

INTELLIGENT STREETLIGHTS FOR HUMAN SECURITY

S.Dhanasekaran

K.Aishwarya

M.Mareeswari

Kalasalingam University

Kalasalingam University

Kalasalingam University

Tamilnadu, India

Tamilnadu, India

Tamilnadu, India

P.Priya

R.G.Muthumari

V.Vasudevan

Kalasalingam University

Kalasalingam University

Kalasalingam University

Tamilnadu,India

Tamilnadu,India

Tamilnadu,India

ABSTRACT: In hillside, forest area regions it is hard to be without lights outside. So it is good to have automatic streetlights if it becomes dark as the climate in such regions change frequently. And also, In recent days, it is an utmost duty for all of us to save electricity, which is the most important resources for our life. Life without electricity can never be imagined by anyone who have always enjoyed the comfort of electricity. So it is very important to conserve the electricity. A good amount of current can be saved only from bulk electric current consuming devices. Applying energy saving concepts in streetlights like devices is a best example to do the energy conservation. In this research work, it is conveyed that electric current can be saved to the maximum from the street lights that are consuming power on a regular basis. This concept is not only applicable for street lights but can also be implemented to garden lights in houses, hotels or in any kind of power consuming light devices. Moreover the usage of only the LDR without the timer will make this research a more security provider to the users by making a automatic streetlight glow system. The security provided by this system is more powerful more than any other system too. Using the LDR(Light dependent Resistor) it is possible to implement this kind of an effective power saving method. The research work implementing LDR technique in many street lights at many places can considerably reduce power resources and it can be used for power saving in many aspects.

KEYWORDS: LDR, ATMEGA16 microcontroller, Relay, Streetlight, Switch, Power Supply.

I.INTRODUCTION

In the current scenario ,even if many places uses automatic timer ON and OFF system, still many places lack in implementing this automatic system . Manual method of switching ON and OFF of the system always is not on right timing and hence results in more usage of the electricity. Already it is estimated that electricity resources on the entire planet is available in very small limits and hence it is a big question mark in the minds of many that, will the currently present electricity resources will be available for many more years to come for our future younger generations . Hence the burden of saving the electricity current is a very important task for the present generation. With the bulk saving of electricity current from many glowing street lights, it is very useful for the purpose of the conservation of energy .This project not only can be limited with street lights but also can be extended to be implemented in balcony lights, garden lightings etc. Overall the effective consumption of the electric current to a far maximum extent is possible using the energy saving concepts for the street lights .

The project is mainly focused on a very cost efficient resistor called the **LDR** also known as the **Light dependent Resistor** which is used to glow the bulb ON and OFF even during the timer ON period .This is because of the working principle of the LDR. The LDR works on the principle that the resistance of the LDR is high only when there is total darkness and when there is even a slight light the LDR resistance drops

down to zero and the power circuit to the glowing bulb will be cut off . This means that when there is lot of lights in the surrounding, the street lights won't glow. Hence a considerable amount of electric current from the street lights are saved , contributing a large amount of conserved energy resources. This concept when applied on the street lights for glowing on the regular basis , a very huge amount of electric current can be saved. When coming about to the cost, it is very efficient than the existing system. And so, the cost efficient way of the system used in this research work is more efficient way of conserving the fast depleting electric current resources.

II.INTELLIGENT SYSTEM

The smart way in which the streetlights work automatically and also in a way in which it understands its surrounding environment, and the light only glows based on it. Due to this factor our research work is termed as intelligent. As of now, the existing streetlight controllers are working only based on automation but lack in understanding its surroundings. Hence our system is much more efficient in saving the energy resource than any other already existing methods.

III.RELATED WORKS

Till this date, same kind of works like the automatic streetlights using timer system ,

efficient streetlights with sensor technologies, IR streetlights all have failed to make the streetlight glow based on the surrounding environment system. Hence electricity is not that much saved because these systems are not that smart. But this proposed technique makes the streetlight bulb glow based on the surrounding environment (i.e) if the surrounding is already lighted up, the streetlight won't glow saving electricity and will glow only when there is pitch darkness surrounding it.

IV. PROPOSED SYSTEM

Coming into the total flow structure of the device, the research work consist most importantly of the ATMEGA16 microcontroller into which embedded c program is embedded. This microcontroller in then connected with the RTC(Real Time Clock), switches and the LCD display is connected with a 9V battery in mini projects and in the case of a real time project up to 10,000W load can be applied to it. In the ATMEGA16 microcontroller, the LDR(Light Dependent Resistor) is connected, using which the light bulb glow is controlled even during the timer ON condition.

A relay is connected to the switches and from the relay is connected the required bulb to glow ON and OFF. In order to make the users to identify whether the system is working or not, a LED bulb is provided with the ATMEGA16 microcontroller. If the LED bulb glows ,it indicates that the system is working in full fledge. So the workers can identify if the streetlight doesn't glow,

whether the fault is with device or with the street light.

The entire power consumed is much less than the power used by the already existing normal automatic street light system using the timer control alone. Hence when the device comes into cost wise, it is also much efficient than any other already existing automatic streetlight concept.

V. HARDWARE COMPONENTS

1. ATMEGA16 MICROCONTROLLER

ATMEGA16 microcontroller is a highly efficient microcontroller. It is a total length of 8 bit and it belongs to AVR family. RISC(Reduced instruction set company) is the technology behind the ATMEGA16 microcontroller . It consists of a total of 131 instructions and they are implemented in one machine cycle. This executes its work speed at a maximum frequency of 16 MHZ. 16KB programmable flash memory ,EEPROM of 512 bytes and a static RAM of 1KB are present in this ATMEGA16 microcontroller. 48 pins are there in ATMEGA16 microcontroller in which 32(Input/ Output) lines are equally classified into four group each consisting of 8 bit ports which are respectively named as PORT A , PORT B, PORT C and PORT D.

2. LDR

LDR works on the principle that when there is total darkness surrounding the LDR, the

LDR resistance becomes high and when there is even a peak of a light streak falling on the LDR, its resistance drops down to zero. Thus the LDR in this system acts as a light detector.

3.RELAYS

Relays are generally electrical switches controlled by an another switch. These are also called as remote switches. The most important task of a relay is to pull in a low current flow to automate a higher current flow circuit .There are several kinds of relays used in day-today experiments such as the 3-pin, 4-pin, 5-pin, 6-pin, single and double switches. In this research work, a 3pin relay will be used for controlling the higher current circuit. The relay used draws an AC current.

4.POWER SUPPLY

A 9V DC power supply from a battery is used. The positive and negative of the 9V battery is connected to the power supply at the microcontroller kit , to provide the necessary power supply for the device to work.

5.SWITCHES

Switches are generally used to make and break electric circuit connections. In this paper, switches are used to set, reset timer for the ON time and OFF time values and to press enter. Thus the switches act as an increment , decrement and enter positions for the timer .

6.REAL TIME CLOCK

Real time clocks are clocks that exists either in a computer or any electronic device to keep track of the current time. In this proposal paper to ensure the current timing, RTC is used.

VI.AUTOMATIC LDR STREET LIGHTS

LDR acts as the input in this proposed system. Once the device is connected with the battery, the LCD will display asking for the ON time setting and the OFF time setting. When both the ON timing and the OFF timing are set, now the device is ready for its working. When the ON timing reaches, the system program looks whether the current time from the real time clock matches the chosen time. If both the time matches now the bulb which acts as a street light should glow. But this will happen only if there is total darkness falling on the surface of the LDR. When there is total darkness on the LDR from the switch ON time, only will the street light glow. But on the other hand, when there is a single bit of light on the LDR, the streetlight wont glow even when the switch ON time is active.

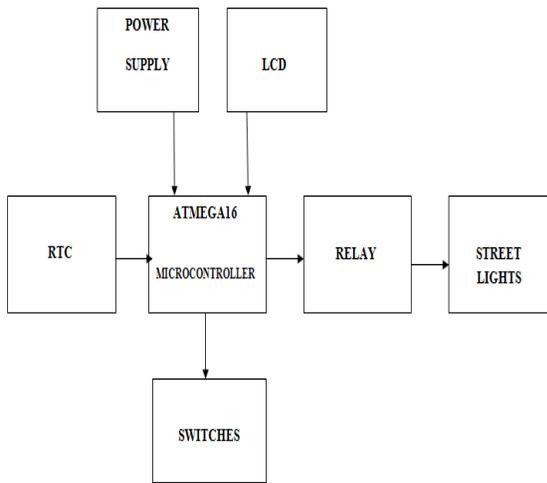


FIG 1.1

This is because due to the presence of light , the resistance of the LDR drops to zero and this will cut the power supply to the electric streetlamp, thereby saving electric current to a far extent.

VII. SECURITY BASED SYSTEM:

The research work is also based on an enhanced version security system. Just imagine a situation in a hillside, forest area where the weather changes are quite visible. The nightfall comes based on situations. hence when the people residing in these places are often scared of harmful insects, thief or even animals. So when the darkness falls so sudden it is not required for the workers to go out in dark, and turn on the streetlights manually. Without the usage of the timer system, and by using only the LDR , it is possible to make an effective street lighting system. With this feature, as soon as the sky becomes dark, the LDR resistance increases and this will make the

streetlight glow automatically once it gets dark. Thus this system is very much useful for the security of the people residing in the hillside, forest side or in ice land regions. This secured system is not only cost efficient but also provides a good amount of security to the people using the system.

VIII. RESULTS AND DISCUSSIONS

The research work proposal is basically implemented to eliminate the loopholes present in the already existing system for the purpose of the conservation of the electricity power resource to a far extent from the daily used street lights. The fig shows the implemented prototype for the system

IX.CONCLUSION AND FUTURE ENHANCEMENT

On a final note ,the LDR based street lights are both an effective and cost efficient system in which power consumption is achieved in a far extend way. This kind of research work can be implemented both in a rural area up to a expensive city area. Hence this is a most efficient way of energy consumption system.

This research work can be enhanced in the future by adopting IOT technique its implementation. the research can be extended in a way that the streetlight glows only when a living object crosses the streetlight. that way the streetlight is not only made SMART but also interactive. Implementing this way , a considerable

amount of electricity is saved on a regular basis for the future generation.

X. REFERENCE

- Sudhakar, K. S., Anil, A. A., Ashok, K. C., & Bhaskar, S. S. (2013). Automatic street light control system. *International Journal of Emerging Technology and Advanced Engineering*, 3(5), 1-2
- Wu, Y., Shi, C., Zhang, X., & Yang, W. (2010, June). Design of new intelligent street light control system. In *Control and automation (ICCA), 2010 8th IEEE international conference on* (pp. 1423-1427). IEEE.
- Priyasree, R., Kauser, R., Vinitha, E., & Gangatharan, N. (2012, April). Automatic Street Light Intensity Control and Road Safety Module Using Embedded System. In *International Conference on Computing and Control Engineering* (pp. 12-13).
- Saad, M., Farij, A., Salah, A., & Abdaljalil, A. (2013). Automatic street light control system using microcontroller. *Department of Control Engineering College of Electronic Technology/BaniwalidBaniwalid-Libya LIBYA, Mathematical Methods and Optimization Techniques in Engineering*.
- Karthikeyan, M., Saravanan, V., & Vijayakumar, S. (2014, March). Cloud based automatic street light monitoring system. In *Green Computing Communication and Electrical Engineering (ICGCCEE), 2014 International Conference on* (pp. 1-6). IEEE.
- Shentu, X., Li, W., Sun, L., & Gong, S. (2010, December). A new streetlight monitoring system based on wireless sensor networks. In *Information Science and Engineering (ICISE), 2010 2nd International Conference on* (pp. 6394-6397). IEEE.
- Yongwei, M. (2007). Huai An city street light intelligence supervisory system outline [J]. *Light & Lighting*, 3, 003.
- Husin, R., Al Junid, S. A. M., Majid, Z. A., Othman, Z., Shariff, K. K. M., Hashim, H., & Saari, M. F. (2012). Automatic street lighting system for energy efficiency based on low cost microcontroller. *International Journal of Simulation Systems, Science & Technology*, 13(1), 1473-8031.
- Pavani, V., & Vasu, G. T. (2014). Street Lighting System with Fault Detection Using ARM7. *International Journal of Emerging Engineering Research and Technology*, 4, 440-443.
- Ambresh, P. A., Ashwini, M., Rodrigues, R. W., & Puspanjali, G. M. (2015). Design of smart automatic street light system. *Indian Journal of Scientific Research*, 28-33.
- Watson, I. A., Braimah, O. A., & Omoregie, A. Design and Implementation of an Automatic Street Light Control System.
- SANI, A. (2011). *DESIGN AND CONSTRUCTION OF AN AUTOMATIC STREET LIGHT* (Doctoral dissertation).