



# INTERNET CONNECTED HIGH TECH STREET LIGHTING SYSTEM USING RTOS

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## ABSTRACT

The proposed system can optimize the management and efficiency of street lighting systems. It also uses a sensor combination to control and guarantee the desired system parameters. A monitoring system based on the embedded Internet technology for street light is designed and implemented. The mode adopted in this monitoring system is the Browser/Server mode. The realization technologies of an embedded web server are used. The results of system performance testing show that the system can meet most of the embedded internet applications demands and the purposes of online access, control and management of the street lighting using a standard web browser over the internet.

Keywords: Street Light, Ethernet, Web Browser.

## I. INTRODUCTION

A Street-light or lamp-post is the main source of light on the road side or intersection of roads or walkways, which determines the high-tech standard of roadways communication of a city or a country [1]. In many areas the old standard of street lighting systems are still used. By these old methods, they are utilizing high rate of raw materials and more power. In addition, these old methods are very costly and threats to environment. However, the recent hike of the cost of raw materials and greater social sensitivity to environmental issues, leading manufactures to develop new techniques which allow significant cost saving and greater respect towards environment [2]. The most revolutionary solution for the simplification of management and maintenance issues is the use of a monitoring system based on Embedded Internet (EI).

With the popularization of the Internet and the rapid development of communication technology, humans bring forward higher desires for the embedded systems. They expect that the internet applications based on the internet protocol (IP) network should be used in the embedded systems, not only computer devices but also various embedded devices [3]. The technology of EI resolves the problem of interconnection between kinds of heterogeneous networks and the internet. The online remote access, control, and management embedded devices based on the EI have realized [4]-[5]. The central control system has been implemented through a network of system, transferring the information via Ethernet.

## II. WORKING PRINCIPLE

The project aim is to design an intelligent high tech street lighting pole that runs an embedded web server to provide smart web based services to people living on the street in addition to the energy efficient lighting management services and other emergency handling facilities. This smart lighting system shows in figure 1 can be implemented in cities, streets, campus, parks and sporting venue. The unique features of the project are described below.

**IP surveillance camera** – allows a resident on the street to view the live video feed from the camera. Any internet browser can be used to view the video. This also helps the government authorities to use it for security and surveillance purposes.

**Way Finding** – allows a resident on that street to save the address of his location. The Pole-SAT system will communicate with the visitor Smartphone and announces the address stored using audible voice. To use this feature, a Smartphone app has to be installed in the visitor’s Smartphone which uses Bluetooth for communication.

**Business advertising** – a business organization or product retail seller in the area could use the resources on the Pole-SAT to advertise their location as well as special offers on the product on a given day. This is actually a revenue generation source for the authorities who are in charge of the Pole-SAT system.

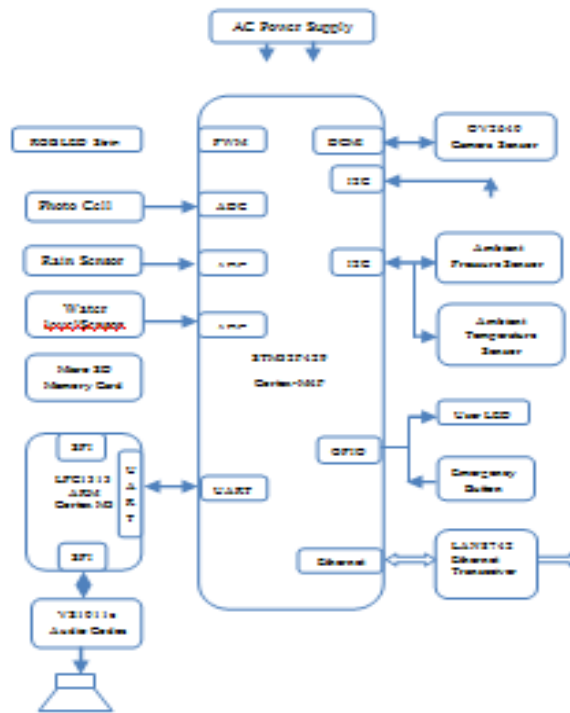


Figure 1: Street Lighting System

**Weather station** – Weather parameters such as temperature and pressure are measured continuously by the Pole-SAT system and upload to the internet where the user could view it on the web page.

**Rain and flood Monitoring** – Rain and water level sensors are integrated within the pole-SAT system to provide warning alert to the people in the street as well as government authorities during heavy rain and flood situations.

**RGB LED light** – LED based street lights consumes least amount of power. Here the lighting in Pole-SAT system is constructed using RGB color LEDs. Brightness of the light can be varied from 0 to 100% with LED technology.

**Photocell control** – The Street light is automatically turned on and turned off during dawn and dusk. This is controlled by a photocell sensor, measuring light intensity in that region.

**Festival lighting** – During festival times, people used to decorate their streets with attractive colored lights. Using festival lighting mode, the color of the street light can be changed and adjusted to suite the festival mood. The user can simply log-in the web page and send commands to the Pole-SAT system. The RGB LED based light helps to implement this feature.

### III. RESULTS AND DISCUSSION

Figure 2 shows that the implementation of street lighting system. A monitoring system based on the embedded Internet technology for street light is designed and implemented. An audio system with an amplifier and speaker is integrated within the Pole-SAT providing mass notification services during an emergency situation. Pre-recorded audio tracks are stored in the file system on a memory card. An audio codec is used to play these tracks. The user can type a text and send it to the Pole-SAT, where it will be played back. It even supports the playback of music tracks during festival time. An emergency push button is built-in on the pole, which will send an alert to the web page when pressed by a person.

### IV. CONCLUSION

The project aim is to design an intelligent high tech street lighting pole that runs an embedded web server to provide smart web based services to people living on the street in addition to the energy efficient lighting management services and other emergency handling facilities. This smart lighting system can be implemented in cities, streets, campus, parks and sporting venue. In this street lighting system used to measure the parameters like temperature, flood level and rain monitoring. Main advantages of this project are used to monitor the internet through Ethernet.

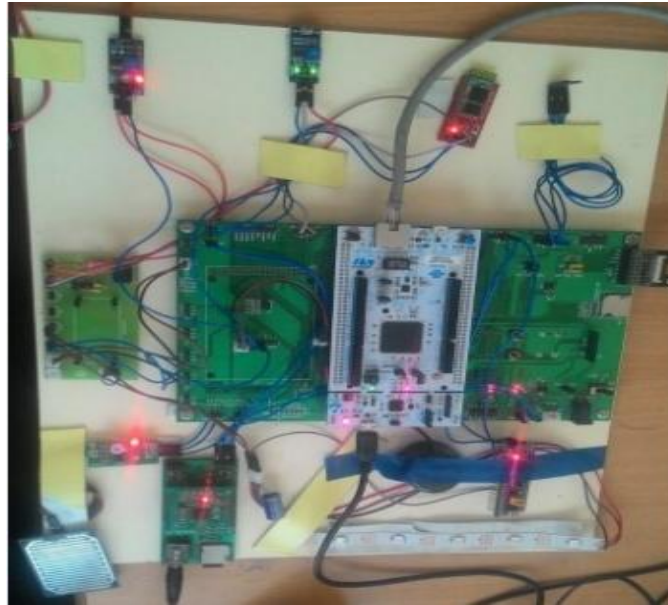


Figure 2: Hardware Implantation

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