Automated street lights

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Abstract **—.**The main objective is to design energy efficient smart streetlight for energy conservation in existing streetlights of rural area, urban area and exclusively for smart cities

The system is programmed to automatically turn off during the hours of daylight and only operate during the night and heavy raining or bad weather. Many times we see that street lights are remain switched ON even during day time, this is total of wastes of electricity while India is facing lack of electricity. Another problem is the traditional street lamp e.g. Sodium vapour, Metal halide, Incandescent, Fluorescent lamps consumes more power as compared to new advanced Led Lights. Streetlights can be operated free of cost by using automatic controlled, self-powered, efficient solar LED street light. LDR will be used for this purpose.

Keywords — (Smart LED street light; Solar; Energy efficient Street Lighting; Illumination)

I. INTRODUCTION

In entire world there are more than 300 million of street lights, which emits 100 million tons of carbon dioxide per year.

40% of energy is wasted which costs around 20 billion dollars. Therefore for economical operation of street lights and reduction of carbon footprints, High efficient LED luminaire is the demand and need of time. About India, India consumes 18% of electricity for street lighting and residential lighting in which street lighting takes major part, while India is facing shortage of electricity. In December 2014, Government of India proposed and started to use LED luminaire in streetlights. If all existing streetlight replaced with LED lights then India will be benefited by 5,500 crore of rupees every year and reduction in CO2 emission. This is beneficial by many aspects like economic, environmental, lighting performance, reduction in road accidents, thief and crime. According to statistical data, for residential lighting, every year in India 77 crore of incandescent, fluorescent bulb and 40 crore of CFL bulb are purchased, which consumes around 60 to 100 Watts and 30 to 40 Watts of power respectively, which lasts for one to maximum four years only. Therefore use of efficient, long lasting 10 to 15 year LED lights would be wise decision. LED is considered a promising solution to modern street lighting system due to it is behavior and advantages apart from that, the advantages of LED are likely to replace the traditional street lamp such as the incandescent lamp, fluorescent lamp and High Pressure Sodium Lamp in future but LED technology is an extremely difficult process that requires a combination of advanced production lines, top quality materials and high-precision manufacturing process. Therefore, this paper highlights the energy efficient street lighting design using automated LED lamps. .

Still today almost all street lights are switched manually and thus due to manual error they are not switched at proper time, sometimes streetlights are remains ON during daytime. Therefore time based streetlights are used to turn on and off on preset time, but still this method has disadvantage due to seasonal differences in time of sunset and sunrise.

The above problems of switching can be avoided using light sensor based streetlights in addition with to turn on in heavy rain and cloudy environment.

The proposed smart solar LED streetlight can be operated free of cost with sufficient solar charging. The system can be made more reliable by using auto changeover technique; in which streetlight is automatically switched to utility supply if there is insufficient charge in battery storage.

The battery starts charging in daytime via PV solar panel. With the help of light sensor (LDR), in dusk, streetlight automatically turns on with and battery starts discharging. In-between this if any movement is detected then again intensity will

increase to its maximum. This ensures optimum lighting as well as energy saving.

II. LITERATURE REVIEW

1. Ravi Kishore kodali and Subbachary Yerroju presented a paper on Energy efficient smart street light [1]. over Singh, IEEE Sr. member has used an automatic microprocessor with solar cell [2]. Bilam Roy has proposed a street light optimizer [3]. Prakash developed an Intelligent Street Lighting system for smart city based on IoT [4]. Dhiraj sunehra has presented an Automatic Street Light Control system using Wireless Sensor Networks [5]. Devi kumar has presented cpld solar power system.[6].J mohenikolava has presented on paper on Energy Savings.[7].M.A wazid has done work on fabrication of Automated Street lights.[8]. R. Priyasree, R. Kauser, E. Vinitha and N. Gangatharan have done work in, Automatic Street Light Intensity Control and Road Safety Module Using Embedded System,[9]., K. S. Sudhakar, A. A. Anil, K. C. Ashok and S. S. Bhaskar,presented paper in Automatic Street Light Control System, International Journal of Emerging Technology and Advanced Engineering, Vol. 3, [10].

III. METHODOLOGY/EXPERIMENTAL

A. Components

We are using following components in our project

1.LDR

The theoretical concept of the light sensor lies behind, which is used in this circuit as a darkness detector. The LDR is a resistor as shown in Fig. , and its resistance varies according to the amount of light falling on its surface. When the LDR detect light its resistance will get decreased, thus if it detects darkness its resistance will increase.and current will not flow through it.

Fig 3.1 LDR

2. Solar Panel

A solar cell is a device that converts light into electricity via the 'photovoltaic effect'. They are also commonly called 'photovoltaic cells' after this phenomenon, and also to differentiate them from solar thermal devices. The photovoltaic effect is a process that occurs in some semiconducting materials, such as silicon. At the most basic level, the semiconductor absorbs a photon, exciting an electron which can then be extracted into an electrical circuit by built-in and applied electric fields.

Fig3.2 Solar panel

3. Transistor

Transistors are devices that control the movement of electrons, and consequently, electricity. They work something like a water faucet -- not only do they start and stop the flow of a current, but they also control the amount of the current. With electricity, transistors can both switch or amplify electronic signals, letting you control current moving through a circuit board with precision.

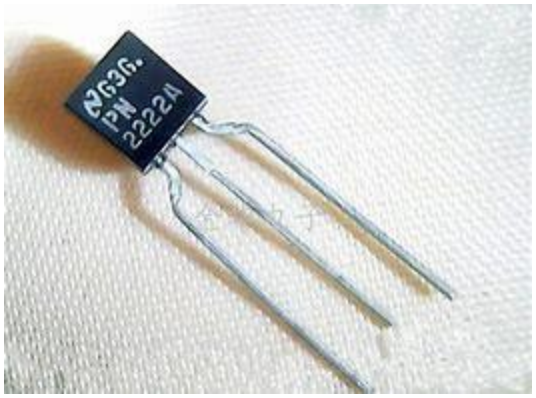
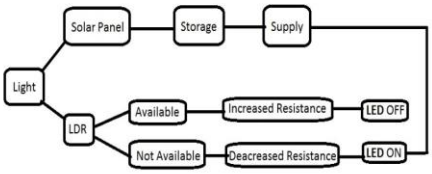
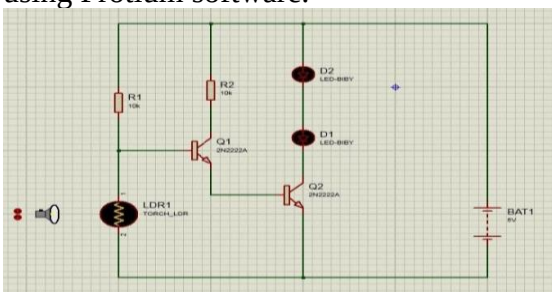


Fig3.3 Transistor

B. Block diagram/Circuit Diagram



The above block diagram shows the basic structure of our project .The circuit diagram below will be performed. The circuit diagram is drawn using Protium software.



IV. RESULTS AND DISCUSSIONS

The project aims were to reduce the side effects of the current street lighting system, and find a solution to save power .Solar energy is the best source of renewable energy.

V. HELPFUL HINTS

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VI. LIMITATIONS

In our project we are using SPDT so it need manual control.

VII. FUTURE SCOPE

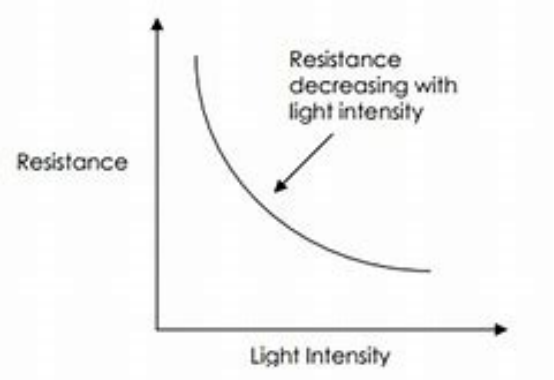
Relay could be used instead of SPDT in the project. Servo motor can be used for movement of solar panel for full utilization of solar energy.

VIII. CONCLUSION

This is the design and implementation of Automatic Streetlight /Light System. This system was designed to automatically detect Light and switch one's light. This design can be used in different areas like Streetlights, Public parks, and lights outside of houses etc.

By using this system energy consumption is also reduced because nowadays the manually operated street lights are not switched off even after the sunlight comes visible and also switching ON earlier before sunset. In this project no need of region and cut-off region. The working manual operation like ON time and OFF time setting. This project clearly demonstrates the working of the transistor in saturation of relay is also known. Implementation of this project encourages digital work.

APPENDIX



ACKNOWLEDGMENT

THE AUTHOR WOULD LIKE TO THANK VISHWAKARMA INSTITUTE OF TECHNOLOGY/.

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