



SMART STREET LIGHT SYSTEM USING MICRO-CONTROLLER

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Abstract: Background - Monitoring and controlling of Street Light power consumption is one of many important factors in a developing nation like India. The aim of this paper is to execute and design latest technology or development in conservation of energy in street light system. Now-a-days, with the technological advancements in the field of microcontrollers and sensors, humans have no need to switch ON/OFF the lights physically at the time of requirement. This paper presents a system in which Street lights will be switched ON before sunset and switched OFF after sun rise. In this paper we will use multiple sensors: 1) LDR (light dependent resistor) sensor used to differentiate between day and night time and 2) IR Proximity Sensor used to detect vehicular movement and change the intensity of LEDs accordingly. A micro controller is used to control the processing of lighting system using C programming language.

Index terms: Street light (LED), LDR, IR Proximity sensor, micro controller, energy conservation, and vehicle detection.

I. INTRODUCTION:

The project objective is to conserve the energy by detecting the vehicle movement on roadways. [1] The project requires sensors to detect the vehicle movements and switches ON

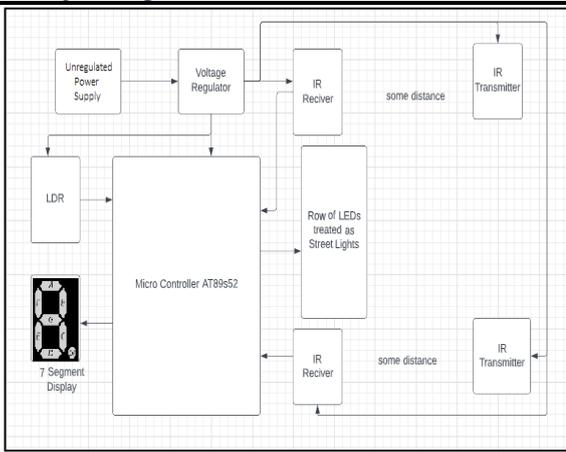
the light ahead. As soon as the vehicle moves ahead the trailing lights automatically switched OFF. This can be used to save lots of energy instead of using conventional system where the street lights are remained ON for the most part. [2].

At day time all lights are automatically turned OFF using a LDR sensor and Logic using microcontroller and, at night, LDR senses night time and all light are switched ON but the street lights are in dim state (30% of intensity), whenever any vehicle enters the road, with the help of multiple IR sensors vehicle detection occurs and the intensity of street lights will be 100% (Bright State), this will be done by with the help of micro controller. When vehicle is passes out from the road the lights will be again in dim mode. Sensors are used on either side of the road to senses the vehicle movement and sends logic commands to micro controller 89s52 to adjust the intensity of LEDs [1].

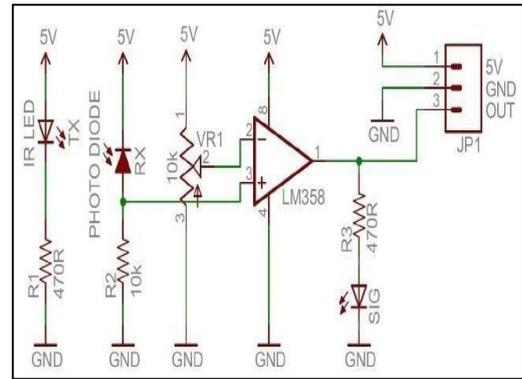
In this project we also use a seven- segment display which is used to count the number of vehicles entering and leaving the road, it is beneficial in the cast of parking lots and when the vehicular movement is slow. Additional virtue of this is that it can be used to get better statistics about the traffic density on the road.

II. SMART STREET LIGHT SYSTEM BLOCK DIAGRAM:

The system consists of IR Proximity sensor, LDR sensor, Power supply Micro controller and 7- segment display.

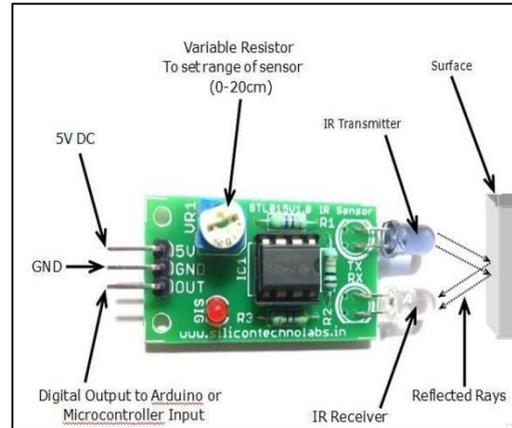


digital output. The IR Sensor used works on 5V DC power supply and the range of the sensor is up to 20cm.



Hardware Requirements:

S No.	Hardware Requirement	Software Required
1.	89S52 Micro controller	Keil u vision
2.	Voltage Regulator	C language
3.	IR Proximity Sensor	
4.	LDR	
5.	LED's	
6.	Comparators	
7.	Capacitor	
8.	Resistors	
9.	Variable Resistor	
10.	Unregulated Power Supply	

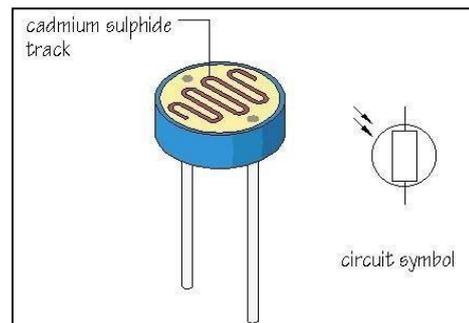


1.) IR Proximity Sensor:

IR Proximity Sensor is a multi-purpose infrared sensor which can be used for obstacle sensing, color detection, fire detection, line sensing, etc. and also as an encoder sensor.[3] The sensor provides a

2.) LDR (Light Dependent Resistor):

A LDR is a passive component that decreases resistance with respect to receiving luminosity (light) on the sensitive surface of the device. The resistance of LDR decreases with increase of incident light intensity. It is used in light sensitive detector circuit.[3] Basically, it used to detect the day/night time.



3.) AT89s52 Micro-controller:

The AT89S52 is a low power, high performance CMOS 8-bit micro controller with 8K bytes of in-system programmable flash memory. The device is manufactured using Atmel's high-density non-volatile memory technology and is compatible with the industry standard 80C51 instruction set and pin out.[4] The on-chip flash allows the program memory to reprogram in system or by a conventional non-volatile memory programmer. By combining a versatile 8-bit CPU with in-system flash on monolithic chip, the Atmel AT89S52 is a powerful micro controller which provides a highly flexible and cost-effective solution to many embedded control applications.[5]

T2 P1.0	1	40	VCC
T2 EX P1.1	2	39	P0.0 AD 0
P1.2	3	38	P0.1 AD 1
P1.3	4	37	P0.2 AD 2
P1.4	5	36	P0.3 AD 3
MOSI P1.5	6	35	P0.4 AD 4
MISO P1.6	7	34	P0.5 AD 5
SCK P1.7	8	33	P0.6 AD 6
RST	9	32	P0.7 AD 6
RXD P3.0	10	31	EA/VPP
TXD P3.1	11	30	ALE/PROG
INT0 P3.2	12	29	PSEN
INT1 P3.3	13	28	P2.7 AD 15
T0 P3.4	14	27	P2.6 AD 14
T1 P3.5	15	26	P2.5 AD 13
WR P3.6	16	25	P2.4 AD 12
RD P3.7	17	24	P2.3 AD 11
XTAL2	18	23	P2.2 AD 10
XTAL1	19	22	P2.1 AD 9
Ground	20	21	P2.0 AD 8

The AT89S52 provides the following standard features: 8K bytes of flash, 256 bytes of RAM, 32 I/O lines, Watchdog timer, two data pointers, three 16-bit timer/counter, two level interrupt architecture, a full duplex serial port, on chip oscillator and clock circuitry. In addition, the AT89S52 is designed with static logic for operation down to zero frequency and supports two software selectable power saving modes. The idle mode stops the CPU while allowing the RAM, timer/counters, serial port, and interrupt system to continue, disabling all other chip functions until the next interrupter hardware reset.[5]

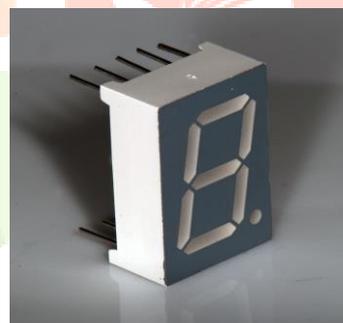
4.) Power Supply:

This project is connected to a power supply of 9V DC so to make it 5V supply we use a voltage regulator LM7805 IC. It is simple to use we connect positive lead of 9V DC to input pin of regulator and negative pin to common pin and then turn on the power a 5V DC supply will be get from the output pin of regulator.



5.) 7-Segment Display:

A seven-segment display is used to display the decimal numbers 0-9 and some alpha character. In this we use 7 segment display to the number of vehicles which are entering and leaving the roadway.



III.SMART STREET LIGHT

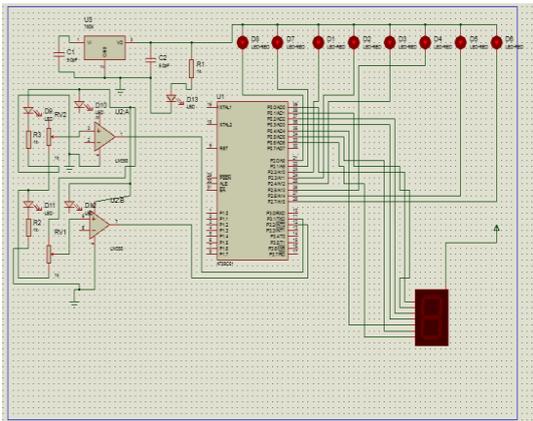
CONTROL CIRCUIT DESIGN:

The inputs of street light system are LDR and IR Proximity sensors, after dark, the light sensor will activate the system and turn ON the street lights but in Dim State (30% of intensity), now the system is ready to detect the any object by IR sensor, on the road to turn ON the street light at their Bright State (or 100% of intensity).

LDR sensor is used to differentiate the day and night time. And two IR

Proximity sensors are used in this project and their function is to sense the vehicle that will pass through street and simultaneously send logic to the micro controller to increase the intensity of light. The idea is to save the energy, where the system has been designed to turn lights ON in night only and except that the light will be OFF. And the second sensor will be activated when the object leaves the road which

will again dim all the street lights, after passing the object. And a 7-segment display is also connected which will count the number of vehicles and give information about how many vehicles are present on road at that time.



IV. RESULTS:

The project aims to conserve power, energy management and efficiency using a cost-effective system. This project, uses the ability of micro-controllers and sensors to a higher potential to save energy and is eco-friendly. This is the idea of using lighting control system is very well and working properly.

V. CONCLUSION:

This paper elaborates the design and construction of smart street light system circuit. This circuit works properly to turn street lamp ON/OFF. After designing the circuit which controls the light according as illustrated in previous

section. The street lights are successfully controlled by micro controller. This is cost effective, practical and eco-friendly and one of the safest ways to save energy. The project has scope in various other applications like providing lighting in industries, museums, stadiums and parking lots of huge malls. This can also be used for surveillance in corporate campus and industries. Finally, this control circuit can be used in a long highway between two cities, and solemnly used roads.

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