"SMART STREET LIGHT CONTROLLED SYSTEM"

Prof . P.N.KHAIRNAR[1], AKSHAY R. PAGARE[2],
SAGAR R. SONAWANE[3], PRAVIN K. WALZADE[4]

[1]*ME (E&TC) Lecturer, S.V.I.T, Chincholi, Nasik, Maharashtra, India.*

[234]*B.E (E&TC) Student, S.V.I.T, Chincholi, Nasik, Maharashtra, India.*

ABSTRACT

This project illustrates the street light glowing system on vehicle detecting movement. Controlling of street light is of almost importance in developing country like India to reduce the power consumption. This paper presents a street light control system which combines various technologies: a timer, a statistics of traffic flow magnitude, photodiodes, Light Emitting Diodes (LED), power transistors. IR Sensors used on either sides of the road send logic command's for the LEDs at the output to get glowing for a patch ahead Intensity control is also possible by pulse width modulation based on sensing the movement and density of vehicles. The project is designed to detect vehicle movement on street to switch ON only a block of street lights ahead of it (vehicle), and to switch OFF the trailing lights to save energy. During night all the lights on the street remains ON for the vehicles, but lots of energy is wasted when there is no vehicle movement. For auto power consumption when there is no vehicle on the Street Light this includes controlling a circuit of street lights with NE555P, specific IR Sensors & Light Dependent Resistor (LDR) is a type of sensor which actually does this work and senses the light as our eyes does. As soon as the sunlight comes, visible to our eyes it automatically switches OFF lights. Total process operation in Solar Power.

Keywords- : LDR, NE555P, Solar Power, Specific IR Sensors, led.

1. INTRODUCTION

The project is designed to detect vehicle movement on highways to switch ON only a block of street lights ahead of it (vehicle), and to switch OFF the trailing lights to save energy. During night all the lights on the highway remain ON for the vehicles, but lots of energy is wasted when there is no vehicle movement.

This proposed system provides a solution for energy saving. This is achieved by sensing an approaching vehicle and then switches ON a block of street lights ahead of the vehicle. As the vehicle passes by, the trailing lights switch OFF automatically. Thus, we save a lot of energy. So when there are no vehicles on the highway, then all the lights remain OFF. However, there is another mode of operation where instead of switching OFF the lights completely, they remain ON with 10% of the maximum intensity of the light. As the vehicle approaches, the block of street lights switch to 100% intensity and then as the vehicle passes by, the trailing lights revert back to 10% intensity again. High intensity discharge lamp (HID) presently used for urban street light are based on principle of gas discharge, thus the intensity is not controllable by any voltage reduction. White Light Emitting Diode (LED) based lamps are soon replacing the HID lamps in street light. Intensity control is also possible by Pulse Width Modulation (PWM) generated by the microcontroller. Sensors used on either side of the road senses vehicle movement and sends logic commands to microcontroller to switch ON/OFF the LEDs. Thus this way of dynamically changing intensity ON/OFF helps in saving a lot of energy. The project uses an 8051 series microcontroller.

Further the project can be enhanced by using appropriate sensors for detecting the failed street light and then sending an SMS to the control department via GSM modem for appropriate action.

2. LITERATURE SURVEY

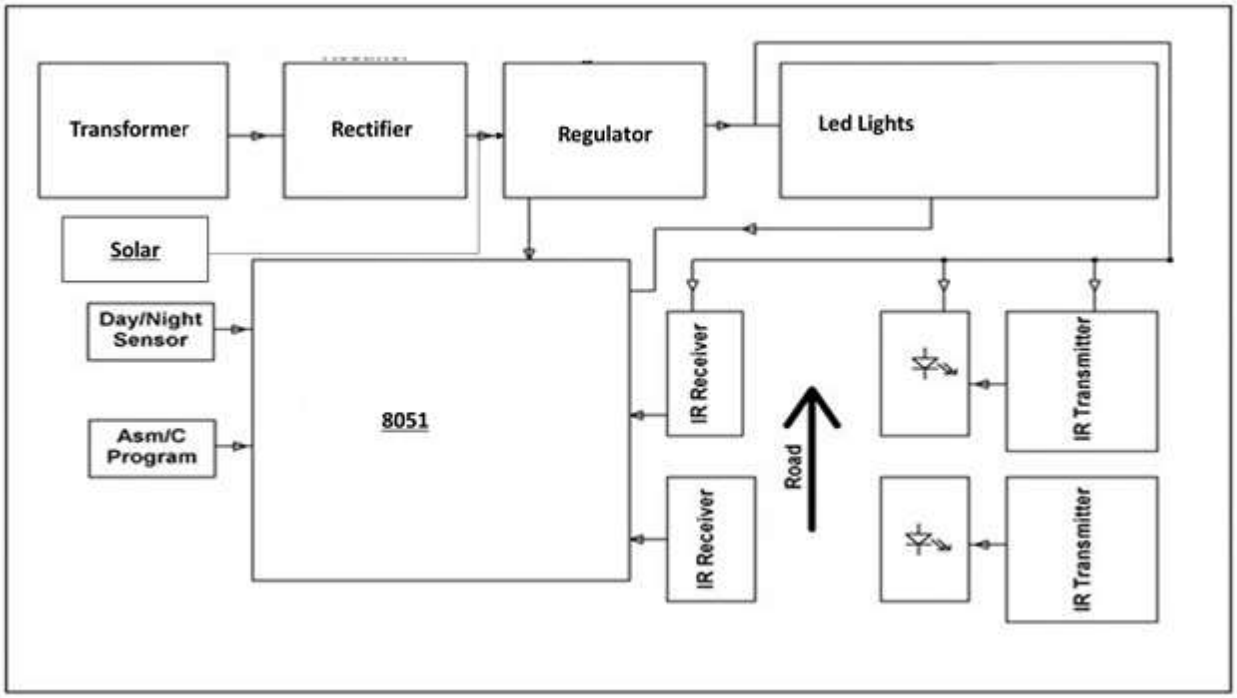
Human and computer interactions

MUSTAFA SAAD et al proposed paper on "Automatic Street Light Control System Using Microcontroller". This paper aims at designing and executing the advanced development in embedded systems for energy saving of street lights. Now a days human has become too busy, and is unable to find time even to switch the lights wherever not necessary. The present system is like, the street lights will be switched on in the evening before the sun sets and they are switched off the next day morning after there is sufficient light on the roads. this paper gives the best solution for electrical power wastage. Also the manual operation of the lighting system is completely eliminated. In this paper the two sensors are used which are Light Dependent Resistor LDR sensor to indicate a day/night time and the photoelectric sensors to detect the movement on the street. The microcontroller 8051 is used as brain to control the street light system, where the programming language used for developing the software to the microcontroller is C language.

Finally, the system has been successfully designed and implemented as prototype system.

B. K. Subramanyam et al proposed paper on "Design and Development of Intelligent Wire- less Street Light Control and Monitoring System Along With GUI" discussed that Now a days, it became essential for people work during nights and returning back to homes late nights; also increasing crime rate during night times. This can be best achieved by implementing proper solar based lighting system on Streets. The efficient monitoring and controlling of this lighting system must be taken into account. We will get more power consumption, saving money through solar panel. Also saving precious time, decrease the huge human power through from the LDR,IR Sensors. The Street lights are controlled through a specially designed Graphical User Interface.

3. BLOCK DIAGRAM



4. CIRCUIT WORKING

The highway model consists of 14 led as streetlights and 8 pairs of photodiodes-IR diodes used as sensors, variable resistors and transistors which acts as switch as explained above. The IR diodes are placed on one side of the road and photodiodes are placed on other side of road, directly facing the IR diodes.

Consider the case when there is no vehicle on the highway. In this case, the IR radiation emitted from the IR diode directly falls on the photodiode which is exactly opposite to it. This causes the photodiode to fall in conduction state. This implies that photodiode conducts and current passes through it. The current passes through the photodiode and goes through the variable resistor and the base-emitter region of the transistor. So, to summarize we can say that, when there is no vehicle on the highway, then all the inputs to the microcontroller port 1 is ZERO.

Consider the case when a vehicle obstructs the IR radiation path. In this case, IR radiation is blocked and hence it does not fall on the photodiode. This in turn implies that photodiode doesn't conduct. Hence there is no current owing through this first transistor. So, the collector is at HIGH state. Let us assume that the first Photodiode-IR diode pair IR path is obstructed. This leads to a transition from ZERO to HIGH at P1.0 pin. The microcontroller is programmed in such a way that, whenever the pin P1.0 goes high, then a window of seven led lights ahead from the vehicle glows. In other words, the respective pins of port 2 and port 3 go HIGH. This process goes on i.e., as the vehicle moves forward, the street lights ahead of it glows and the trailing lights goes back to its original off state.

There are two basic modes of operation,

1. Transition of streetlights from dim to bright state.
2. Transition of streetlights from dark to bright state.

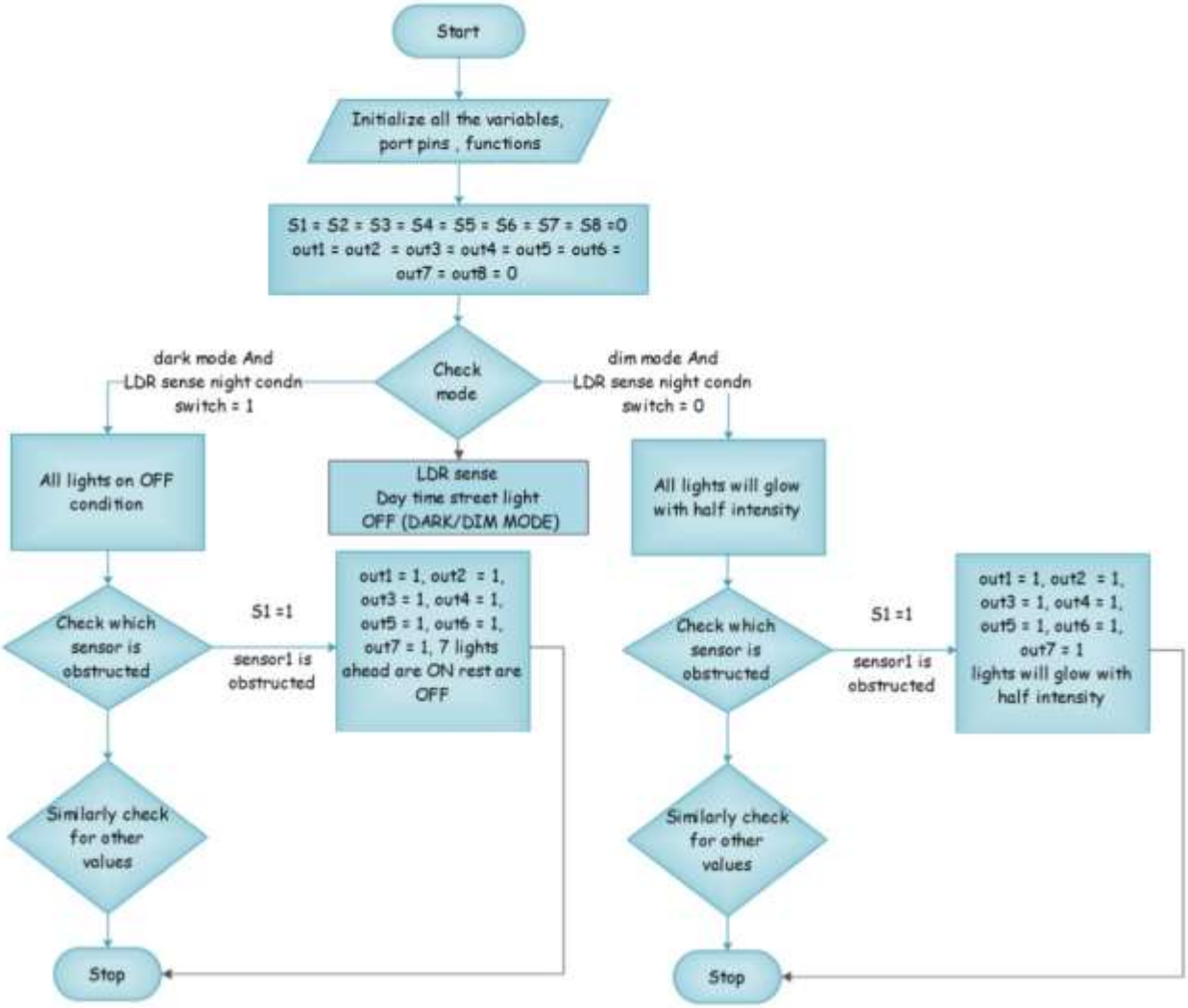
1. In the first mode of operation, initially when the vehicle is not sensed, all the streetlights will be in dim state. This is achieved by use of pulse width modulation technique through the program stored in the microcontroller. When a vehicle is sensed, all the streetlights are illuminated for 1ms and the window of streetlights are illuminated for 100ms. Thus we have a PWM wave of 99% duty cycle for those seven led.

2. In the second mode of operation, when the vehicle is not present, all the streetlights will be in dark state. When a vehicle is sensed then the window of streetlights is illuminated in front of the vehicle.

5. FUTURE SCOPE

1. Add to the Smart Grid to monitoring all the light and energy backup purpose
2. With adding other renewable energy sources
3. Railway signaling aspects

6. FLOW CHART



7. ADVANTAGE

1. Power saving
2. LEDs consume less power
3. Easily implementable

4. Low cost

8. APPLICATION

1. Highways
2. Industries
3. Museums

9. CONCLUSION

1. This project smart power consumption system is a cost effective, eco-friendly and safest way to utilization of solar energy.
2. The LEDs have long life, emit cool light, donor have any toxic material and can be used for fast switching.

10. REFERENCES

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