Automatic Street Light Control System

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Abstract— **The system elaborates the design and construction of automatic light control system. The developed electronic system eliminates the disadvantages of the existing systems. Based on the results the microcontroller calculates and automatically detects geographical area and retrieve relevant data for sunrise and sunset in the area, respectively ensures very precise ON/OFF mode of the lighting system. The circuit uses a light sensor to sense the light. It doesn't need operator maintenance and initial installation setup. The developed electronic device increases bulb life in result of the dimming effect. On the other hand this decrease of the illumination leads to reduce in the energy consumption. Light sensors and micro controller, relay are the main components of the project. Light sensor is like our eye which detect the presence of an object and Relay is an electromagnetic device which is used to isolate two circuits electrically and connect them magnetically.**

Keywords: Microcontroller; Light Dependent Resistors (LDR); Relay.

I INTRODUCTION

The Street lights are the major requirements in today's life for safety purposes and avoiding accidents during night. Providing street lighting is one of the most important and expensive responsibilities of a city. Lighting can account for 10-38% of the total energy bill in typical cities worldwide. Street lighting is a particularly critical concern for public authorities in developing countries because of its strategic importance for Now, we need arise to make the system automated so that human intervention and manual work avoided and create the transparency in system. In our project we propose the concept about to economic and social stability. The fixtures of street lights indirectly have assisted the public and government in reduction of crime rate and accidents in the area. It also encourages social inclusion by providing an environment in which people feel they can walk in hours of darkness. Despite that in today's busy lifestyle no one bothers to switch it OFF/ON when not required. Inefficient lighting wastes significant financial resources each year, and poor lighting creates unsafe conditions. Energy efficient technologies and design can cut street lighting costs dramatically. The main consideration in the present field technologies are Automation, Power consumption and cost effectiveness [1],[2]. Automation is intended to reduce man power with the help of intelligent systems. Power saving is the main consideration forever as the sources of the power

are getting diminished due to various reasons. Designing a cost-efficient system is very important as the requirement is more. In order to overcome this problem, automatic street light control methods is introduced. The main objective of our project is to provide a better solution to minimize the electrical wastage in operating street lights, in this era of automation humans are restless and are not in a position to regulate the manual operations in any field, a rapid advancement in embedded systems has paved path for the design and development of microcontroller based automatic control systems. Our project presents an automatic street light controller using light dependent resistor (LDR).

By using this system manual works are removed. The street lights are automatically switched ON when the sunlight goes below the visible region of our eyes. It automatically switches OFF the street lights under illumination by sunlight. It is a simple and powerful concept, to switch ON/OFF the street light system automatically. It automatically switches ON the streetlight when the sunlight goes below the visible region of our eyes and switches OFF the streetlight when ample amount of sunlight is available. The component used for light sensing is a Light Dependent Resistor. By using the LDR we can operate the streetlight automatically, when ample amount of light is available the streetlight will be in the OFF state and when it is dark the light will be in ON state, it means LDR resistance is inversely proportional to light falling on it. When the light falls on the LDR it sends the commands to the control circuit that it should be in the OFF state and the streetlight turns OFF.

II PROJECT IDEA

The main consideration in the present field technologies are Automation, Power consumption and cost effectiveness. Automation is intended to reduce man power with the help of intelligent systems. Power saving is the main consideration forever as the source of the power(Thermal, Hydro etc.,)are getting diminished due to various reasons. The main aim of the project is Automatic street power saving system with LDR, this is to save the power. We want to save power automatically instead of doing manual. So its easy to make cost effectiveness. This saved power can be used in some other cases. So in villages, towns etc we can design intelligent systems for the usage of street lights. Needs no manual operation for switching ON and OFF. When there is need of light. It detects itself weather there is need for light or not. When darkness rises to a certain value then automatically street light is switched The sensitiveness of the street light can also be

adjusted. In our project we have used four L.E.D for indication of bulb but for high power switching one can connect Relay (electromagnetic switch) at the output of pin 3 of I.C 555. Then it will be possible to turn ON/OFF any electrical appliances connected all the way through relay.

III LITERATURE SURVEY

We need to save or conserve energy because most of the energy sources we depend on, like coal and natural gas can't be replaced. Once we use them up, they're gone forever. Saving power is very important, instead of using the power in unnecessary times it should be switched off. In any city STREET LIGHT is one of the major power consuming factors. Most of the time we see street lights are ON even after sunrise thus wasting lot of energy. Over here we are avoiding the problem by having an automatic system which turns ON OFF the street lights at given time or when the ambient light falls below a specific. intensity. Each controller has an LDR which is used to detect the ambient light. If the ambient light is below a specific value the lights are turned ON[3].

A light dependent sensors is interfaced to the pic18f452 microcontroller it is used to track the sun light and when the sensors goes dark the led will be made on and when the sensor founds light the led will be made OFF. It clearly demonstrates the working of transistor in saturation region and cut-off region. The working of relay is also known Microcontroller and the code is written in c language in MikroC ide, the resulted value can be seen with the help of UART or LCD display .Automatic Street Light Control System is a simple yet powerful concept, which uses transistor as a switch. By using this system manual works are 100 percent removed. It automatically switches ON lights when the sunlight goes below the visible region of our eyes. This is done by a sensor called Light Dependent Resistor (LDR) which senses the light actually like our eyes. It automatically switches OFF lights whenever the sunlight comes, visible to our eyes[4].

Aim of this project is to control the street light using LDR. When the light falling occur means resistance value will be change. There is no light then the resistance value is change. From this resistance change the voltage variation can be obtained this value is given to ADC of PIC. PIC is stand for peripheral interface controller.

The existing system is commonly used in all streets of street light system. But in this method there is a loss of heavy electricity in the whole night. And also the street light is not necessary when there are no human movements in the street. A real local time is received from the GPS data and a sunrise and sunset time associated with the geographic location can then be determined. Street light is poorly designed and inadequately maintained, there are large number of burned out lamps which leads to insecurity. There is a complaint register in every zonal office street light section. It is being maintained by the line inspector. The complaint received from public, councillors and corporation officials either over phone is in person being recorded in the complaint register[5].

The complaint thus entered is being handed over to the fieldwork man so as to rectify the complaints. the field staff will have the rounds in the respective areas twice in a week and the complaints about non burning are also being attended then and there. But this is not the immediate remedy on complaints and has many disadvantages like the repair work takes days/even months instead of taking few hours which results in delay, telephone line may be busy, sometimes no response. The switches of street lights are switched ON/OFF manually by the workman in all the zones. This leads to the rise of man power and time. As it is human operation it is prone to errors.

IV PROBLEM STATEMENT

Existing methods like registering the complaint, switching on/off the light manually is time consuming & requires man power. The new method automatic ON/OFF and fault detection without human intervention is easier when compared to the existing system. We proposed an automatic light control system which eliminates the disadvantages of the existing systems by taking date and time from the GPS, as it also gives information about the position of the system. Based on the results the microcontroller calculates and automatically detects geographical area and retrieve relevant data for sunrise and sunset in the area, respectively ensures very precise ON/OFF mode of the lighting System. It increases bulb life in result of the dimming effect.

V GOALS AND OBJECTIVES

1. To provide lighting to the streets such that minimum possible power is consumed during nights.
2. To manage the traffic flow smoothly and efficiently during night.
3. To replace the conventional halogen lamp with the power LED's in the lighting system.
4. To develop the hardware of control unit.
5. To test and validate the designed system.

VI PROPOSED SYSTEM

We need to save or conserve energy because most of the energy sources we depend on, like coal and natural gas can't be replaced. Once we use them up, they're gone forever. Saving power is very important, instead of using the power in unnecessary times it should be switched off. In any city STREET LIGHT is one of the major power consuming factors. Most of the time we see street lights are ON even after sunrise thus wasting lot of energy. Over here we are avoiding the problem by having an automatic system which turns ON OFF the street lights at given time or when the ambient light falls

below a specific intensity. Each controller has an LDR which is used to detect the ambient light. If the ambient light is below a specific value the lights are turned ON. A light dependent sensors is interfaced to the pic18f452 microcontroller it is used to track the sun light and when the sensors goes dark the led will be made on and when the sensor founds light the led will be made OFF[6]. It clearly demonstrates the working of transistor in saturation region and cut-off region. The working of relay is also known Microcontroller and the code is written in c language in MikroC ide, the resulted value can be seen with the help of UART or LCD display
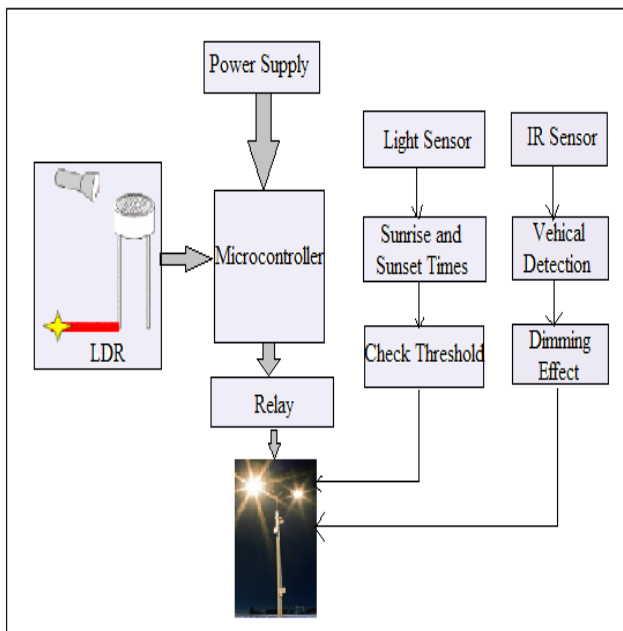

Figure 1 Basic Block Diagram

Automatic Street Light Control System is a simple yet powerful concept, which uses transistor as a switch. By using this system manual works are 100 percent removed. It automatically switches ON lights when the sunlight goes below the visible region of our eyes. This is done by a sensor called Light Dependent Resistor (LDR) which senses the light actually like our eyes. It automatically switches OFF lights whenever the sunlight comes, visible to our eyes. Aim of this project is to control the street light using LDR. When the light falling occur means resistance value will be change. There is no light then the resistance value is change. From this resistance change the voltage variation can be obtained this value is given to ADC of PIC. PIC is stand for peripheral interface controller. The developed electronic system eliminates the disadvantages of the existing systems by taking date and time from the GPS, as it also gives information about the position of the system. Based on the results the microcontroller calculates and automatically detects geographical area and retrieve relevant data for sunrise and sunset in the area, respectively ensures very

precise ON/OFF mode of the lighting system. The main aim of the project is to automatic switch ON/OFF the street light by sensing the light. In this system Light Sensors are used for sensing. Initially the street lights are in OFF state by using the LDRS. The ON and OFF state of one or more LED lighting modules of the streetlight can then be controlled upon the determined sunrise and sunset times. The block diagram of street light system as shown in figure consists of microcontroller, LDR, and photoelectric sensor. By using the LDR we can operate the lights, i.e. when the light is available then it will be in the OFF state and when it is dark the light will be in ON state, it means LDR is inversely proportional to light. When the light falls on the LDR it sends the commands 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. All these commands are sent to the controller then according to that the device operates. We use a relay to act as an ON/OFF switch.

VII ARDUINO UNO BOARD

Arduino is an open-source platform used for building electronics projects. Arduino consists of both a physical programmable circuit board (often referred to as microcontroller) and a piece of software, or IDE (Integrated Development Environment) that runs on your computer, used to write and upload computer code to the physical board. The Arduino platform has become quite popular with people just starting out with electronics, and for good reason. Unlike most previous programmable circuit boards, the Arduino does not need a separate piece of hardware (called a programmer) in order to load new code onto the board you can simply use a USB cable. Additionally, the Arduino IDE uses a simplified version of C++, making it easier to learn to program. Finally, Arduino provides a standard form factor that breaks out the functions of the micro-controller into a more accessible package. The Uno is one of the more popular boards in the Arduino family

Arduino IDE

Step 1: Download The Software: At this point, were ready to download the free software known as the IDE. The Arduino IDE is the interface where you will write the sketches that tell the board what to do.

Step 2: Arduino IDE: Once the software has been installed on your computer, go ahead and open it up. This is the Arduino IDE and is the place where all the programming will happen.

Step 3:Connect Your Arduino Uno: At this point you are ready to connect your Arduino to your computer. Plug one end of the USB cable to the Arduino Uno and then the other end of the USB to your computers USB port. Once the board is connected, you will need to go to Tools then Board then finally select Arduino Uno. Next, you have to tell the Arduino which port you

are using on your computer. To select the port, go to Tools then Port then select the port that says Arduino.
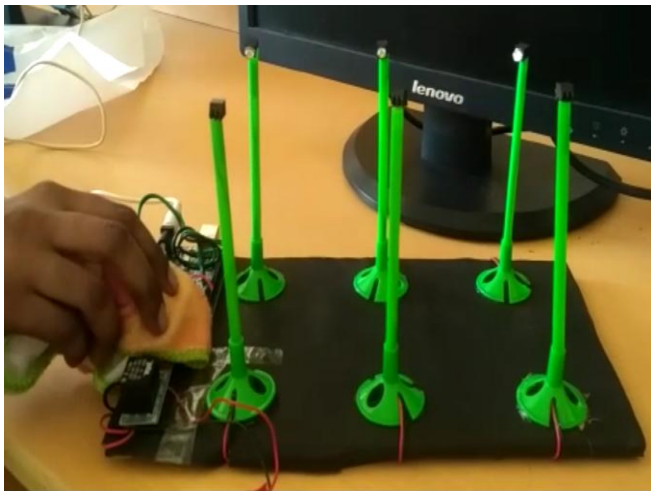
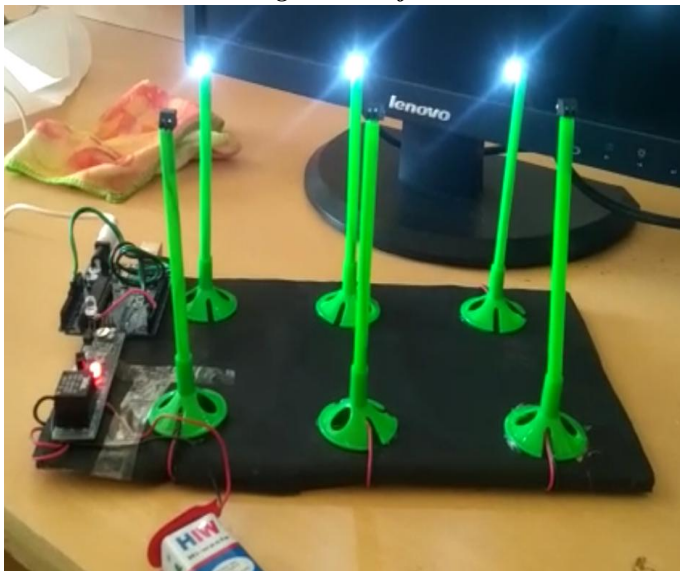## VIII RESULT

Figure 2. Project View

Figure 3. Hardware Kit

IX CONCLUSION

We design and implement an automatic system where in the street lights that are not required through the night can be dimmed. Additionally, the ambiance of light is checked and lights are turned ON when it is dark and turned OFF during the day. Our government is striving hard to provide electricity to customers. Thus this paper once implemented on a large scale can bring in significant reductions in the power consumption caused by street lights. Here we are saving lot of power without any wastage, by these advanced technologies.

X FUTURE SCOPE

The above project we can develop Solar Street light system with Automatic street light controller. The system can be powered from a battery, which can be charged during day time by harvesting the solar energy through a solar cell. The solar energy harvested from sunlight can be stored, inverted from DC voltage to AC voltage using sun tie converter. The AC voltage can be stepped up and given to the electric grid. The AC voltage from the electric grid can be stepped down, rectified and used for powering the circuit. Meanwhile, the street light can also be powered by the A.C. voltage, which is controlled by a relay switch connected to the switching part of the circuit. The above mentioned strategy will enable us to harvest solar energy in an effective way for the operation of the circuit and for powering the street light also.

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