



Independent University Bangladesh

Project Proposal

Topic - Smart Street Light

Course Information

Course Code : CSE216L
Course Title : Microprocessor Lab
Section : 02
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Group Information

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Introduction:

Existing street light systems suffer from problems like inefficiency, power wastage, power pilferage and cumbersome maintenance. Faulty street lights can also be a reason for crimes on roads and highways. Smart street light management systems address all these issues.

Define the problem you chose:

At present time we use sodium vapor light or LED light in our maximum cities as street light. It is seen in a number of cities that the street light is one of the huge expenses in a city. The cost spent is huge because all the sodium vapor lamps consume more power. Currently a manual system is used where the light will be made to switch ON/OFF i.e the light will be made to switch ON in the evening and switched OFF in the morning. In fact a lot of lamps are switched on in the morning and some of these lamps are out of service and some of the lamps remain on for a long time at night with nobody passing in the street. Hence there is a lot of wastage of energy between the ON/OFF. Also how can we check all these lamps periodically, if a man checked these lamps each time it would be a very hard task and would have a high cost.

Disadvantages of Existing System :

- Manual switching off/on of street lights: Every month, 420MW of power worth Tk34 lakh is lost due to the municipal corporation staff's incompetence in turning street lamps on and off. (Dhaka Tribune, Published at 08:52 pm August 23rd, 2014).
- More energy consumption: A high-pressure sodium street light can consume up to 1000 watts, while a 320-watt incandescent light from the 1900s was required. According to the US Department of Energy, some LED street lights use only 73 watts and produce a superior quality of light. Sodium light is still utilized as a street light on numerous streets today. Even if there are no vehicles on the road at night, the lights remain on at maximum intensity, wasting electricity.
- Hard process to find the disable lights to repair them: If a street light goes out, the authorities will not be notified right away (So that that part of the road remains dark). After a specific amount of time had passed, they would check the lights. During the inspection, they turn on all of the street lights and then check them. It also necessitates a significant amount of time. This is a time-consuming and costly process.
- Maintenance cost is high: The manual system needs staff to turn on and turn off the lights. Which is very expensive. The lights are controlled manually so in the cloudy weather at the day time the lights remain off.

Propose your solution :

In the digital Bangladesh vision, everything is becoming digitized. Roads are vital to the development of any country or community. We propose an automated street light system with light sensors, not only to save energy but also to ensure safety, in consideration of road safety and the goal of digital Bangladesh. If there is darkness and someone is walking down the street, the street light will turn on. The major goal of this project is to reduce energy usage by only turning on the street light when it is required. The money spent on the street light could be put to better use elsewhere in the country. Because our system will be built on the Internet of Things, there will be numerous aspects on which we can expand in the future to make our system more advanced for road safety.

Advantages of the Proposed System:

Automatic switching of street lights: When the light is required, the system will turn it on (at night or in cloudy weather). As a result, the light will not be switched on if it is not required.

Maintenance cost reduction: The automatic system does not require any staff to maintain it, maintenance costs will be reduced.

Controlling the light intensity: In the night when there is no vehicle or object on the road then the light intensity will remain low so that we can save energy.

Reduction of light pollution: It will reduce if we can control the extra waste of energy.

Reduction in CO₂ emission: It will reduce if we can control the extra waste of energy.

Energy saving: It's an automated system, so there won't be any unnecessary energy waste, and we're considering using solar energy to power the lighting system.

Wireless communication: We are using IoT in our system so it will be wireless communication. Wireless communication makes our life easy.

Easy to find the disable lights to repair them: When a light fails to function properly, it sends information (light code number) to the mentors over the IoT.

Elaboration, steps to be done & outcomes:

The hardware components of the system are:

1. LDR, 1 Mohm
2. LED (generic)
3. Arduino Uno R3
4. Resistor 1k ohm
5. Digilent IR Proximity Sensor
6. Espressif ESP8266, ESP-12E
7. Connecting wires
8. Breadboard
9. Adaptor
10. Socket

11. IoT sensor

Software required for the programming and Online services-

1. Arduino IDE
2. ThingSpeak API

Time Frame defining your steps till project Submission:

Week	Activities
1st - 2nd	We formed our team for the project.
3rd	We worked on our project topic and formed a project proposal, having a discussion between us.
4th	Working on our literature review and deciding on the component list.
5th - 6th	Learn about Arduino Uno R3 and its application, and the understanding of Arduino IDE.
7th - 9th	We will work on assembling the components and writing the code. Start working on...
10th	A trial process of the project. Will Preview the whole project.
11th	Final demo.

Risks/challenges you might face:

- 1.The most challenging part is that all the team members are not able to do this project together directly still now , hence knowledge sharing between the members is minimal.
2. The members are not familiar with the use and applications of Arduino Uno R3 and IoT things. As a result there is some time loss, in the process of becoming familiar with its use.

Conclusion:

With a capability to change the amount of light emitted depending upon the external environment it will be an innovation with many future applications. The usage of the smart lighting system will help us innovate the road sector conditions.