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Vehicle Movement Based Street Light System

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***Abstract*—** Now-a-days the amount of power consumed by lighting and streets shares a major energy demand. The vehicles passing over at some places will be consisting of less density areas or even no vehicle moments itself. But during night all street lights will be on conventional street lighting system. To overcome from this issue, a proper energy saving methods and lighting control to be implemented. The proposed work is to have two controls, one is to switch of lights during day time and automatically switch it on when vehicles arrive at night time and other mode is to give less intensity light of LED when there is no vehicle and to switch on bright mode during vehicle movements. From this method the overall energy being utilized now-a-days for lighting can be minimized. The automatic andsmart control schemes are required to control the complex lighting system due to growth of cities and standard of living.

Keywords*—PIR sensor, PIC microcontroller, LDR, LED*

I. INTRODUCTION

Street Lights are an essential part of all cities. As it is major requirement in today's life of transportation for safety purpose and avoiding accidents during night. In this project our aim is to develop a smart street light system which will reduce electric power consumption and eliminating man power. In this PIR sensor, LDR and Pic microcontroller are the main components of project. During day time, there is no requirement of street lights so LDR keeps the street lights OFF until the light level is low. During night time street lights dims when no vehicles are detected but brightness automatically when movement of vehicles are detected. Street light system can be classified according to types of lamp used. Such as incandescent light, mercury vapor light, sodium light, fluorescent light and LED. Over the last few years, LED street lamps have turned into real products that one can see on the road. They make sense for many reasons, such as their compact size, high efficacy (lumens per watt), longevity, and robustness. LED sources also allow for interesting new design forms, often with slimmer profiles than traditional metal halide arc lamps. LED is considered as solution to modern street lighting system due to its advantages and behavior.

The paper puts forward the design and implementation of a Vehicle Movement Based Street Light System. The specific objectives are:

- To save energy by putting on the lights of the system when movement of vehicles detected.
- When vehicle pass the system automatically light turn on with high intensity and decreases the light intensity of trailing lights.
- The project is less cost and eco-friendly.

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- To assist drivers, cyclist and humans for finding their way in dark.

II. LITERATURE REVIEW

Gustavo W. Denardin deals about control network for LED street lighting system. The use of LEDs is being considered promising solution to modern street lighting system, due to their longer lifetime, higher luminous efficiency. The obtained experimental results show that the proposed control network is able to meet the requirements of a LED street lighting system. It mainly deals about safer roadways with intelligent light system to reduce power consumption. This system has automatic street light intensity control based on the vehicular movement and switching ON and OFF of street lights depending on the light ambience during hours of meager road usage. The street light module is installed consequently for every certain distance [1].

Radhi Priyasree explains a system to reduce the power consumption of street lights by avoiding inefficient lighting which wastes significant financial resources each year. This is done by dimming the lights during less traffic hours. For this purposed PIR sensor is used which detects any movement. This work also aims at reducing the fatal crashes and road accidents caused due to alcohol consumption. This is done using skin sensors placed in vehicle doors and also using breadth. This will help in reducing the power consumption inside the vehicle. By implementing this death rates due to drunk driving can be reduced to a great extent. The prototype has been implementedand works as expected and will prove to be very useful and will fulfill all the present constraints if implemented on a large scale. scale. It also aims at detecting consumption of alcohol by the driver and if it exceeds certain level it impairs the driver from entering into the Vehicle. This prevents occurrence of accidents or any fatal crashes. This initiative will help the government to save this energy and meet the domestic and industrial needs. [2].

S.H. Jeong describes about the Development of Zigbee based Street Light Control System which control and monitor status of street lights installed alongside load. Lights are switched to ON/OFF by this system's control command. This Street light control system can save maintenance time and costs and which can improve safety level. [3].

Hengyu Wu, MinliTang propose about The core technology of the street light control system is an PIC18f452. It integrates a power circuit, a fault detect circuit, a photosensitive detection circuit, an infrared detect circuit, an LCD display circuit, a street light control circuit, an a1ann circuit, a pressed key control circuit and so on. This system can automatically tum on or off the lights and controls the switches according to traffic flow. It expands the fault detect circuit and the corresponding a1ann circuit. It also has a convenient and flexible button control circuit to switch on and off. [4]

K. Subramanyam worked on intelligent wireless street light control and monitoring system, which integrates new technologies, offering ease of maintenance and energy savings. Using solar panel at the lamp post by using LDR it is possible to save some more power and energy, and also we can monitor and controlled the street lights using GUI application, which shows the status of the lights in street or highway lighting systems. [5]

III. SYSTEM DESIGN

Figure 3(a) show the architectural diagram of the proposedvehicle movement based street light system.

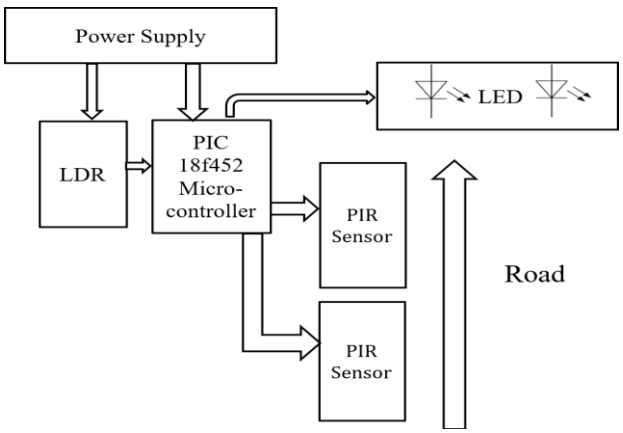

Fig 3(a): Block Diagram of Vehicle movement based street lightsystem

A LDR is connected to microcontroller and power supply. It detects the presence or absence of sunlight with the help of change in resistance. When sufficient sunlight is present in surrounding the LDR offers low resistance. In this case, microcontroller read output from LDR and automatically turn OFF all LEDs. When there is absence of sunlight, LDR offer high resistance. In this case, microcontroller read output from LDR and turn on all LEDs with low intensity of light.

PIR sensor use to detect IR radiation or heat radiation emitted from an object. As an object crosses the PIR sensor it intercepts and thus positive differential change between the two slots occur and this output read by the microcontroller and increases the light intensityof the LEDs. And when there is no detection of any object the signal between the slots is zero this output read by the microcontroller and decreases the light intensity of the LEDs.

IV. METHODOLOGY

A Vehicle movement based system device consist of LDR, PIC microcontroller, PIR sensor, LEDs.
A LDR is connected to PIC microcontroller and power supply. The LDR detects the presence or absence of sunlight with the help of change in resistance. When sufficient sunlight is present in surrounding the LDR offers low resistance. When there is absence of sunlight, LDR offer high resistance. PIR sensor use to detect IR radiation or heat radiation emitted from an object.

PIC microcontroller 18f452 is 40 pin IC. 34 pins are input output pins of PIC microcontroller. It has 5 ports.
Port A has 7 pins RA0-RA6 Port B has 8 pins RB0-RB7 Port C has 8 pins RC0-RC7 Port D has 8 pins RD0-RD7Port E has 3 pins RE0-RE2

In Port A we are connecting LDR for checking whether it is night or day condition and accordingly turn ON and OFF LEDs.

In sufficient sunlight LDR offers low resistance and in this case, pic microcontroller read output from LDR and automatically turn OFF all LEDs. When there is absence of sunlight, LDR offers high resistance and thus pic microcontroller read output from LDR and turn ON all LEDs with low intensity of light.
In port A we are also connecting MCLR pin from pic-kit. This MCLR pin is master clear pin it is an external reset that is activated by pulling up pin low for working mode.

In Port B we are connecting PGD and PGC pin of pic-kit. PGD pin is programming data function as both input and output allowing programming data to be read in. PGC pin is programming clock. It controls the overall process. It can be used for successful device programming. In Port B we have ouroutput i.e. LEDs are connected.

All the PIR sensors are connected to the Port C of pic microcontroller. When no vehicle passes from PIR sensor, it gives low output to pic microcontroller and that's why light remains dim or no change in the intensity of LEDs. When any vehicles pass from PIR sensor it gives high output to pic microcontroller. The pic microcontroller is set such that when output is high at that point 3 lights ahead the vehicle starts glowing with high intensity increased to 90% and trailing lightintensity reach to 10%-20%.

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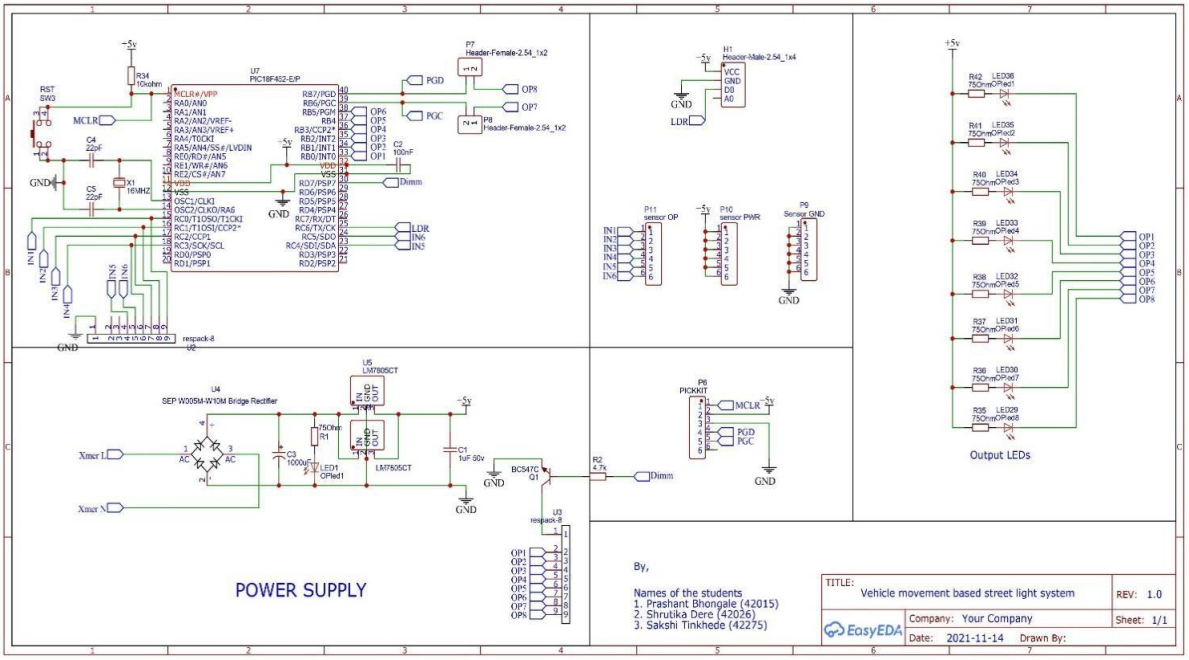

Fig 4(a) System implementation

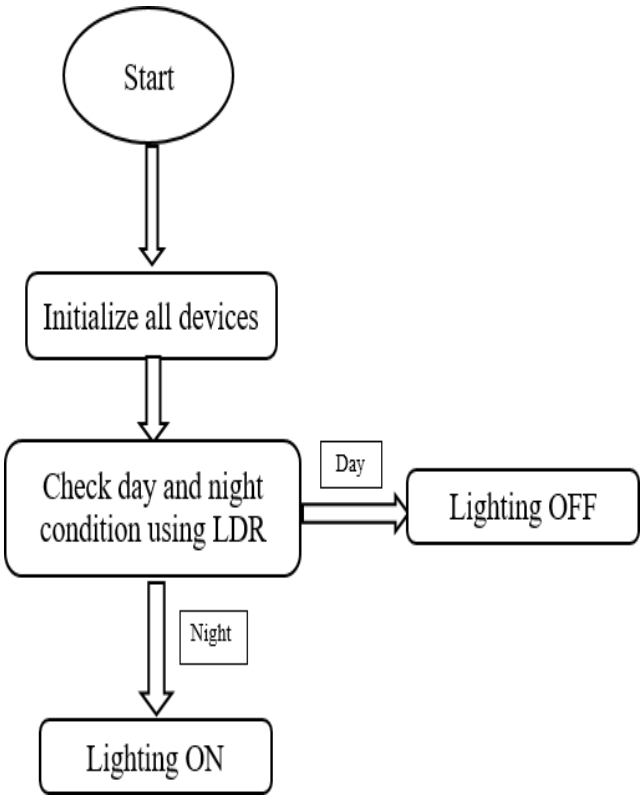

Fig 4(b) Flow Diagram of LDR system

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A. LDR system

First we initialize all devices and power supply is provided toLDR. Using LDR we check whether it is Day or Night. Variation in resistance state whether it is morning or night. When there is low resistance from LDR it means there is morning and automatically all LEDs turn OFF. And when there is high resistance from LDR it means there is night so automatically LEDs turn ON.

B. Vehicle Detection System

First initialize all devices and power supply is provided to PIR sensor. If any vehicle crosses the PIR sensor that data passes to pic microcontroller and provide maximum intensity of LED. If vehicle not crosses the PIR sensor, that data passes to microcontroller and provide minimum intensity of LED.

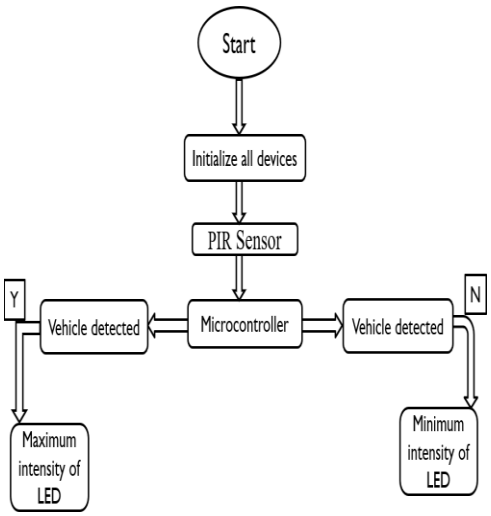
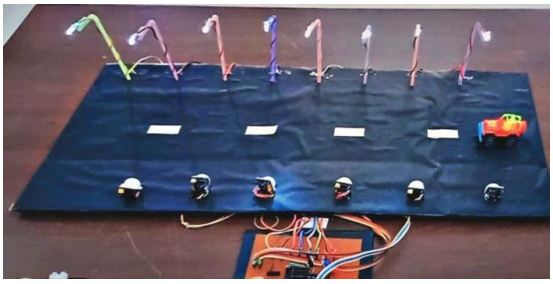


Fig 4(c) Flow Diagram of Vehicle detection system

V. RESULTS



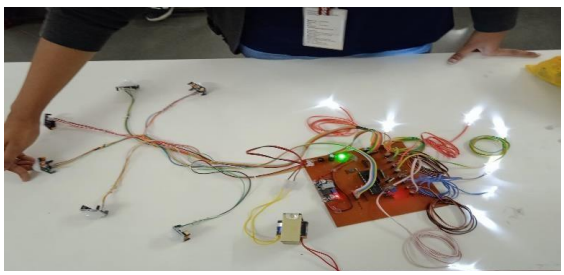
In this Project, the setup of the whole research work is depicted in a step by step manner. Sample screenshots are displayed once the components are fixed and connected to each other. All the components are connected to each other and thus completes the system setup which helps one to understand the steps in a simple and easy way.

The six PIR sensors are placed next to each other. The PIC18f452 is about to be mounted and connected to the external power supply for the flow of current. All the six PIR sensors are going to be connected to the PIC. All the wirings with the breadboard are installed.

VI. CONCLUSION

This paper proposes the design and implementation of a Vehicle Movement Based Street Light System. A simulation of the proposed system was tested in Proteus design suite. The project has been studied and designed using PIC18F452. This work includes the energy saving systems. The main benefit of the present system is power saving. It requires the initial cost only for designing and setting up and not for utilization. Therefore, such systems are very much useful for the government to reduce the utilization of conventional power. As a result, such systems are once implemented on a large scale can bring significant reduction of the power burning up caused by street lights.

This initiative will help the government to save this energy. In addition to energy consumption, another advantage is it provide maintenance cost. The concept can be developed further to implement this system on normal roads, garden, parking, balcony, staircase, etc. With the widespread emergence, the automatic and intelligent control schemes are required to, controlthe complex lighting system due to growth of cities and standardof living the Vehicle Movement Based Street Light System can positively impact on power consumption of electricity.



REFERENCES

[1]. "Automatic Street Light Intensity Control and Road Safety Module Using Embedded System" International Conference on Computing and Control (ICCCE 2012), 12 & 13 April, 2012.

[2]. S. A. Bhosale and T. Ankalkote "Modern

Street Lighting System with Intensity Control based on Vehicle Movements and Atmospheric Conditions using Zigbee,"2018 International Conference on Information, Communication, Engineering and Technology(ICICET),2018.

[3]. N. Yashaswini , N. Raghu, S. Yashaswini and G. Prathib Kumar, "Automatic Street Light Control by Detecting Vehicle Movement," 2018 3rd IEEE International Conference on Recent Trends in Electronics, Information & Communication Technology (RTEICT), 2018

[4]. P. C. Veena, P. Tharakan, H. Haridas, K. Ramya, R. Joju and

[5]. T. S. Jyothis, "Smart street light system based on image processing," 2016 International Conference on Circuit, Power and Computing Technologies (ICCPCT), 2016

[6]. 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

[7]. S. M. Qaisar, W. M. Alzahrani, F. M. Almojalid and N. S. Hammad, "A Vehicle Movement Based Self-Organized Solar Powered Street Lighting," 2019 IEEE 4th International Conference on Signal and Image Processing (ICSIP), 2019.

[8]. "Intelligent Street Lighting System" International Journal of Engineering Science Invention ISSN 319 – 6726Volume 2 Issue 3 March. 2013.