Abstract

In many areas streetlight control is done manually. That means, some person turns on the light in the evening time and turns them off in the morning time. However, there are a few drawbacks to this manual method of controlling the streetlight. Accidents may occur if the person forgets to turn on the streetlights. Also, if the streetlights are not turned off in the morning, then it causes electricity wastage. Also, if we implement a time-based streetlight controlling system, then it will cause a problem since the evening start time is different in winter and summer. This project of automatic streetlight control can be used to overcome all these drawbacks.

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% removed. It automatically switches ON light when the sunlight goes below the visible region of our eyes. This is done by a sensor which senses the light like our eyes. It automatically switches OFF lights whenever the sunlight comes, visible to our eyes. By using this system energy consumption is also reduced because nowadays the manually operated streetlights are not switched off even when the sunlight comes and switched on earlier before sunset.

In this project, there is no need for manual operation like ON time and OFF time setting. This project clearly demonstrates the working of transistors in saturation region and cut-off region. The working of relay is also known.

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CHAPTER 1
INTRODUCTION

Automatic street Alerting systems have gained popularity in recent years due to their energy-saving and cost-effective capabilities. These systems use sensors and other smart technologies to automatically adjust lighting levels based on factors such as traffic density, time of day, and weather conditions. The integration of microcontrollers, such as the 8051, has further enhanced the capabilities of intelligent street lighting systems by allowing for greater control and flexibility in programming.

This technology not only provides better lighting conditions for pedestrians and drivers but also helps reduce energy consumption and lowers maintenance costs for municipalities. In this article, we will explore the implementation of an intelligent street lighting system using the 8051 microcontroller and its advantages over traditional lighting systems.

The 8051 microcontroller is a popular choice for intelligent street lighting systems due to its robust features, low power consumption, and cost-effectiveness. Its flexible programming capabilities allow for the customization of lighting patterns and the integration of sensors, such as light and motion sensors, to automatically adjust lighting levels. The use of the 8051 microcontrollers also enables remote monitoring and control of the lighting system, reducing the need for manual intervention and maintenance.

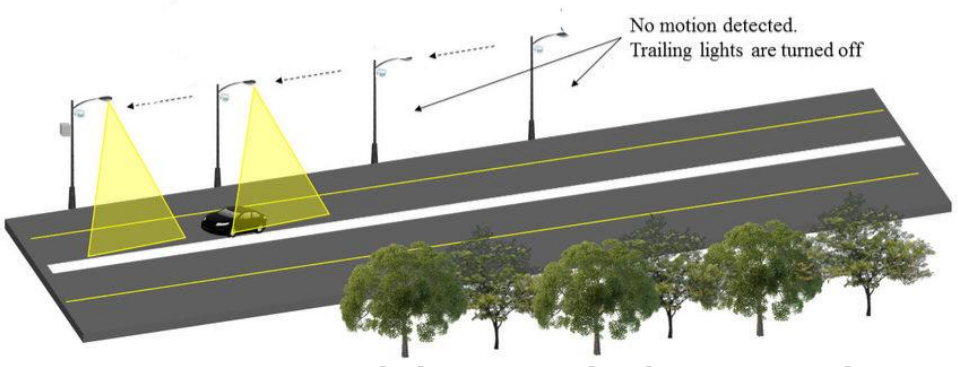

Fig.1.1 Automatic Vehicle Sensing and Light up Street Lights

1.2 Aim of the Project:

The aim of implementing an intelligent street lighting system with 8051 microcontroller is to provide an efficient and cost-effective solution for urban lighting. This system uses sensors and smart technologies to automatically switch on and off lighting based on various factors such as traffic density, time of day, and weather conditions.

1.3 Objective:

To enable remote monitoring and control of the lighting system, reducing the need for manual intervention and maintenance. To reduce energy consumption by automatically adjusting lighting levels based on various factors such as traffic density, time of day, and weather conditions.

1.4 Software Required:

- **Keil µ Vision-5:**

  The µVision IDE (Integrated Development Environment) combines project management, run-time environment, build facilities, source code editing, and program debugging in a single powerful environment. µVision is easy-to-use and accelerates your embedded software development. µVision supports multiple screens and allows you to create individual window layouts anywhere on the visual surface.

Fig.1.2 Keil µ Vision-5 Icon

- **Proteus software:**

  The proteus design suite combines each of use with a powerful feature set to enable the rapid, design, test and layout of professional printed circuit board.

Fig.1.3 Proteus software Icon

CHAPTER 2

Overview of 8051 Micro Controller

The 8051 microcontroller is a popular 8-bit microcontroller architecture developed by Intel in the 1980s. It has since become a widely used architecture in embedded systems and has been adopted by many other manufacturers, such as Atmel, Philips, and Texas Instruments. The 8051 microcontroller has a simple and compact design, making it suitable for low-power, high-speed applications with limited memory and I/O requirements.

The architecture of the 8051 microcontroller consists of several main components, including the Central Processing Unit (CPU), Random Access Memory (RAM), Read-Only Memory (ROM), and Input/Output (I/O) ports. The CPU is responsible for executing instructions and managing data, while the ROM contains the program code and other data that are stored permanently. The RAM is used for temporary data storage, and the I/O ports allow the microcontroller to interact with the outside world.

Fig.2 8051 IC

- ➤4K bytes internal ROM.
- ► 128 bytes internal RAM.
- ➤Four 8-bit I/O ports (PO - P3).
- ➤Two 16-bit timers/counters.
- ➤One serial interface.
- ➤64k external memory for code.
- ➤64k external memory for data Microcontroller.
- ➤210 bit addressable.

CHAPTER 3
Block Diagram and Implementation

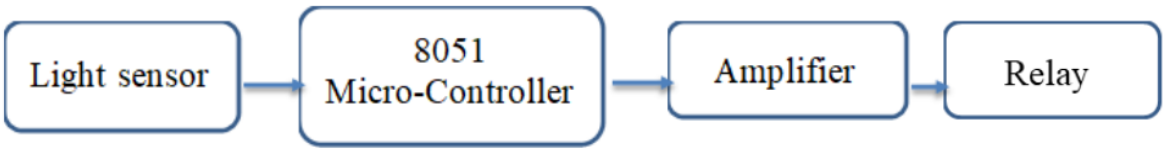

Fig.3.1 Block Diagram of Project

3.1 Implementation

► 230V Ac power supply will be given to micro controller through Adapter. It can be converting the 230V Ac into 12V Dc by step down transformer.

► We have three inputs, those are LDRs (Light depending on resister), crystal oscillator and reset and three Outputs those are 3led steeps for light sensor.

➤ Reset output is connected to the microcontroller's 9 pin.

➤ LDR Sensors output is connected to the microcontroller's Port's

➤ ULN2003IC input is connected o microcontroller's Port 2 - 21 pin, pin23 and pin 24 and its output is connected to Led steps.

➤ Relay drivers are using to ON/OFF condition in Led's connected to microcontrollers.

3.2 Pin Diagram Representation

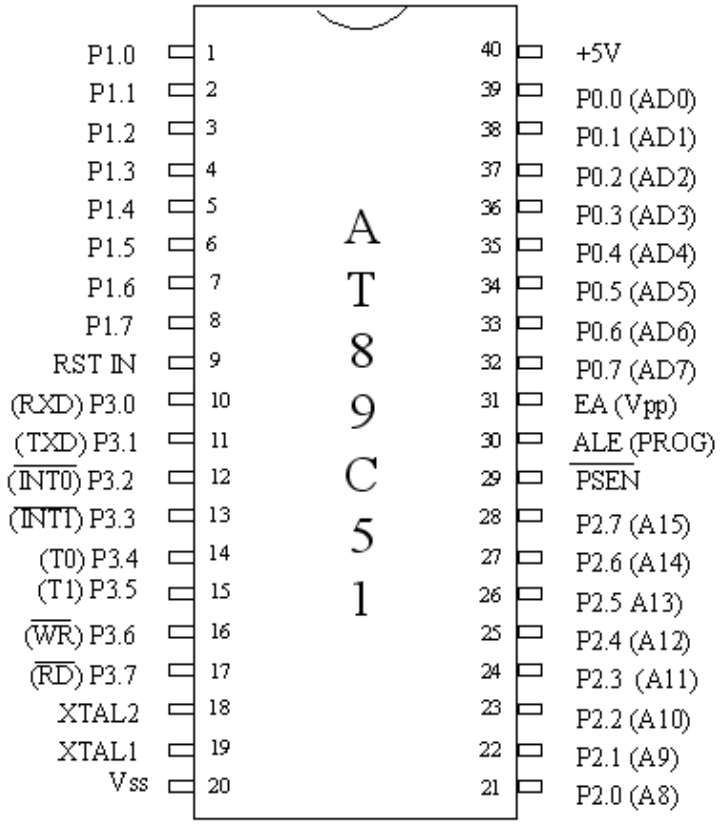

Fig.3.2 IC AT89C51

3.2 Ports Representation

- Port 0 - external memory access low address byte/data.
- Port 1 - general purpose I/O.
- Port 2 - external memory access high address byte.
- Pins 0, 1 for timer/counter 2.
- Port 3 - Special features.
    - 0 - RxD: Serial input
    - 1 - TxD: Serial output
    - 2 - INTO: External interrupt
    - 3- INT1: External interrupt
    - 4 - TO: Timer/counter 0 external input
    - 5 - T1: Timer/counter 1 external input
    - 6 - WR: External data memory write strobe
    - 7- RD: External data memory read strobe

CHAPTER 4
Circuit Representation

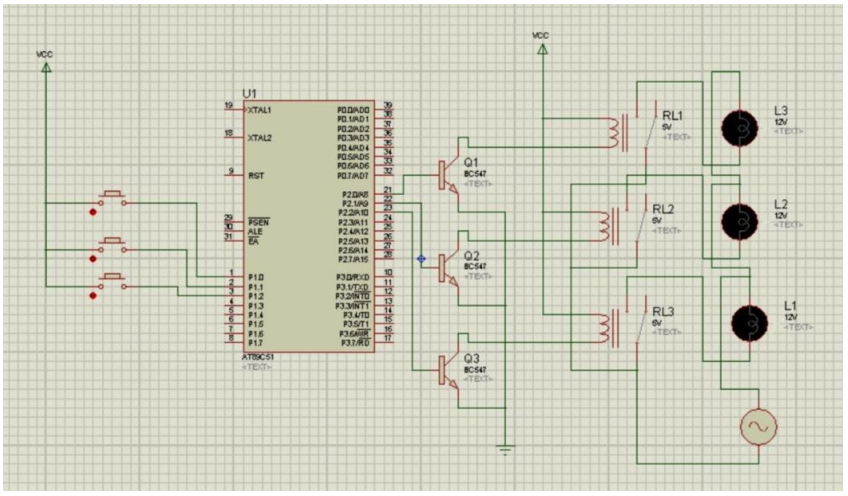

Fig. 4.1 Circuit in its Ideal State

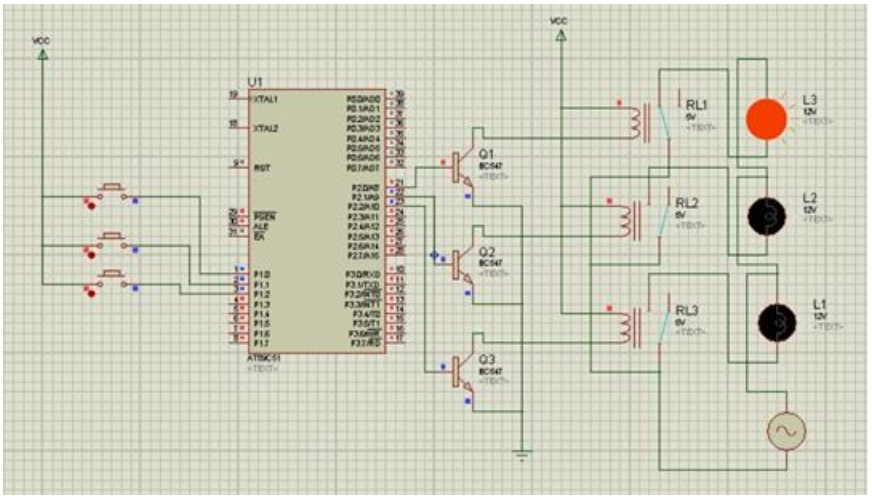

Fig.4.2 Circuit in Its Operating State

CHAPTER 5
Working Principle and Procedure

5.1 Working Principle

- This proposed system provides a solution for energy saving.
- This is achieved by sensing an approaching vehicle and then switching ON a block of streetlights ahead of the vehicle.
- As the vehicle passes by, the trailing lights switch OFF automatically. Thus, we save a lot of energy.
- However, there is another mode of operation where instead of switching OFF the lights completely, they remain ON with 10% of the maximum intensity. Streetlight That Glows on Detecting Vehicle Movement.

5.2 Working Procedure

Light that Glows on Detecting Vehicle Movement

Nowadays, street lighting systems in industries or cities are growing rapidly. The important considerations in the field of different technologies like electrical and electronics are cost effective, automation and power consumption. There are different street lighting systems developed to maintain and control them. These lighting systems are used to control and decrease energy consumption. This report illustrates the streetlight that glows on detecting vehicle movement. Streetlight controlling is one of the most developing systems in India to conserve the energy.

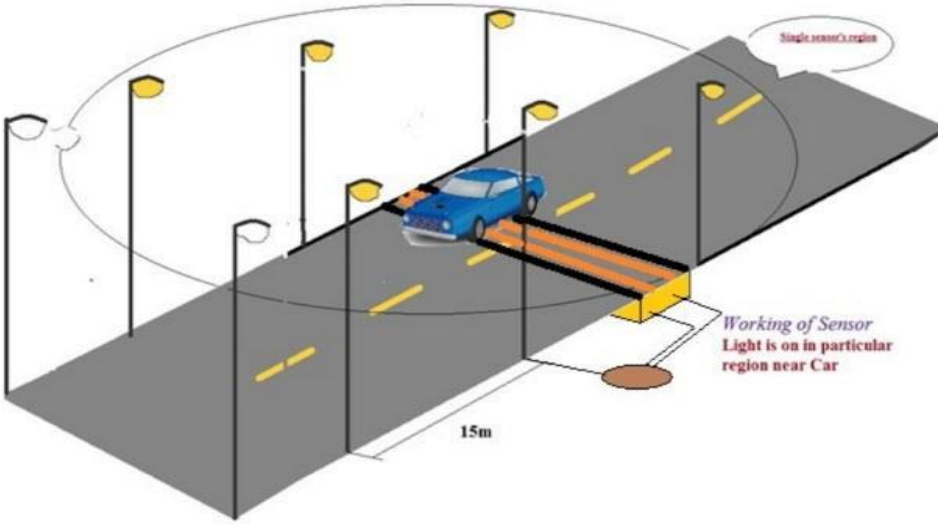

Fig.5 Street Light that Glows on Detecting Vehicle Movement

Generally, street light controlling system is a simple concept which uses a transistor to turn ONin the nighttime and turn OFF during the daytime. The entire process can be done by usinga sensor namely LDR (light dependent resistor). Nowadays conserving energy is an essential part and day by day energy resources are decreasing. So, our next generations may face a lot of problems due to this lack of resources. This system does not need a manual operation to turn ON/OFF the streetlights. The streetlight system detects whether there is a needfor light or not.

CHAPTER 6

Source Code

```
#include<stdio.h>
#include<reg52.h>
sbit sensor1=P1^0;
sbit sensor2=P1^1;
sbit sensor3=P1^2;
sbit load1=P2^0;
sbit load2=P2^1;
sbit load3=P2^2;
void main(){
load1=load2=load3=0;
sensor1=sensor2=sensor3=0;
while(1){
if (sensor1==1){
load1=1;load2=0;load3=0;
}
if (sensor2==1){
load1=0;load2=1;load3=0;
}
if (sensor3==1){
load1=0;load2=0;load3=1;
}
}
}
```

CHAPTER 7
Conclusion

This project of "AUTOMATIC STREETALERTING SYSTEM" is a cost effective, practical, ecofriendly, and safest way to save energy. It clearly tackles the two problems the world is facing today, saving energy and disposal of incandescent lamps, very efficiently. According to statistical data we can save more than 40 % of electrical energy that is now consumed by the highways. Initial cost and maintenance can be the drawbacks of this project. With advances in technology and valuable resource planning, the project's cost can be reduced, and with the use of good equipment, maintenance can also be reduced in terms of periodic checks.

LEDs have long life, emit cool light, donor have any toxic material and can be used for fast switching. For these reasons, our project presents 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 investment return time is short. The project has scope in various other applications like for providing lighting in industries, campuses, and parking lots of huge shopping malls. This can also be used for surveillance in corporate campuses and industries

7.1 Advantages

- This circuit uses LED Bulbs, so it is incredibly low cost, and it has a longer life span.
- Maximum energy can be saved.
- Limited maintenance and low power consumption.
- Low power consumption.
- Less workforce required.
- Light Sensors used have high sensitivity and are Easily implementable.

7.2 Applications

- Parking Lightings.
- Streetlights.
- Garden Lights.
- Highways.
- At the Industries.
- Parking lots at malls and open places.

Bibilography

- https://rcciit.org/students_projects/projects/ece/2018/GR14.pdf
- file:///C:/Users/dachu/Downloads/project%20work.pdf
- Vishalsoni India 'Smart Street Light Using IR Sensor with Arduino', 2018. [Online]. Available:https://www.instructables.com/id/Smart-Street-Light-Using-Ir-Sensor- With Arduino/ [Accessed: 16- May- 2019].
- Available:https://www.google.com/search?q=wastage+of+energy+street+lights&rlz=1C1 CHBD_enIN777IN777&source=lnms&tbm=isch&sa=X&ved=0ahUKEwjZ0tmo153iAhXp7nMBHZS7BlUQ_AUIDigB&biw=1920&bih=969#imgrc=go9kkfP6nJ6IeM: [Accessed: 15- May- 2019].
- D. A. Devi and A. Kumar, Design and Implementation of CPLD based Solar Power Saving System for Street Lights and Automatic Traffic Controller, International Journal of Scientific and Research Publications, Vol. 2, Issue11, November 2012.
- K. S. Sudhakar, A. A. Anil, K. C. Ashok and S. S. Bhaskar, Automatic Street Light Control System, International Journal of Emerging Technology and Advanced Engineering, Vol. 3, May 2013.