

REAL TIME STREET LIGHT USING RASPBERRY PI

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Abstract-This paper aims to make use of an efficient street lighting system with minimal power consumption. The heart of the project is RASPBERRY PIE. An infrared sensor is fixed about 100 meters of the street light which detects the moving vehicles, animals and persons. A LDR sensor fixed at the lamp post is employed to detect darkness. Only when both the sensors give a positive response, the street light glows. Thus, this technique reduces power wastage and also a manual switch is provided for emergency.

This project is intended for auto intensity controlling of solar LED street lights using solar power from PV cells interfaced to a Raspberry Pie. Day by day solar power awareness is increasing. The awareness of solar power increasing, and lot of people and establishments are choosing solar power. PV cells are used for charging batteries by changing the daylight into electricity. A charge controller circuit is employed to regulate the charging. Automatically the solar LED street lights to turn ON at dusk and then turns OFF at the dawn and every day this process repeats daily. Also, it will find presence of load.

KEYWORDS-Raspberry Pi, street light, sensors, switch , energy saving

1. INTRODUCTION

A Street light or lamppost is raised source of light on the edge of a road or walkway, which is turned on or lit at ascertain time every night. Major advantages of street lighting includes: prevention of accidents and increase in safety. Studies have shown that darkness leads to an outsized no of crashes and fatalities, especially those involving pedestrians; pedestrian fatalities are 3 to 6 times more likely within in the dark than in daylight. Street lighting has been found to scale back pedestrian crashes by approximately 50%. A number of streetlight control and reduce energy consumption of a town’s public lighting system .Manual controlling is prone to energy wastage and manually dimming during midnight is impractical .The main consideration in present , field technologies is automation ,power consumption and cost effectiveness . In this project, the main idea is to make use of efficient street light system with minimal power usage .The heart of this system is ARM PROCESSOR. An IR sensor will be fixed 100m before every street light this sensor is used to detect vehicle .A LDR sensor will be fixed in the street light.

2. OBJECTIVE

In this project we will try to operate street light from the remote server .The main objective to develop street light is to provide backup supply source by Switchover between solar energy as well as supply source and Location tracking nearby accident zones. Ensuring the presence of load by using load identifier.

3. METHODOLOGY

Following figure shows the block diagram of the proposed system. It consists of solar tracker, switchover motor, sensors, Raspberry Pi.

The supply is given through the battery which is charged from the solar energy .whenever the battery is charged less than 30 % then the supply will be switched over to main supply .solar tracker is used to increase the efficiency of solar panel .

Load identifier is to detect the presence of load.PIR sensors are used to detect the motion of an object and acts according to it.LDR sensors are used to vary the intensity of the street light.

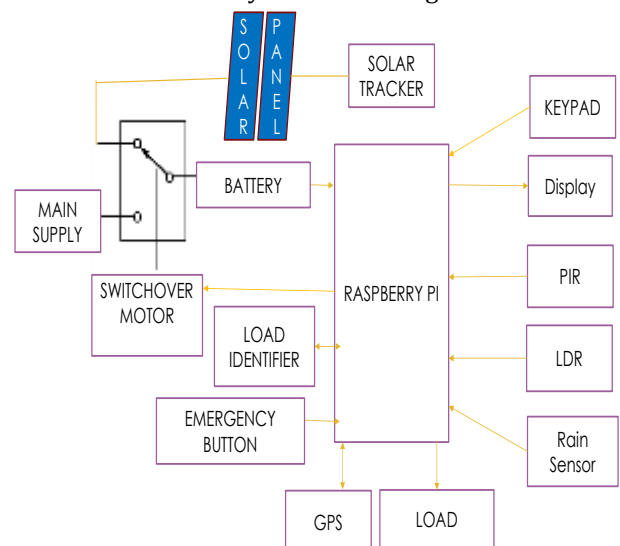
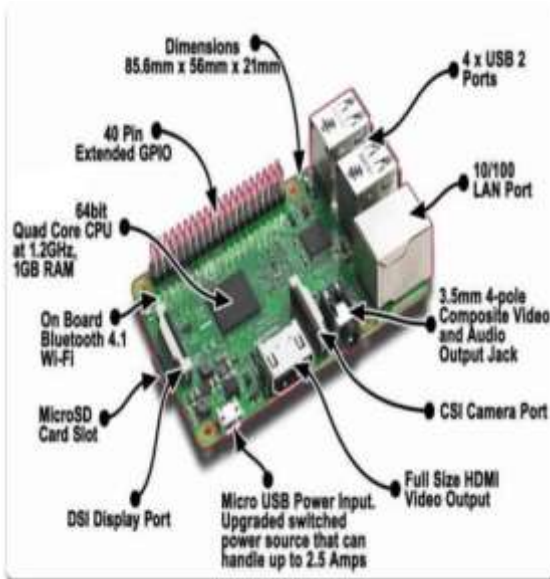


Fig: block diagram

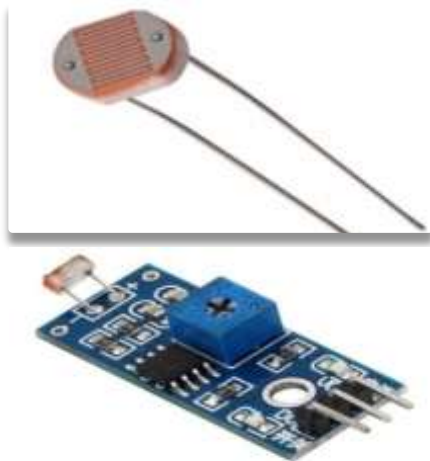
4. COMPONENTS

4.1 RASPBERRY PI



- Raspberry pi 3 module
- 64 bit processor
- 1.2GHZ quad core ARM Cortex-A53 CPU
- OPERATING SYSTEM –Raspberry pi

4.2 LDR SENSOR



Light dependent resistor is a variable resistor made up of semiconductor materials whose resistance depends on the amount of light falling on its surface. LDR works on the principle of photoconductivity. The intensity of light falling on it is measured in lux where as resistance in ohms. As the intensity of light falling on LDR increases, the resistance decreases and vice versa.

4.3 PIR SENSOR



Passive infrared sensor detects the object that generates IR radiations. It is passive because it does not emit any kind of radiations to detect the radiations. This sensor is formed from crystalline material that generates surface electric charge when exposed to heat. The white dome shaped material is called as Fresnel lens, which is used to increase the wide range of working area of the sensor. It consists of BISS0001IC, two potentiometers to vary the range of sensor and to control the time-delay or the duration of the output.

4.3 RAIN SENSOR

It works on the principle of conductance. This sensor has a pattern of conductive material on the board. When the rain drop falls on the board, it creates a contact between the conductive patterns increasing the conductivity. The board has three pins VCC, ground and signal and also has an additional digital output pin which gives only high or low. The signal pin gives an analog voltage proportional to the amount of water on the board. The water on the board increases the conductivity there by changing the potential difference across the conductive pattern on the board. This potential drop is measured by the processor to detect the rain drop.



4.4 CURRENT SENSOR

A current sensor is used to detect the presence of current in a wire or a circuit, and generates the output proportional to current. The output could be analog or digital. The generated output can be used to display the amount of current in an ammeter. It consists of three pins ground, VCC and OUT.



SOLAR PANEL-12V, 10W

BATTERY-12V, 2500mAh

CONCLUSION

This project helps in saving the large amount of electricity consumed from the street lights. LDR and PIR sensors are the two main conditions in working of this circuit. If two conditions are satisfied, the circuit will perform the desired work according to the programs. The street light has been successfully controlled by Raspberry Pi. With commands from the arm controller the lights will be ON in the places of movement when it is dark furthermore the drawback the street light using single supply source has been overcome, where the system depends on microcontroller.

ABOUT REFERENCES

[1] Worked on power saving street light, in which main aim is to find way for maximum utilization of available energy with minimum wastage or loss. Using solar panel at lamp post by using LDR it is possible to save more power and energy.

[2] Worked on real time street light control system using arm controller, in which main aim is to eliminate the manual operations and to design an energy efficient automatic street light controller using LED and micro controller.

[3] Worked on automation in street lights.

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