

Enhancement for Street Light Management System Using WSN

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Abstract- In olden days street lights were not operated in an automatic way. Automation of street lights has become apparent these days. But we can notice that we do not require high intensity light during night hours, i.e. when there is no traffic, no people in the streets or on roads and even in the early mornings. The internet of things (IoT) are able to implement transparently a very large amount of heterogeneous end systems, while digital service provides open access to sub set of data. The focus of this paper is smart street light system. In this system the street light systems are automatically ON and OFF according to the situation. This smart light system automatically detects the movements of the object on the street. In the traditional system IR sensor is used to detect the object. The Raspberry Pi is used to control the process involve the net. This paper is focused on the controlling intensity of the light considering the object movement near the light. Two different sensors named light sensor and motion sensor are used. Once if the sun light goes under the visible region then this system automatically switches ON light. As soon as the sun light is visible then automatically switches OFF lights. This Smart light system is used to reduce energy consumption. This smart system is used to avoid unnecessary usage of electricity. The IR sensor and LDR sensors are used to sense the human being and light intensity of a particular area. This smart system is best suited for street lighting in remote urban and rural areas.

Keywords- IR Sensor, LED, Raspberry-pi 3, LDR

I. INTRODUCTION

IOT is the network of physical devices that allows the devices to communicate with each other. IOT allows remote sensing and control over the devices. It is an advanced automation and analytics system which uses artificial intelligence technology to deliver advanced and automated products and services. These systems allow greater transparency, control, and good performance [2]. The Smart City paradigm helps renovate the traditional city concept. In fact, it is possible to realize and develop efficient demand-side strategies integrating the monitoring and automation features. Ensured by intelligent devices and their communication apparatus typically used in many applications. Within this concept, public lighting, being a great electrical energy

consumer, has recently been attracting the interest of the research community. Scientists, combining the Smart City paradigm with alternative energies and new lighting technologies, are conceiving systems previously unimaginable, we are proposing the system for efficient utilization using Raspberry pi and Android which can increase the efficiency obtaining considerable energy consumption savings and consequently money savings.

A good street lighting system can provide safety, good visibility and comfort to vehicles /pedestrians to travel along the roads thereby lowering many malfunctions that cause all along the night and enhance the appearance of the locality. Contrarily, the design of poor lighting systems can result to indigent visibility and this will not be useful for vehicles or pedestrians going along the roads. Street lighting is designed poorly very frequently and has scanty maintenance (e.g., many failed lights are there), and adopts outdated technology for lighting, thus it consumes high energy and more money (due to street lights glowing during the day time), while often failing to provide reliable lighting System [1].

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II. EXISTING SYSTEM

Many of the places in India have the existing methods like noting the complaint, turning on/off the light manually. Generally, this is the time consuming & needs manpower. The new method automatic ON/OFF and fault detection without human intervention is easier when compared to the existing system [1]. We have many street lighting systems like brute-force search algorithm technique, solar street lighting but implementation and maintenance cost is high with these methods.

III. PROBLEM DEFINATION

In most of the cities, the street lights are ON when it is not need and It is OFF when is not needed. Because of these situation the huge energy expenses for a city gets wasted. Usually the lights are ON in the evening after the sunset, it continuous to be ON till the sun rises in the next day morning. This paper focuses on reducing the energy by automatically switching ON and OFF street lights. When vehicles come to the street/road the sensor will capture the movements of the vehicles then lights automatically ON. Otherwise automatically OFF the lights.

IV. PROPOSED STUDY

This project provides a better solution for streetlight control and automation. The system consists of LDR, IR, Relays, Raspberry Pi and some electronic components. A single system is capable of controlling four to eight lights [2]. The entire system can be monitored and controlled by a central system through a web interface. A central database is created to fetch data from all individual systems which can simultaneously control up to eight lights.

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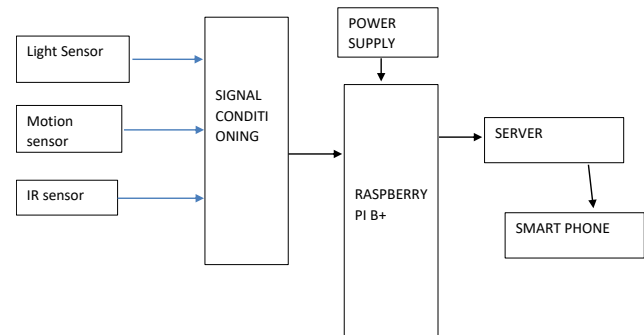


Fig. 1. Street Light Management System Architecture

Light Sensor

A light sensor is an electronic device used to detect light. There are several types of light sensors. A photocell or photo resistor is a small sensor which changes its resistance when light shines on it. Photomultipliers detect light and multiply it.

Motion Sensor

A motion sensor (or motion detector) is the linchpin of your security system, because it's the main device that detects when someone is in your home when they shouldn't be. A motion sensor uses one or multiple technologies to detect movement in an area.

IR Sensor

An infrared sensor is an electronic device, that emits in order to sense some aspects of the surroundings. An IR sensor can measure the heat of an object as well as detects the motion. These types of sensors measure only infrared radiation, rather than emitting it is called as a passive IR sensor.

Power Supply

A *power supply* is an electrical device that supplies electric power to an electrical load.

LED

A light-emitting diode (LED) is a two-lead semiconductor light source. It is a p–n junction diode that emits light when activated. When a suitable current is applied to the leads, electrons are able to recombine with electron holes within the device, releasing energy in the form of photons.

Raspberry Pi

The Raspberry Pi is a series of small single-board computers developed in the United Kingdom by the Raspberry Pi Foundation to promote the teaching of basic computer science in schools and in developing countries. It does not include peripherals (such as keyboards and mice) and cases. However, some accessories have been included in several official and unofficial bundles.

Web Server

A web server is a system that delivers content or services to end users over the internet.

Smart Phone

A smartphone is a class of mobile phone and mobile computing device. They are distinguished from feature phones by their stronger hardware capabilities and extensive mobile operating systems, which facilitate wider software, internet (including web browsing over mobile broadband), and multimedia functionality (including music, video, cameras, and gaming), alongside core phone functions such as voice calls and text messaging.

V. IMPLEMENTATION

Before, the street lights were manually operated. But now we can make use of the android app via which we can operate the street light.

There are two types of modes – Automatic mode and Manual mode. We can make use of the android application to switch between the modes. In case the system needs to be operated automatically we can change the mode directly in the application.

In automatic mode, the motion sensor detects the motion and thus gives the result by the dim-dip operation. Similarly, the IR sensor detects the intensity of light and switches the light automatically.

VI. CONCLUSION AND FUTURE ENHANCEMENT

It is proposed to implement the Project using Raspberry pi and Android Technology as it is Emerging Technology and in coming near future most of the equipment and control systems will be connected to internet using Internet of things this will help to further enhance our project usefulness. This project aims at designing and executing the advanced development in embedded systems for energy saving of street lights with depending sensors. Nowadays humans are busy and

sometimes may even forget to switch off the lights whenever not necessary. This can be seen more effectively in the case of street lights. Hence this problem is solved as these operations can be done automatically. This project gives the best solution for electric power wastage. An enormous amount of energy can be saved by replacing sodium vapour lamps by LED and adding an additional feature for security purposes. It prevents unnecessary wastage of electricity, due to manual switching of streetlights. It provides an efficient and smart automatic street light control system with the help of LDR. It can reduce the energy consumption and maintenance of the cost.

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