



# American International University – Bangladesh

Faculty of Engineering  
Department of EEE & COE

## MICROPROCESSOR & EMBEDDED SYSTEM

SEMESTER: Fall 2021-2022

### Project Literature review

#### Group no.-01

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- |    |                             |               |
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## TITLE: SMART HIGHWAY LIGHT CONTROL SYSTEM BY MOTION SENSOR

### Introduction:

Street lights are an essential element of the roads. Whenever we travel or walk outside at night, the lights show us the way clearly. As civilization has advanced, we have street lights almost everywhere and even on the highways which we use to travel long distances. But, even if the highway does not stay crowded the lights stay on for the whole night. Which is a great waste of energy.

Currently, only embedded brightness sensors are used to regulate street lights; they automatically turn on when it gets dark and turn off when it is bright. This is a major waste of energy and that has to be changed. In our project, we want to implement an energy-saving system where the lights will turn off when not needed and turn on only when necessary.

## **Literature Review:**

Noriaki Yoshiura, Yusaku Fujii, Naoya Ohta (2013) [1] mentioned a concept of an autonomous-distributed controlled light system which is proposed by Fujii et al (Japan), in a conference paper, where all the street lights are connected to a network that sends a signal to nearby lights if motion is detected.

This kind of smart street light exchanges information of detecting moving objects and turn them on so that neighbourhood of the moving objects lightens. The method is tracking the detection of the existence of pedestrians or vehicles using several kinds of sensors. Also, Image processing is used that obtain pictures and adjust the brightness of the lights. The idea of this system can be helpful for building our proposed system.

The major drawbacks of this system are safety, privacy, and damage issues. Image processing is a hindrance to privacy and if one light is damaged, that can be known if anyone reports it and can be fixed only by physically going to that place. If someone is hiding somewhere or a vehicle is stopped, the light will also turn off which is a major safety issue.

The centrally-controlled system with host computers is also a result of research that was mentioned by Noriaki Yoshiura (2017) [2]. A Zigbee communication module was used to communicate with the servers, sensors, and other street lights. Which sends a signal to the server/host computer if a pedestrian or vehicle is detected and the server decides that the lights should turn on. Every smart light has one module to communicate.

But the time lag to communicate with the servers and the high cost of the host computer is the major flaw of this system.

Being an energy-saving era, it is necessary to save energy effectively. The “Street Light System based on Piezoelectric Sensor Networks” by R. Abinaya, V. Varsha, and Kaluvan Hariharan's (2016) [3] journal paper explains how the energy can be saved from the street lights through effective management using sensors. This project requires piezoelectric sensors to detect the vehicle's movements and accordingly switch on the lights ahead of it. In our project, we can use piezoelectric sensor system information and we can gather knowledge on how to use this sensor.

In this review, some articles/journals were summarized and evaluated in terms of cost, time, repair, privacy, safety, etc. By improving every section, a sensor-controlled street/highway light system can be implemented in which both the pedestrians and vehicle drivers will be benefitted.

## **References:**

[1] Noriaki Yoshiura, Yusaku Fujii, Naoya Ohta ; ‘Smart street light system looking like usual street lights based on sensor networks’; Conference paper (2013); DOI: 10.1109/ISCIT.2013.6645937

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[Accessed June 28, 2022]

[2] Noriaki Yoshiura ; ‘Smart street light system based on IoT’ from ‘Proceedings of International Conference on Technology and Social Science 2017’; Conference paper (2017)

[http://www.ejikei.org/Conf/ICTSS2017/proceedings/materials/proc\\_files/Keynote%20paper\\_ICTSS2017\\_%5Bprof.Yoshiura%5D/ICTSS2017-yoshiura-.pdf](http://www.ejikei.org/Conf/ICTSS2017/proceedings/materials/proc_files/Keynote%20paper_ICTSS2017_%5Bprof.Yoshiura%5D/ICTSS2017-yoshiura-.pdf)

[Accessed June 29, 2022]

[3] R. Abinaya, V. Varsha, and Kaluvan Hariharan; 'An Intelligent Street Light System based on Piezoelectric Sensor Networks'; Article 64(2016); Indian Journal of Science and Technology, Vol 9(43), DOI: 10.17485/ijst/2016/v9i43/102879, November 2016

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