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Automatic Light Street

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Abstract

Solar Photovoltaic panel built up street lighting systems are becoming more common these days. But the bonds with these customary street light systems are its shortage, smart performance. It is most necessary to automate this system so that we can remain energized as well as to maximize the efficiency in the system. In this paper, a new process is put forward so as to maximize the audition necessary for the system. Also, to maintain the energy usage of the LED lights sensors and automation of street lights are accomplished by LDR sensor.

Keywords: *Solar Power, Street Light Control System, LDR, LED, IR Sensor, Automation.*

1. Introduction

The idea of building a new system for the streetlight, that do not use up a great amount of electricity and give light to large areas with the highest density of light, is important for every engineer working in this field. The fundamental parts of the project are sensors, monitors, and solar panels. Two types of sensors will be used which are motion sensor and light sensor. The light sensor will find out darkness to stimulate the ON/OFF switch, so the streetlights will be prepared to turn on. Otherwise, the motion sensor will reveal motion to activate the streetlights. The solar panels will feed the system with solar power, which will be charging the battery throughout The day. At night, the battery will be discharging through the project process. The streetlights and the battery will be monitored to observe their level and performance in the operating board.

2. Aim of the Project

The project aims to lessen the side effects of the current street lighting system and find a solution for ancient fuel future extinction by change it with solar power which is a renewable source of power and Also, to increase safety on the roads by increase.

Methodology: The theoretical concept of the light sensor lies behind the LDR (Light Dependent Resistor) which is used in this circuit as a dark detector. The LDR is a resistor and its resistance varies according to the amount of light falling on its face. When the LDR detect light its resistance will get decreased, thus, if it disclose darkness its resistance will increase. the block diagram of the proposed system is described in figure 1. Here we use a microcontroller 80C51so as to control unit. We do employ certain sensors namely, IR sensor and LDR sensor. These sensors are linked to the ports of the microcontroller through an interfacing circuit and an amplifier. The signal from the microcontroller could be sighted through an LCD display. The microcontroller generates a PWM which is fed to the driver circuit which changes the operating cycles of each LED in the LED Array. The working of the entire system is fundamentally with the sensors present. The main idea behind the system is that the LED array will be in off state at day time. Even at daytime if the intensity of light is depress due to weather conditions like fog, thunderstorm etc. then the array will get switched on. Presence sensor will find out the presence of any cars or humans. When IR sensor detects the vehicles, the brightness of the LED will be more; when there is no vehicles brightness, will be decreased. This

is done so as to lessen the power consumption. Here, we need light only when it is needed. At night sometimes roads will be not full and hence there is no use of illuminating all the lamps. So we can lower the power of LEDs and can conserve the power.

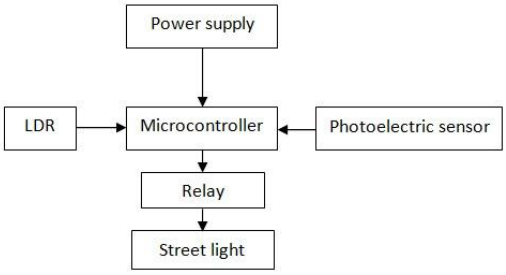

Figure 1: Block Diagram of Proposed System

2.1 Automatic Street Light System Circuit Design

The system essentially consists of an LDR, Photoelectric sensor, Power supply, Relays and Microcontroller.

LDR: The theoretical concept of the light sensor lies behind, which is applied in this circuit as a dark detector. The LDR is a resistor as shown in Figure 2, and its resistance diverges as claimed by to the amount of light falling on its face. When the LDR detects light its resistance will reduce, thus if it detects darkness its resistance will grow. Illustrations or pictures: In this Paper, all illustrations or pictures are clear black and white prints. And author supply the best quality illustrations or pictures possible.

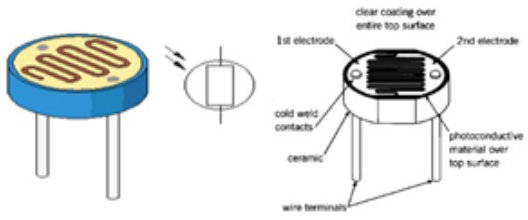

Figure 2: LDR

3. Photoelectric Sensor

To find out the movement in the street, the photoelectric sensors have been applied in this paper, where emitter and receiver are in one unit. Light from the emitter strikes the aim and the throw back light is spread from the surface at all angles. If the receiver extradites enough reflected light the output will turn states. When no light is reflected back to the receiver, the output feedback to its main state. In diffuse scanning the emitter is designed at right angle to the target. The receiver will be at some angle orderly to receive some of the diffuse reflection. Thephotoelectric sensor specifications are shown in Table 1.

Table 1: Photoelectric Sensor Specification

Photoelectric Sensors (MC005)	
Sensing extent	3-80 cm
Sensing purpose	Translucency, opaque
Supply voltage, current	DC 5V, 100mA
Output operation	Normally open
Output	DC three-wire system (NPN)
Diameter, Length	18mm, 45mm
Ambient temperature	-25 to 70

3.1 Regulated Power Supply

Usually, we start with an unregulated power supply Be extended from (9Vto12V) DC. To make a 5V power supply, KA8705voltage regulator IC as shown in Figure 3 has been used.

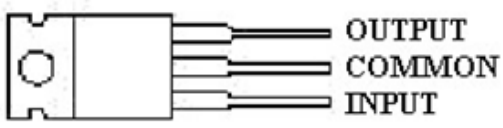

Figure 3: Power Supply Regulator

PIC16F877AMicrocontroller

Microcontroller rise computer control system on a single chip .It has many electronic circuits structure in to it which can decipher written instructions and modify them to electrical signals. The microcontroller will then execution through these instructions and implement them one by one .As an example of this a microcontroller we can employ it to controller the lighting of a street by using the accurate technique.

Microcontrollers are now variable electronic designs. Instead of trying wiring number of logic Gates together to fulfill some function we now use directive to wire the gates electronically. The list of these instructions presented to the microcontroller is called a program .There are various types of microcontroller, this project concentrate only on the PIC16F877A Microcontroller where it's pins as shown in Figure 4.

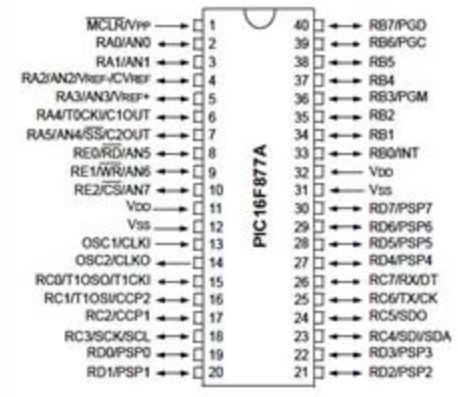

Figure 4: Pin diagram of PIC16F877A Microcontroller

4. Automatic Streetlight Control Circuit Design

The inputs in the streets lighting system are LDR and photoelectric sensors, after gloaming the light sensor will fill the system, to be ready to reveal any target by photoelectric sensors, on the road to turn ON the streetlights. Lamps will be applied as street lights in this paper. LDR circuit as shown inFig.5, the LDR and RV1form one arm of the bridge, and R1-R2 form the other arm. These arms can indeed be regarded as potential dividers, with the R1-R2 arm stratify fixed half-supply voltage to the non-inverting input of the op-amp, and with the LDR-RV1divider applying alight- following variable voltage to the inverting terminal of the op-amp.

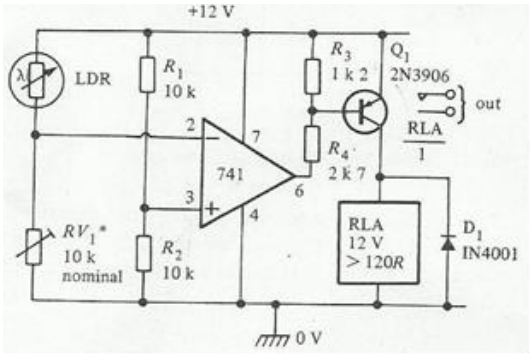

Figure 5: LDR Circuit

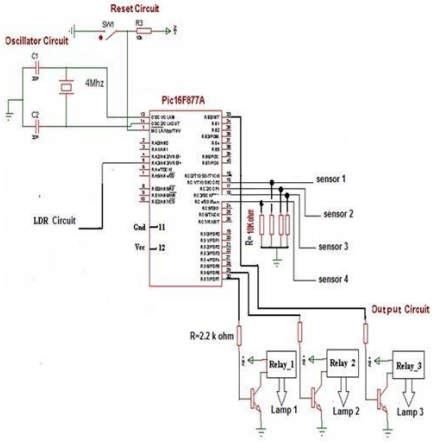

Figure 6: Schematic Circuit of the Street Light System

Four photo electric sensors are applied in this paper. Their job to sense the target that will pass through the street ,at the same time generate a signal to the microcontroller to turn on the lamp .The concept is to save the energy ,where the system have been prepared to light ON the lamp in the night only and only if there is any aim passes through the street. Except to that the light will be OFF .First photoelectric sensor is applied to turn ON the first lighting pole via a microcontroller automatically when any target

passes in front of it .Mean time the second photo electric sensor will fill the second lighting column and turn OFF the first one after few delay when the target passes in front of it .The third sensor will activate the third lighting pole when the target passes in front of it, and will turn OFF the second lighting column after few delays.

5. Results and Discussions

The project aims were to lessen the side effects of the current street lighting system and get it a solution to economize power. In this project, the first thing to make is to get ready the inputs and outputs of the system to referee the lights of the street. The prototype as shown in Figure 7 has been proceed and works as predictable and will prove to be very useful and will realize all the present constraints if implemented on a large scale.

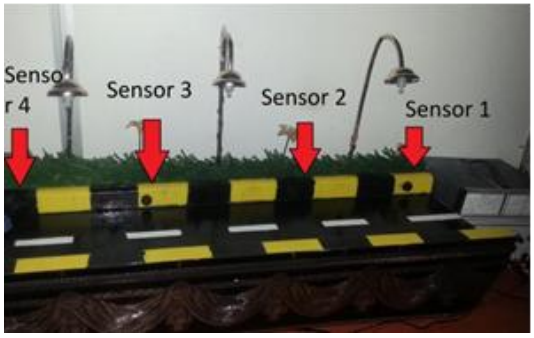

Figure 7: Prototype of Street Light System

6. Conclusions

This project of AUTOMATIC STREET LIGHTS is a cost effective, practical, eco-friendly and the safest way to keep energy. It clearly tackles the two problems that world is meeting today, saving energy and also disposal of electric lamps, very efficiently. According to statistical data, we can save more that 40% of the electrical energy that is now used by the highways. Initial cost and maintenance can be the drawbacks of this project. With progress in technology and good resource design, the cost of the project can be cut down. Also, with the use of good equipment, the upkeep can also be decrease in terms of periodic checks. The LEDs have a long life, emit cool light and can be used for fast switching. For these reasons, our project provides far more advantages which can overshadow the present limitations. Keeping in view the long term benefits and the initial cost would never be a problem as the saving return time is very less. The project has scope in various other enforcement like for providing lighting in industries, parking and campuses lots of huge shopping malls. This can also be used for observation in corporate campuses and industries.

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