

# A Novel Approach to Street Light Automation

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**Abstract**— Sometimes street lights will be ON even if it is day time, power wastage takes place due to continuous lightening of street light. So, the concept of Automatic Street light system can be introduced which will save our natural resources and is also a powerful technique .In this paper, we propose a design which consists of microcontroller with intensity regulator in it. Here, light can be sensed by LDR (or) by solar panel, we have proposed two sensors LDR and photoelectric sensor (PES) which recognizes the movement of street. Whereas, LDR senses the light. Here PICmicrocontroller is used .This system is totally automatic which turns ON when sunlight goes down and turns OFF during daytime. So maximum power will be saved.

**Index Terms**— street light, PICmicrocontroller, automation, LDR, photoelectric sensor.

## INTRODUCTION

It is sure that we can't leave in a society without power. So we need to maximize the usage of renewable energy so that we can preserve conventional resources. We all know that fossil fuel resources are going to feed us for only 50-60 years from now. So it is high time for us to conserve our natural resources. The idea of designing a new system for the streetlight that do not consume more amount of electricity. Manual control causes errors and leads to energy wastages and manually dimming during midnight is impracticable.

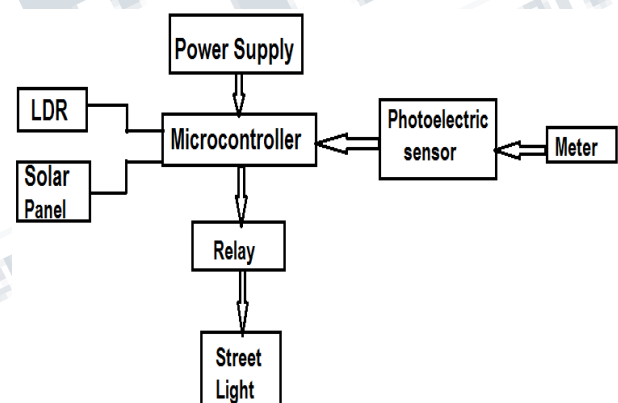
In this paper we have approached for two kinds of sensors which are light sensor and photoelectric sensor. The light sensor will detect darkness to activate the ON/OFF switch and the photoelectric sensor will detect movement to activate the streetlights. LDR, varies according to the amount of light falling on its surface, this gives an inductions for whether it is a day-night time, the photoelectric sensors are placed on the side of the road, which can be controlled by Microcontroller PIC16f877A. The photoelectric will be activated only on the night time. If any object crosses the photoelectric beam, a particular light will be automatically ON .

This as a basic principle, of our approach to streetlight automation .The block diagram of street light system is shown in Fig. 1 consists of microcontroller, LDR, solar panel, relay and photoelectric sensor.

The LDR is used to operate the lights when it is day then it will be in the OFF state and when it is dark the light will be in ON state. When the light falls on the LDR it sends the instructions to the microcontroller 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 absent of the object.. We use a relay to act as an ON/OFF switch. Solar panels are used to receive the sunlight for sensing

the light. All these commands are sent to the controller then according to that the device operates.

## 2.PROPOSED SYSTEM AND METHODOLOGY



**Fig 1:- Block Diagram of Automation**

### 2.1 Microcontroller

A microcontroller is a compact Microcomputer designed to govern the operation of embedded. In today's world of technology we find microcontroller in almost every electronic devices. Almost all general porpoise devises such as digital watches, office machines etc. microcontroller is used.



**Fig 2**

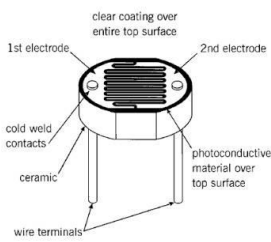
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The PIC microcontroller PIC16f877a is one of the famed microcontroller in the industry this controller is very convenient to use the coding or programming of this controller is also easier, one of the main advantage is that it can be a written and erased as many times as possible because it has flash memory technology, it has total number of 40 pins and there are 33 pins of input and output.

PIC16f877a finds its application in a huge number of devises. It is used in remote sensors, security and safety devices home automation and in many industrial instruments, an EEPROM is also featured in it which makes it possible to store some information permanently like transmitter code and receiver techniques. The cost of this controller is low and its handling is also easy it is used in microprocessor applications and timer functions etc.

**2.2 LDR [Light Dependent Resistor]**

Light dependent resistor or photo resistor is a device whose resistivity is a function of the incident electromagnetic radiation. hence they are light sensitive devices. They are also called as photoconductors, photoconductive cells or simply photo cells. They are made up of semiconductor materials carrying high resistance. There are many different symbols used to a LDR .some of the applications are,LRD have low cost and simple structure, they are often used as light sensors, they are used when there is a need to detect absence or presence of light like camera light meter.



**Fig3;LDR**

**2.3 Photoelectric Sensors**

Photoelectric sensors detect objects, changes in surface conditions and other objects through a verity of optical properties. A photo electric sensor consists of an emitter for emitting light and a receiver for receiving light. When emitted light is interrupted or reflected by sensing object, it changes amount of light that arrives t the receiver.

The receiver detects this change and convert it to an electrical output. The light source for the majority of photoelectric sensor is generally red or green or blue for identifying colors



**Fig 4:Photoelectric Sensor**

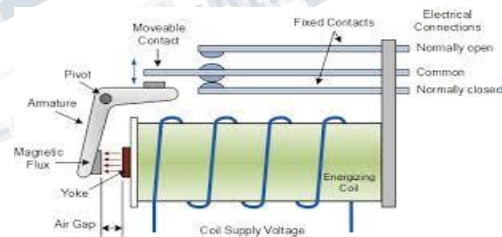
Some of the applications are counting products, acuraty detects automobiles in parking lots, checks failure of spinning etc.,

**2.4 Relay**

The current flowing in one circuit causes the opening or closing of another circuit. A relay is unusually an electro magnetical device that is activated by an electrical current.

A relay is an electrically operated switch, many relay use an electromagnet to mechanically operate a switch, but other operating principles are also used, such as solid states relay. Relays are used where it is necessary to control a circuit by a separate low power signal or where several circuit must be controlled by a signal.

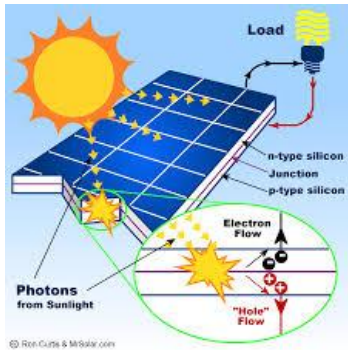
A type of relay that can handle the high power required to directly control an electric motor or other loads is called contactor solid state relay control power circuits with no moving parts.



**Fig5:Relay**

**2.5 Solar Panels**

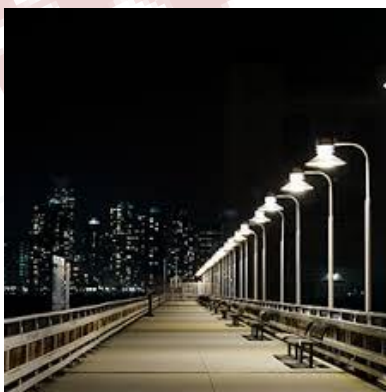
Solar panels absorb the sunlight as a source of energy to generate electricity or heat. A photo voltaic module is package connect assembly of typically 6x10 photovoltaic solar cells. Electricity is commercial and residential applications. Each module is rated by its DC output power under standard test conditions (STC) and typical ranges from100 to 365 watts (W). the efficiency of a module determines the area of module given by the same rated output an 8% efficient 230 w some of the applications are photovoltaic power stations, roof top TV system solar hybrid power system, solar planes etc.



**Fig6: Solar Panels**

**2.6 Street Light**

The street light or lamp standard is a raised source of light on the edge of a road or path. Many street light systems are being connected underground instead of carrying one utility post to another. Major advantages of streetlight include prevention of accidents and increase in safety it reduces pedestrian crashes by approximately 50%. Major criticism street light are that it can cause accident of misuse and causes light pollution.



**Fig7: Street lights**

**2.7 Power Supply**

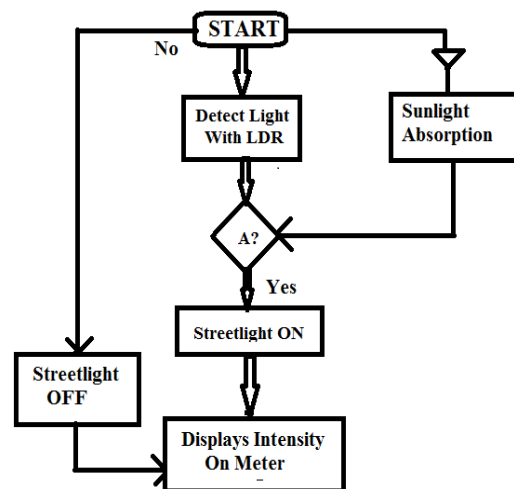
A power supply is hardware component system that converts AC current from the wall outlet into the DC current required by electronic circuits. A computer power supply converts AC into multiple DC voltage.

For example 12 volts is commonly used for drives, while 33V and 5V are used by the chips and other motherboard components.



**Fig8; power supply**

**3. FLOWCHART**



**Fig9; Flowchart –Automation of street light**

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According to this flow chart our approach to the streetlight automation can be introduced, as it reduces the power wastages and is totally automatic.

#### 4. CONCLUSION

In this paper the approach to streetlight automation has been controlled by microcontroller. With instructions from the controller the lights will be ON in the places when it's dark. LDR sensor and the photoelectric sensors are the two main conditions in working the circuit. Each sensor controls the turning ON or OFF the lighting column. Here we are saving lot of power without any Wastage; these technologies can be used to construct many more automations. This approach can be used in streets for automatic On and OFF of lights.

#### 5. REFERENCE

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