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Smart Street Lights

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Abstract: In today's digitalized and technological age, immense electricity has been consumed by street lights because of incessant working of street lights during night. Smart system is mechanized and designed to tackle the crisis related to access consumption of electricity as well as emission of carbon dioxide from it. The system of 'SMART STREET LIGHTS' can be imposed through some technical operations inside it.

Index Terms: Smart Street light, LDR sensor, PIR sensor, Microcontroller, Infrared waves

I. INTRODUCTION

The importance of automation in both daily life and the global economy is rising. Systems that are automatic are preferred to those that are manual.

The research demonstrates automatic control of the streetlights, which results in some electricity savings. Automation goes beyond mechanization in the context of industrialization. Automation considerably reduces the need for human sensory and mental requirements as well, whereas mechanization offered human operators with machinery to aid the users with muscle requirements of job.

Fundamentally, one of the crucial components is street lighting. Street lighting are therefore quite straightforward, however as urbanization progresses, the number of streets grows quickly with high traffic density. In order to construct a decent street lighting system, a number of issues must be taken into account, including the need to provide public lighting at a reasonable cost, reduce crime, and minimize the environmental impact of that crime. Street lights were first manually operated, with a control switch placed in each one.

This period is referred to as the first generation of the original street light. After that, a further approach that was employed involved optical control, which made advantage of high. In the meantime, street lighting systems can be divided into groups based on the types of bulbs that are utilized, including incandescent, mercury vapour, metal halide, high pressure sodium, low pressure sodium, fluorescent, compact fluorescent, induction, and LED lights. Various types of light technology, together with its luminous efficacy, bulb life, and concerns, are employed in lighting design.

II. LITERATURE SURVEY

In this project 'SMART STREET LIGHTS' we have inspected some other aspects known by the other researchers. In the system all the components are well developed itself and enforced by various aspects in several platforms. As we know rural areas and urban areas electricity is a dire need, therefore this system analyses and text decisions accordingly.

As per the research in most of the cases the LDR sensor and PIR sensor is mostly used individually. So they are able to work according to the component's function.

But in this project both the sensors LDR & PIR sensors are used collectively so as to give a better result and more efficient circuit system. LDR sensors are used to acknowledge the light. Also we have viewed PIR sensor which detects the motion and send the messages to the other components of a system so that they can prepare and work efficiently before the object arrives. The proposed system which we have used reduces the consumption of electricity upto 40%.

III. PROPOSED SYSTEM

A. Light Unit

Coordination of LED PIR sensors and communication devices enables the lamp unit to work efficiently. The main function of this unit is to pass on the message whenever any motion is detected.

B. Sensing Unit

Communication devices and controller are main an important parts of this. It carries and passed the message by detection of motion. Assistant like this is placed to many areas to ensure the regulation of street lights.

IV. PROPOSED DESIGN

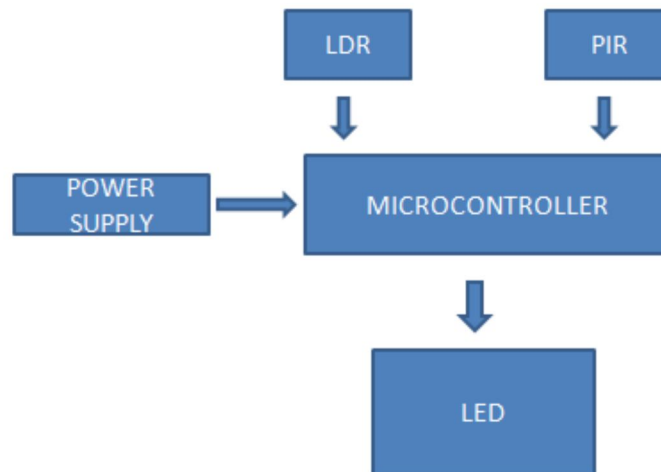


Fig. 1 Working

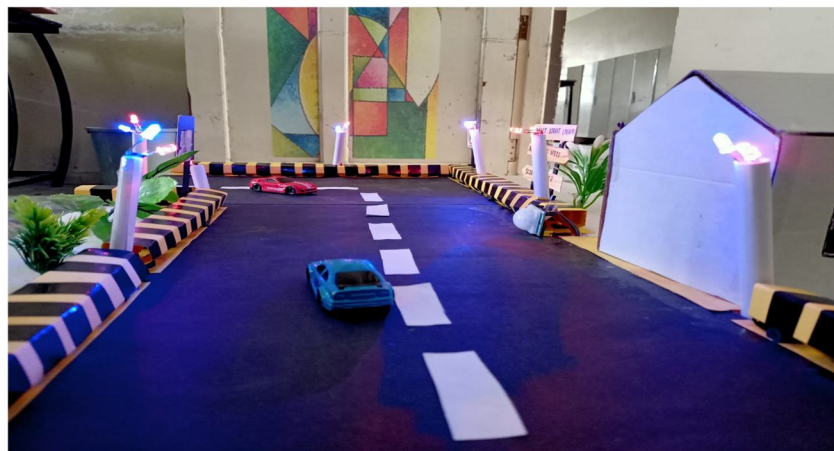


Fig . 2 Model

V. SCHEMATIC DIAGRAM

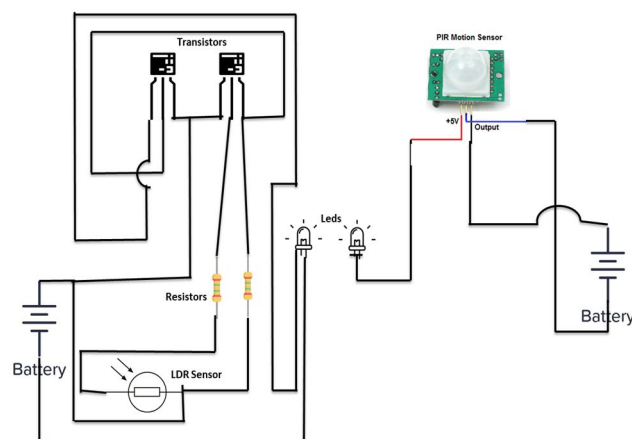


Fig.3 schematic diagram

VI. COMPONENTS USED

A. LED

Semiconductor device that emits electromagnetic waves when electric current flows in it. Whenever the current flows through the LED, the electrons present in that recombine with holes discharging light in the process. LED's restrict the current to flow in backward direction, hence it flows only in forward direction. LED's are heavily doped in P-N JUNCTION. On the basis of semiconductor material used & the amount of doping the LED will determine the emission of coloured light, spectral wavelength when forward BIASED



Fig . 4 LED

B. Battery

A battery is a portable device that stores chemical energy and converts it into electrical energy. This process is known as electrochemistry. And the system that supports a battery is called electrochemical cell. Battery consists of one or more electrochemical cells. Its electrochemical cell consists of two electrodes separated by an electrolyte.



Fig. 5 Battery

C. Resistor

A resistor is a passive two terminal electrical component that implements electrical resistance as a circuit element. In electronic circuits, resistors are used to reduce current flow, adjust signal levels, to divide voltages, bias active elements and terminate transmission lines, among other uses. Variable resistors can be used to adjust circuit elements (such as a volume control or a lamp dimmer), or as sensing devices for heat, light, humidity, force or chemical activity.



Fig. 6 resistor

D. Motion Sensor

A motion sensor, or motion detector, is an electronic device that uses a sensor to detect nearby people or objects. Motion sensors are an important component of any security system. When a sensor detects motion, it will send an alert to your security system, and with newer systems, right to your mobile phone. If you have subscribed to an alarm monitoring service, motion sensors can even be configured to send an alert to your monitoring team.



Fig.7 Motion Sensor

E. PIR Sensors

PIR sensors are bit more complex than active ultrasonic sensors , but the result is the same . Walls , floors , stairways , windows , cars , dogs , trees , people you name it radiate some amount of heat . Infrared waves can detect temperature . Infrared motion sensors detect the presence of a person or object by detecting the change in temperature of a given area .

A PIR sensor uses these temperature changes to detect the presence of a person or a object . Like active ultrasonic sensors , PIR sensors can be set to ignore small changes in IR , so you can walk around your home or business without setting off alarms all day and nights.

F. LDR Sensor

The working principle of an LDR is photoconductivity , which is nothing but an optical phenomenon. When the light is absorbed by the material then the conductivity of the material enhances . When the light falls on the LDR , then the electrons in the valence band of the material are eager to the conduction band. But the protons in the incident light must have energy superior to the bandgap of the material to make the electrons jump from one band to another band [valance to conduction] .

Hence when the lights having ample energy , more electrons are excited to the conduction band which grades in a large no of charge carriers . when the effect of this process and the flow of the current starts flowing more, the resistance of the device decreases .



Fig. 8 LDR sensor

G. Transistor

The transistor is made up of two pn diodes that are attached back to back. it has emitter, base, and collector terminals as its three terminals. the central part, which is composed of thin layers, serves as the base. the emitter diode is the portion of the diode on the right, while the collector-base diode is the portion on the left. these designations are given in accordance with the transistor's common terminal. the transistor's collector-base junction has a high resistance because it is connected in reverse bias while the transistor's emitter-based junction is connected in forward bias.

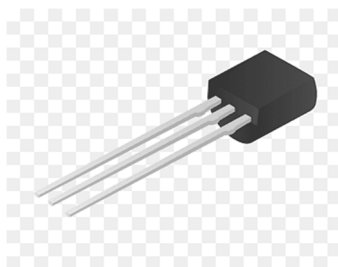


Fig. 9 Transistor

VII. CONCLUSION

The result includes the successful operation of vital and dynamic Street lightning. Introduces the wastage of electricity in unused hours. This system controls the intensity of the lights based on density of lane. It is also referred to as 'intelligent street lights'.

VIII. ACKNOWLEDGMENT

Our guide Shivrajsinh Rayjada assists us . He helped a lot to make this project so well . All the circuit and sensor system was suggested by him . And also he guided us for certain transformation in the project .

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