

Secure IOT data using cryptography algorithm

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Abstract - This project aims for designing and executing the advanced development in embedded systems for energy saving of street lights. Project gives solution for electrical power wastage also the manual operation of the lighting system is completely eliminated. The proposed system provide a solution for energy saving. This is achieved by sensing and approaching a vehicle using an IR transmitter and IR Receiver couple. Upon sensing the movement the sensor transmit the data to the microcontroller which furthermore the Light to switch ON. Similarly as soon as the vehicle or an obstacle goes away the Light gets switched OFF as the sensor sense any object at the same time the status (ON/OFF) of the street light can be accessed from anywhere and anytime through internet, and after that process we are saving information to the cloud server how much energy was saved from the street and Consumed from the street. After that information we will apply AES Algorithm for data security.

Key Words: LDR:Light Dependent Resistor, LED:Light Emitting Diode, IR:Infrared Sensor.

1.INTRODUCTION

In the Project we are focusing on the concept like we need to secure the IOT data and main concept if for the after detect of obstacle the light will be on for the street. The system architecture of the intelligent street light system consists of IR sensors, LDR, Raspberry PI, Relay, UART and Wifi Module. LDR's are light dependent devices whose resistance decreases when light falls on them and increases in the dark and detection of the car. When a light dependent resistor is kept in dark, its resistance is very high. The vehicle which passes by the street light is detected by IR sensor. Relay is used as a switch to switch on/off the street light bulb. A UART (Universal Asynchronous Receiver/Transmitter) is the microchip with programming that controls a computer's interface to its attached street light system. After receiving all the information we convert the information in the encryption format for the second user for the data security. That information we will saved in cloud storage only authorized user can access the all information.

1.1 Disadvantages of existing system

1. Manual switching off/on of Street Lights
2. More Energy Consumption.
3. High expense.
4. More manpower.

1.2 Advantages of proposed system

1. We use wireless communication.
2. Completely elimination of man power.

2. Materials:

- 1 .IR sensor:



Infrared Sensor Module has built-in IR transmitter and IR receiver that sends out IR rays and looks for reflected IR rays to detect presence of any obstacle in front of the sensor module. The module has on board potentiometer that lets user adjust detection range. The sensor has very good and stable response even in ambient light or in complete darkness.

Working Principle of IR Sensor:

The IR Sensor has built-in IR transmitter and IR receiver. Infrared Transmitter is a light emitting diode (LED) which emits infrared rays. Hence, they are called IR LED. Even though an IR LED looks like a normal LED, the radiation emitted by IR LED is invisible to the human eye. Infrared receivers are also called as infrared sensors as they detect the rays from an IR transmitter. IR receivers come in the form of photodiodes and phototransistors. Infrared Photodiodes are different from normal photo diodes as they detect only infrared radiation. When the IR transmitter emits radiation, it reaches the object and some of the radiation reflects back to the IR receiver. Based on the intensity of the reception by the IR receiver, the output of the sensor is defined.

2 .LDR sensor:



An light dependent resistor is also known as photo resistor, photocell , photoconductor.It is a one type of resistor whose resistance varies depending on the amount of light falling on its surface When the light falls on the resistor, then the resistance changes. These resistors are often used in many circuits where it is required to sense the presence of light. These resistors have a variety of functions and resistance. For instance, when the LDR is in darkness, then it can be used to turn ON a light or to turn OFF a light when it is in the light.

Working principle of LDR sensor:

This resistor works on the principle of photo conductivity. It is nothing but, when the light falls on its surface, then the material conductivity reduces and also the electrons in the valence band of the device are excited to the conduction band. These photons in the incident light must have energy greater than the band gap of the semiconductor material. This makes the electrons to jump from the valence band to conduction. These devices depend on the light, when light falls on the LDR then the resistance decreases, and increases in the dark. When a LDR is kept in the dark place, its resistance is high and, when the LDR is kept in the light its resistance will decrease.

3.Raspberry pi 3B-



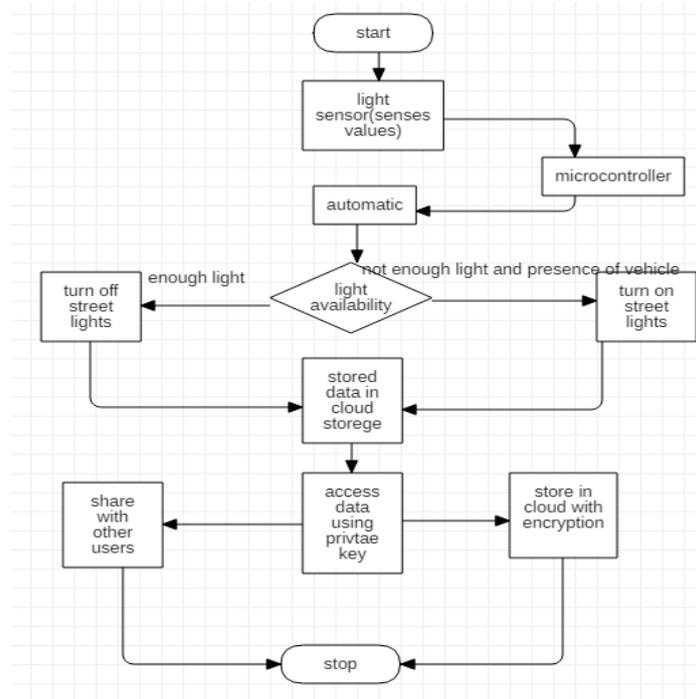
The Raspberry Pi just got juicer! Now with a Quad-Core 64bit CPU, WiFi & Bluetooth.The Raspberry Pi 3 Model B is the third generation Raspberry Pi. This powerful credit-card sized single board computer can be used for many applications and supersedes the original Raspberry Pi Model B+ and Raspberry Pi 2 Model B. Whilst maintaining the popular board format the Raspberry Pi 3 Model B brings you a more powerful processor, 10x faster than the first generation Raspberry Pi. Additionally it adds wireless LAN & Bluetooth connectivity making it the ideal solution for powerful connected designs.

4.LED

It is Light Emitting Diode. To save energy we are using LED .It is a light-emitting diode is a two-lead semiconductor light source. It is a p–n junction diode that emits light when activated.

4. Methodology:

Flow chart



Street lights are consuming too much energy so to eliminate that problem we are using automated street lights. LDR sensor is used so that lights will get off during daytime and on during night time. It completely eliminates the manual process. In addition to that at night time whenever the car arrives the lights will get ON and once the car is gone lights will get OFF. In this way street lights are efficient at night time also. Energy consumed by street lights is stored in a database. Also the data is secured by using AES algorithm.

3. CONCLUSIONS

This project “IoT Based Smart Intelligent Lighting System for Smart City” is a cost-effective, practical, eco-friendly and the safest way to save energy and this system the light status information can be accessed from anytime and anywhere. It clearly tackles the two problems that the world is facing today, saving of energy and also disposal of incandescent lamps very efficiently. Initial cost and maintenance can be the drawbacks of this project. The system ensures the security to the people and it provides a great security exclusively for women.

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