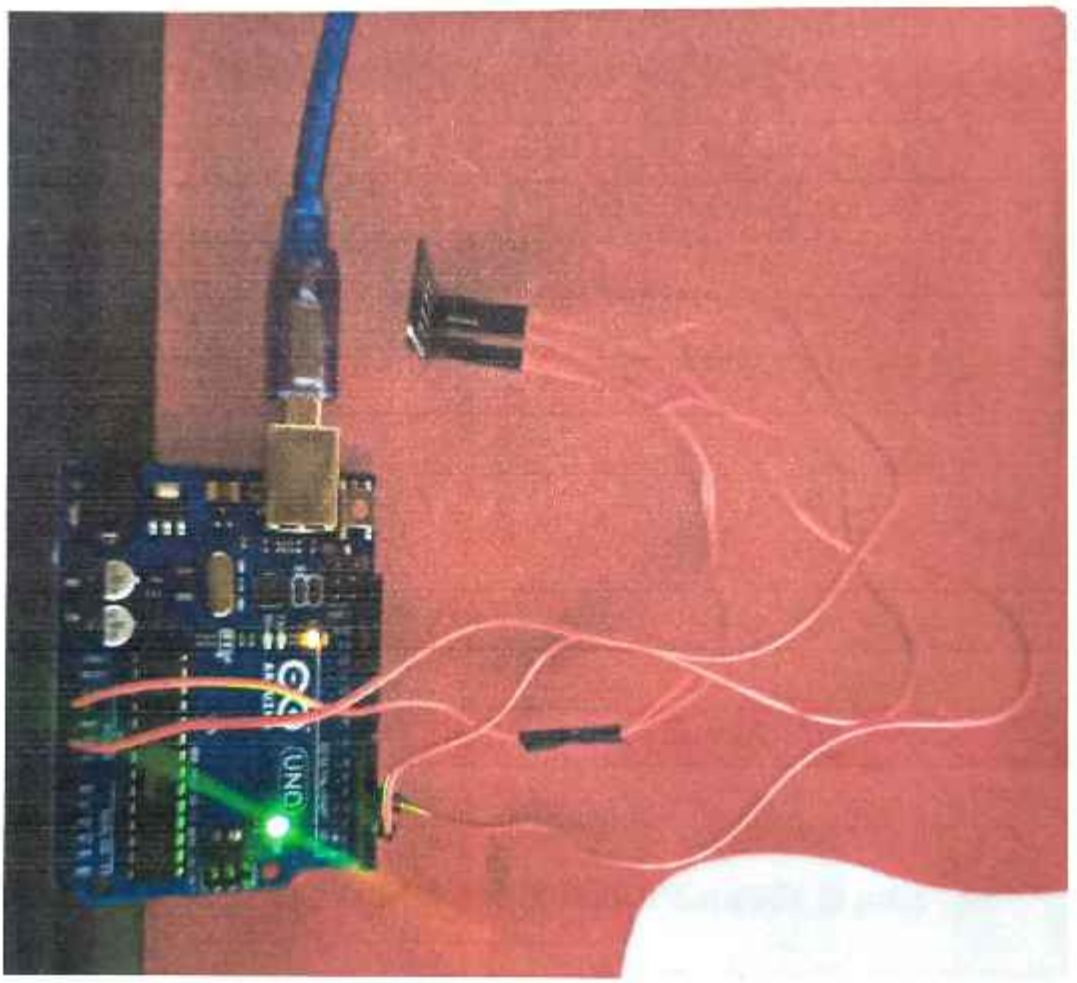
Coil voltage

Coil resistance

Switch ratings (voltage and current)

switch contact arrangement ()SPDT, DPDT etc

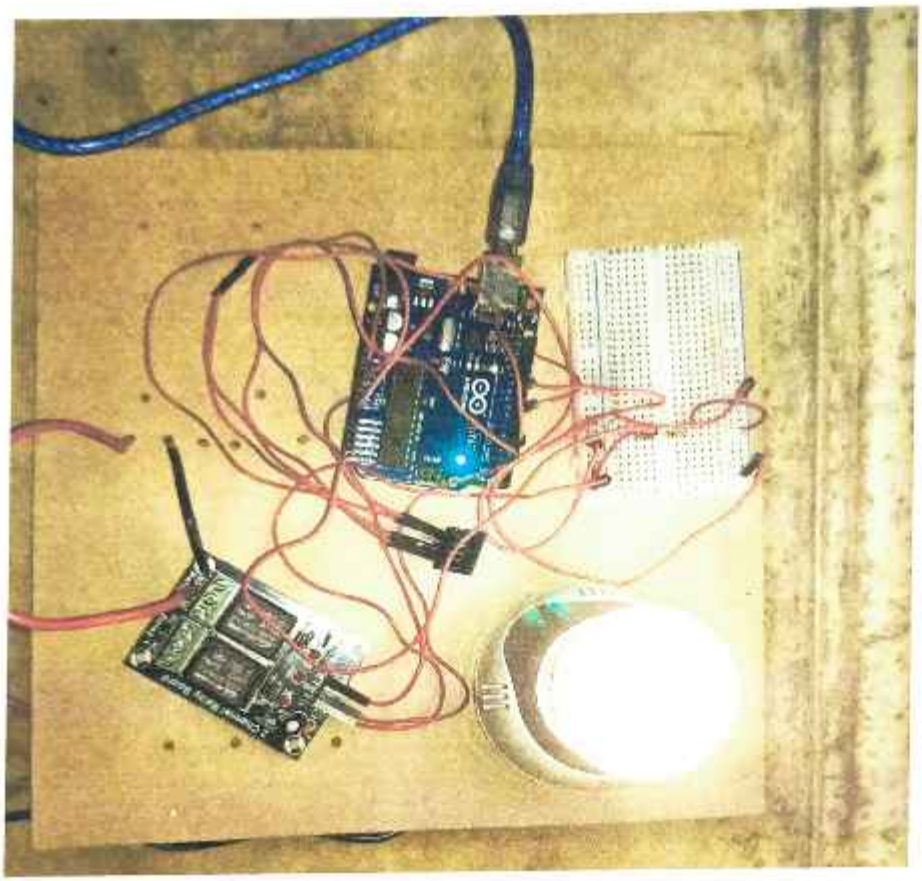
Arduino uno Testing



While Testing Arduino with Arduino IDE

Uploading Program Code on Arduino uno

Testing Project



While Arduino uno is connected with P€a code is pass through Arduino IDE.

Light intensity is control by ThingSpeak

All Wires are connected with Arduino uno,ESP8266, Breadboard, Relay, bulb.

Future Enhancement

FUTURE ENHANCEMENTS

1) We are going to add more features and advanced sensor for other street lights for betterment of human life and it may be used to control street light.
2) We are going add many features that City Light will be in control on mobile by the authority.
3) When any car pass through Street light a light intensity will increase and decrease while it move from there.
4) It will benefits the government for reducing a money.

CONCLUSION

This project of AUTOMATIC STREET LIGHTS is a cost effective, practical, eco-friendly 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. According to statistical data we can save more that 40 % of electrical energy that is now consumed by the highways. Initial cost and maintenance can be the draw backs of this project. With the advances in technology and good resource planning the cost of the project can be cut down and also with the use of good equipment the maintenance can also be reduced in terms of periodic checks. The LEDs have long life, emit cool light, donor have any toxic material and can be used for fast switching. For these reasons our project presents far more advantages which can over shadow the present limitations. 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.

References

References

- https: //www.youtube.com/
- https: //www.skyfilabs.com/

Annexure III

WORK RECORD/DIARY

Name of the College : Goa Multi – Faculty College

Name of the Candidate : Sandesh Shivaji Patil

Course : BCA

Year : 2019 – 2020

Title of the Project : LI-FI(IOT Controlled Streets Light)

Library/Laboratory Fieldwork	Description of work	Date	Time spent	Signature of Authority	Counter Signature of Guide & Date
Class	Meeting Guide Discussion On Topic	26/6/19 27/6/19	1hours 2 hours		
Class	Finalisation of topic	20/7/19	2 hours		
Fieldwork	Requirement Gathering Finalising online course	4/8/19 26/8/19	4 hours		
Class	Online Course	10/9/19	3 month		
Lab	Circuit diagram Activity diagram	6/12/19 6/12/19	2hours 2hours		
	Implementation Assembly	13/12/19 20/12/19	8 days		
	Testing Casing	27/12/19 27/12/19	8 days		
Class	Status report	3/1/2020 ~~3/12/19~~	1 days		
	Report Performance Control changes	3/1/20 10/1/20	2 day		

1. Signature of the Student :
2. Signature of the Guide : Nisha Sawant 15/01/2020
3. Signature of Project Coordinator : Nisha Sawant 15/01/2020

Annexure III

WORK RECORD/DIARY

Name of the College : Goa Multi – Faculty College

Name of the Candidate : Sweeta Vaman Assotikar

Course : BCA

Year : 2019 – 2020

Title of the Project : LI-FI(IOT Controlled Streets Light)

Library/Laboratory Fieldwork	Description of work	Date	Time spent	Signature of Authority	Counter Signature of Guide & Date
Class	Meeting Guide Discussion On Topic	26/6/19 27/6/19	1hours 2 hours		27/6/19
Class	Finalisation of topic	20/7/19	2 hours		26/7/19
Fieldwork	Requirement Gathering Finalising online course	4/8/19 26/8/19	4 hours		30/8/19
Class	Online Course	10/9/19	3 month		13/12/19
Lab	Circuit diagram Activity diagram	6/12/19 6/12/19	2hours 2hours		12/12/19
	Implementation Assembly	13/12/19 20/12/19	8 days		4/1/2020
	Testing Casing	27/12/19 27/12/19	8 days		4/1/2020
Class	Status report	3/01/2020 ~~3/12/19~~	1 days		4/1/2020
	Report Performance Control changes	3/1/20 10/1/20	2 day		15/01/2020

1. Signature of the Student : Sweeta

2. Signature of the Guide : Nisha Sawant 15/01/2020

3. Signature of Project Coordinator : Nisha Sawant 15/01/2020

Annexure III

WORK RECORD/DIARY

Name of the College : Goa Multi – Faculty College

Name of the Candidate : Pankaj Kushali Falkar

Course : BCA

Year : 2019 – 2020

Title of the Project : LI-FI(IOT Controlled Streets Light)

Library/Laboratory Fieldwork	Description of work	Date	Time spent	Signature of Authority	Counter Signature of Guide & Date
Class	Meeting Guide Discussion On Topic	26/6/19 27/6/19	1hours 2 hours		27/6/19
Class	Finalisation of topic	20/7/19	2 hours		20/7/19
Fieldwork	Requirement Gathering Finalising online course	4/8/19 26/8/19	4 hours		03/9/19
Class	Online Course	10/9/19	3 month		12/12/19
Lab	Circuit diagram Activity diagram	6/12/19 6/12/19	2hours 2hours		13/12/19
	Implementation Assembly	13/12/19 20/12/19	8 days		07/1/2020
	Testing Casing	27/12/19 27/12/19	8 days		2/1/2020
Class	Status report	~~3/12/19~~ 3/01/2020	1 days		5/1/2020
	Report Performance Control changes	3/1/20 10/1/20	2 day		15/01/2020

1. Signature of the Student :
2. Signature of the Guide : Nisha Sawant 15/01/2020
3. Signature of Project Coordinator : Nisha Sawant 15/01/2020

Annexure III

WORK RECORD/DIARY

Name of the College : Goa Multi – Faculty College

Name of the Candidate : Deepraj Dadi Naik

Course : BCA

Year : 2019 – 2020

Title of the Project : LI-FI(IOT Controlled Streets Light)

Library/Laboratory Fieldwork	Description of work	Date	Time spent	Signature of Authority	Counter Signature of Guide & Date
Class	Meeting Guide Discussion On Topic	26/6/19 27/6/19	1hours 2 hours		27/6/19
Class	Finalisation of topic	20/7/19	2 hours		20/7/19
Fieldwork	Requirement Gathering Finalising online course	4/8/19 26/8/19	4 hours		30/8/19
Class	Online Course	10/9/19	3 month		12/12/19
Lab	Circuit diagram Activity diagram	6/12/19 6/12/19	2hours 2hours		12/12/19
	Implementation Assembly	13/12/19 20/12/19	8 days		1/1/2020
	Testing Casing	27/12/19 27/12/19	8 days		1/1/2020
Class	Status report	3/1/2020 ~~3/12/19~~	1 days		5/1/2020
	Report Performance Control changes	3/1/20 10/1/20	2 day		15/01/2020

1. Signature of the Student :

2. Signature of the Guide : Nisha Sawant 15/01/2020

3. Signature of Project Coordinator : Nisha Sawant 15/01/2020

Annexure III

WORK RECORD/DIARY

Name of the College : Goa Multi – Faculty College

Name of the Candidate : Shivraj Shivram Khatekar

Course : BCA

Year : 2019 – 2020

Title of the Project : LI-Fi(IOT Controlled Streets Light)

Library/Laboratory Fieldwork	Description of work	Date	Time spent	Signature of Authority	Counter Signature of Guide & Date
Class	Meeting Guide Discussion On Topic	26/6/19 27/6/19	1hours 2 hours		
Class	Finalisation of topic	20/7/19	2 hours		
Fieldwork	Requirement Gathering Finalising online course	4/8/19 26/8/19	4 hours		
Class	Online Course	10/9/19	3 month		
Lab	Circuit diagram Activity diagram	6/12/19 6/12/19	2hours 2hours		
	Implementation Assembly	13/12/19 20/12/19	8 days		
	Testing Casing	27/12/19 27/12/19	8 days		
Class	Status report	5/1/2020 ~~6/12/19~~	1 days		
	Report Performance Control changes	3/1/20 10/1/20	2 day		

1. Signature of the Student : Khatekar

2. Signature of the Guide : Nisha Sawant 15/01/2020

3. Signature of Project Coordinator : Nisha Sawant 15/01/2020