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IOT Based Light Monitoring System in Shopping Malls Parking

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***Abstract*- This project aims for designing and executing the advanced development in embedded systems for the energy saving of smart lights. Currently, we have a manual system where the lights will be switched ON in the shopping malls parking. This project gives a solution for electrical power wastage. The proposed system provides a solution for energy saving. This is achieved by sensing and approaching a vehicle using an ultrasonic sensor. Upon sensing the movement, the sensor transmitted the data to the Arduino which makes the light switch bright. Similarly, as soon as the vehicle or an obstacle goes away the Light gets switched dim as the sensor senses any object at the same time, the status (Bright/Dim) of the smart light can be accessed from anywhere and anytime through the internet. This project is implemented with a smart embedded system that controls the smart lights based on the detection of vehicles or any other obstacles on the shopping malls parking. Using wi-fi , Whenever the obstacle is detected on the parking within the required time the lights will get automatically Bright/ Dim consistent and therefore the same information can be accessed through the internet. The real-time information of the smart light (Bright/Dim) status can be accessed from anytime, anywhere through the internet within the specified range.**

***Keywords*- Transformer, Voltage regulator, Bridge rectifier, Wifi module, LED lights, Light dependent resistor, Arduino board, Ultrasonic sensor, LCD display.**

I. INTRODUCTION

The more than 350 million bulbs that light up the world consume a humongous amount of energy, which, many estimates put at about 19 percent of the world's energy consumed. These lighting costs are essential and not avoidable, though they cost governments roughly Euro 3 billion every year. Though LED lights are gradually replacing CFL and incandescent lamps, quite three-fourths of the prevailing streetlamps are of quite 25 years old. Most of these old vintage streetlamps are ON throughout the night, even when there is no one around. Therefore, to reduce their carbon footprint, while saving both money and electricity, an increasing number of cities around the world are opting certain smart technologies to prevent unnecessary wastage of lights, utilizing dimming or automatically switching ON/OFF these lights in the dark. A pilot project was conducted in Norway, using self-dimming streetlamps along routes with low traffic, at night by Tvilight, an Amsterdam-based company working towards sustainable, smart cities of the future

II. PROJECT IDEA

Lights in shopping malls parking are constantly in ON situation. Our system helps to sense the object and give brightness to the vehicles and remaining time the lights will be in dim condition. Bright and dim are the main options of this system.

III. GOALS AND OBJECTIVES:

By use of this system, we will try to control the lights using the sensors.
The primary objective is to develop an efficient Street Light System.

- To provide wireless access for handling it.
- Lights will be automatic gets bright and dim using sensors.
- Power consumption and energy consumption will be calculated.

IV. MOTIVATION OF THE PROJECT:

The main motivation of the project is to help the public people to use the shopping malls parking efficiently. The shopping malls also gets some power saving using this system.

V. RELATED WORK:

1. Street Light Monitoring and Controlling System (2015 April)

Akash RB, Holabasappa K, Kiran Kumar DM, Kiran Mardi, Asst Prof Smt.B.M.Nandini
This project is all close to control the facility's consumptions at the streets and eliminating manpower. This includes controlling a circuit of street lights with specific Sensors, LDR, and Microcontrollers during day

and night. This requires three basic componentsi.e. LDR, Sensors, and microcontroller. During daytime, there's no requirement of street lights therefore the LDR keeps the road light off until the sunshine level is low or the frequency of sunshine is low the resistance of the LDR is high. This prevents current from flowing to the bottom of the transistors. Thus the street lights do not glow.

2. Arduino Based Led Street Light Auto Intensity Control System (2016 -April)

Shreesh Mishra, Shivakant Gupta, Santosh Singh, Tripuresh Tiwari, Anand Mohan By using this as a basic principle, the intelligent system can be designed for the perfect usage of streetlights in any place. The lighting system consists of Arduino board, LDR, photoelectric sensor and other electrical equipment. By using the LDR we can operate the lights, i.e. when the light is available then it will be in the OFF state and when it is dark the light will be in ON state. It means LDR is inversely proportional to light, when the light falls on the LDR it sends the commands to the Arduino board that it should be in the OFF state then it switch OFF the light, the photoelectric sensor will be used to turn ON or OFF the light according to the presence or absence of the object. All these commands are sent to the controller then according to that the device operates. We use a MOSFET switch as a relay to act as an ON/OFF switch.

3. Design and Implementation of Automatic Street Light Control System using Light Dependent Resistor (May 2016)

Gouthami.C, Santosh.C, A. Pavan Kumar, Karthik.A, Ramya. K.R
LDRs or Light Dependent Resistors are very useful, especially in light/dark sensor circuits. Normally the resistance of an LDR is extremely high, sometimes as high as 1000000 ohms, but once they're illuminated with light resistance drops dramatically. Photosensors are the devices that alter their electrical characteristics, within the presence of visible or invisible light. The best-known devices of this sort are the sunshine dependent resistor, the photodiode, and therefore the phototransistors.

Light-dependent resistor because the name suggests depends on light for the variation of resistance. LDR is made by depositing a movie of greenockite or cadmium selenide on a substrate of ceramic containing no or only a few free electrons when not illuminated. The longer the strip the more the worth of resistance. When light falls on the strip, the resistance decreases. In the absence of light - resistance can be in the order of 10kΩ to 15kΩ and is called the dark resistance. Depending on the exposure of sunshine the resistance can subside to the value of 500 Ω. Light-dependent resistors are available as discs 0.5cm to 2.5cm. The resistance rises to many Mega ohms under dark conditions. The figure-1 shows that when the torch is turned on, the resistance of the LDR decreases, and allows the current to pass through it.

4. IoT Based Street Lights for Smart City (2016)

Sayali Arkade, Akshada Mohite, Shraddha Joshi, Rutuja Sonawane, Vikas Patil We are using Raspberry-Pi to supply interface between user and system. It is connected to the wireless network and relay circuit which can pass the operational admin's message to the system. Then the relay circuit operates the commands like ON Lights, OFF Lights, Alter ON, Alter OFF onto the connected array of a street light. Our system includes two admins: System admin and Operational admin. The system admin handles log messages and operational admin. System admin can add, delete, and consider operational admin. Once the operational admin added to the system by the system admin then operational admin can log in to the system.

5. Iot Based Smart Led Street Lighting System (2017)

J.Arthi, W.Lydiapreethi, B. Gunasundari
To make use of the property of LDR, which is its resistance varies concerning the sunshine intensity, In our proposed system the night and day are identified using LDR, Then during the day time the street light will be switched off and then during the night time street light will be switched on automatically, IR sensor is used to detect the presence of a vehicle in the Road, If the crowd of the vehicle is low in the street then it will be sensed by means of IR sensor and light will be switched off, If the vehicle is present in the street then light will be turned on.

7. Iot Based Dynamic Control Of Street Lights For Smart City (May 2017)

Snehal Bhosale, Komal Gaware, Pradnya Phalke, Dipali Wadekar, Pallavi Ahire
Lights contain chips. Chips consist of Microcontroller along with side various sensors like CO2 sensor, fog sensor, candlepower sensor, noise sensor, and GSM modules for wireless data sending and receiving between concentrator and PC. The data from the chips would get on a foreign concentrator (PC), and therefore the PC would also transfer the controlling action to the chip. According to the survey of variation within the intensity of sunshine within the field area, and efficient programming would be done to make sure the smallest amount of consumption of energy. The emissions in the atmospheres would detect along with the use of energy and any theft of electricity.

6. Intelligent Street Light System For Smart Cities (May 2019)

Kasa Sudheer, Duvvuru Madhurita, Amudala Chandana, Marella Thanesh, M Karunakar Babu

This system uses solar panels as a source of battery. The system can vary the intensity of the street light according to the density of the traffic and pedestrians which is sensed using LDR and IR. The use of the IR sensor makes the system less efficient. There are high chances of detecting unwanted movements such as animals crossing the street by the IR sensor. Also, the installation cost of the solar panel is high. It has developed a sensor node for street lighting based on the requirement of the industry. The function of the sensor node is to detect the movement of an object or a car with the help of an IR sensor.

By default, the street lamps remain OFF. When the sensor node detects an object moving past its position, the street light will turn ON automatically and transmits the data to the consecutive poles. Once the object has passed the sensor node, the light return to its default state (i.e., OFF). Though this sensor node seems to conserves power, the number of packets transmitted across the pole is huge which makes the system complex. Also, there's always an opportunity for packet loss during this system. Thus, the sensor node might be further improved within the aspect of durability and compatibility. The authors have introduced a wireless street lighting system that uses to enhance fault detection and maintenance.

The system draws the whole power from solar panels which are highly expensive in terms of installation cost. The system has an Arduino Uno which is programmed to consider inputs from both LDR and IR at the same. One of the drawbacks of this system is that the ON and OFF time of the street light is static. The system shifts to dimming mode from 12 am to 4 am, which causes inconvenience at late night users. Movement of human beings and objects is sensed with the help of the IR sensor. Based on the output of the IR sensor a dimming control circuit was designed.

It operates in two different modes namely Physical Control mode and Remote- control mode. In the physical control mode, the bulbs are all either turned ON or alternately turned ON. In remote control mode, the bulbs are switched OFF at the day time and switched ON at the night time. The system proves to be very efficient in terms of power conservation, but it's essential to update the model of the system on an endless basis. Incorporating a dimming module would make it even more reliable.

8. IOT based street light monitoring system

K.Tamilselvan, K.S.Deepika, A.Gobinath, S.Harhini, S.Gokhulraj

In this paper, we design ZigBee-based energy-efficient outdoor lighting control systems. The lamps continuously monitor the intensity of the daylight by using the sensors connected thereto, and supported that intensity ESP8266 microcontroller unit (MCU) takes the choice to dim and turn the lamps on or off. Information is transferred hop by hop from one lamp to a different, where each lamp features a unique address within the system. Each lamp can only send the knowledge to the closest one until the knowledge reaches the coordinator.

VI. METHODOLOGIES OF PROBLEM SOLVING

In recent times the concept of smart cities has gained great popularity. Thanks to the evolution of the Internet of things the thought of smart city now seems to be achievable. Consistent efforts are being made within the field of IoT to maximize the productivity and reliability of urban infrastructure. Problems like, traffic jams, limited car parking facilities, and road safety are being addressed by IoT. In this paper, we present an IoT based light monitoring system in shopping malls parking. The proposed system of the light monitoring system is, the lights can be monitored from anywhere through the application. The paper also describes a high-level view of the system architecture. Towards the end, the paper discusses the working of the system in the form of a use case that proves the correctness of the proposed model.

VII. PROPOSED SYSTEM

The light monitoring system in shopping malls parking is an automated system designed to increase the efficiency and accuracy of an enterprise by automatically controlled switching to bright and dim. This project represents a new cost-effective solution for shopping malls parking. The control system consists of control circuitry, internet, and electrical devices. The system also consists of an application, where can control the light from anywhere through the application. When the vehicle comes the ultrasonic sensor senses the vehicle and gives the brightness, until a vehicle comes the light will be in dim condition. The most important and interesting factor in this system is we can able to calculate the power consumption for a particular amount of days and can save the amount. The main motive of this project is energy consumption and power consumption.

VIII. ARCHITECTURAL DESIGN:

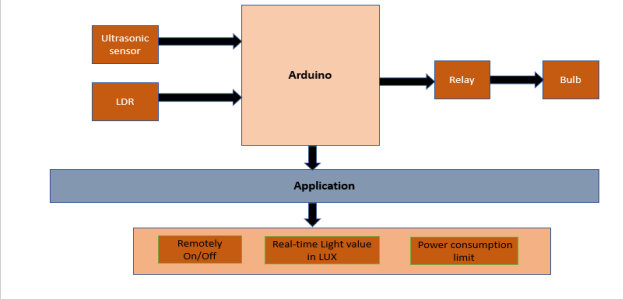

Fig. 1 Architectural Design.

IX. CONCLUSION

This system helps in making the shopping malls smarter with energy consumption and power consumption. Surely this helps public peoples those who are coming to shopping malls parking.

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