SMART STREET LIGHT CONTROL SYSTEM

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Abstract - T*he main objective of the project is to develop a smart street light system which reduces the consumption of electricity by using effective ways. The project will be designed by using an Arduino UNO board, LDR, IR sensor and Bread board. Smart street lights are effective and extremely dependable. The two sensors, LDR (light dependent resistor) and a IR sensor, the role of these sensors in the project is to detects the intensity of atmospheric light and accordingly the street lights will switched on and also when detects an object coming towards the street light and it sends the message to the serially connected street lights through the cloud so that every street light in the particular serial will be automatically switched on. We will be using Internet of things (IoT) as the main technology in the project, since the main role of this technology is to enable the connectivity between any living or non-living things to the internet.*

Key Words*:* IoT, Arduino UNO, LDR, Street Light.

1. INTRODUCTION

As we know that "Street Lights" are the major power consuming elements in any city. We frequently come across many cases where the street light will be turned ON even in the day time, which is completely against the energy conservation rule. Therefor this type of continous lightning may result in the increase rates and charges of the electricity. The main purpose and use of streetlight is in transportation after the dusk time or when the day atmospheric light is lessin intensity. So, the design and controlling of the street lights is an important field of work for maintaining safe transportation in our daily life. Many researchers have done many numbers of researches in order to provide a less energy consuming street light system. In our project we have made our efforts to present an smart street light system with an reduced energy/power consumption in comparison to the previous and present lighting systems by observing and studying many kinds of street lighting lamps, which include lamps and lights like CFL, incandescent and Light-Emitting diode (LED), where we will be showing that the LEDs are more than any other lighting systems which are present in the current place. A recent study by some researchers has also stated that the operating and working life of the LED is higher when compared to any other lighting lamps and lights, this is the main reason that some of the state government have also started to produce LED lights to give for the people. The Arduino UNO board is used as the brain to control all the process of the project. The sensors and all the other equipments which we will be using shall be connected through the jump wires to the bread and UNO.

2. PROPOSED SYSTEM

The Flow chart of the proposed Smart street light control system is shown in figure 1.

LDR(Light Detecting Resistor)

As we have mentioned earlier in the report, LDR is the one of the main component in the project.so, the main reason and objective of using this LDR because it has a resistance which ususaly changes with the amount of light or the light intensity that falls on the LDR or even absorbed by it, this main feature of LDR makes it as one of the super main component which has to be used in any light sensing devices and projects. The LDR can also be called as light sensitive devices

2.2 IR Sensor

The IR sensor is called as the infrared sensor, we can say that it is an electronic device which can easily measure the heat of the object and also it has the ability to detect the motion, which we can state as motion detection, this kind of sensors only detect and sense the infrared radiation. As, the infrared rays are invisible to our eyes, they can be detected using the IR sensors.

2.3 Arduino UNO

The Arduino UNO is a largely and most widely used microcontroller which was developed by Arduino.cc. The board has both the sets of digital and analog input/output (I/O) pins. The board contains of 14 Digital and 6 Analog pins. It is programmable with the ARDUINO IDE(Integrated Development Environment) with a USB cable. The board can be charged by using a USB cable or also by an external 9 volt battery as it accepts voltages between 7 and 20 volts. The term "Uno" means one in Italian.

2.4 Bread Board

A bread board is called so because previously it was used for the slicing of the bread later a solderless bread board came into use. Since, bread boards are solderless

which means it is re-usable this reason makes it popular among students and many projects, many varieties of electronic devices can be prototyped using this bread board, starting from any analog and digital circuits to the largest CPU(Central Processing Unit).The bread board consists of clips which are called as tie or contact points, the clips will be maintaining a gap of 2.54mm between each one of them. They connect from one pin to the other pin using metal strips.
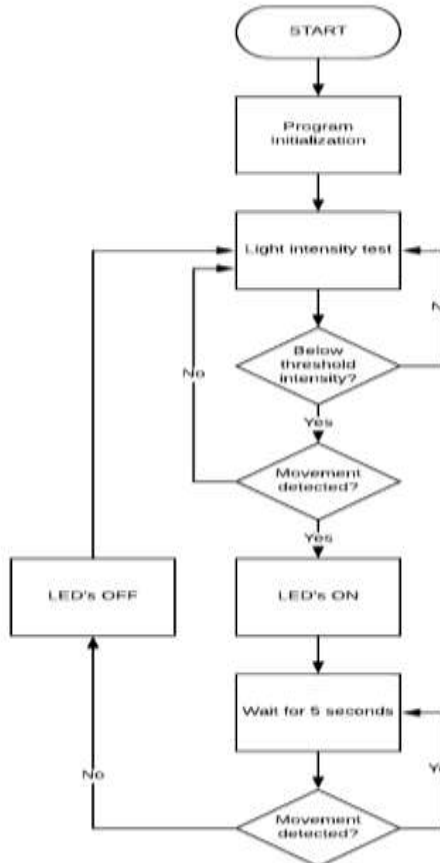

Fig-1: The flow chart of the proposed system

3. EXPLANATION OF THE FLOW CHART

The above shown flowchart breifly and clearly depicts the way on how the project is designed and also how the step by step process of the project and is working. Firstly in the experiment the LDR detects the amount of light energy that it has been receiving or we can also say that it detects the presence of the light that is the reason why it is called as light detecting resistor and when the LDR also detects the light it sends an signal to the microcontroller which in our project is the Arduino UNO board, after receiving the signal from the LDR and microcontroller performs its function which in this case is to switch on the LEDs which are connected to the arduino board through the bread board using jump wires. So, now the lights will be turned ON, and they will be turned OFF again when the LDR or the IR sensor will not receive any kind of input from the light which is the sunlight or the atmospheric light, as during the night time there will be no sunlight or any atmspheric light

the street lights will be tuned ON the whole night, in our proposed system of project we have found a solution even to this problem, which can again be solved using the IR sensor, since the IR sensor can even detects the motion of the objects, we will be using this feature of the IR sensor to reduce the amount of energy that is consumed even in the night time through the street lights as our main aim of the project is to reduce the consumption of the electricity. Let us begin and learn how to use the IR to reduce the power consumption even during the night time, As we know that the IR sensor can aslo detect the motion of the object, so as soon as any vehicle gets closer to the street light the IR sensor which is present in the light sends an signal to the microcontroller which automatically turns ON the street light and also sends the same message to all the street lights which are connected in series, which makes it switch ON all the street lights in the series, and they gets turned OFF when the vehicle leaves, by following this kind of approach we can minimize the consumption of the electricty more and more.
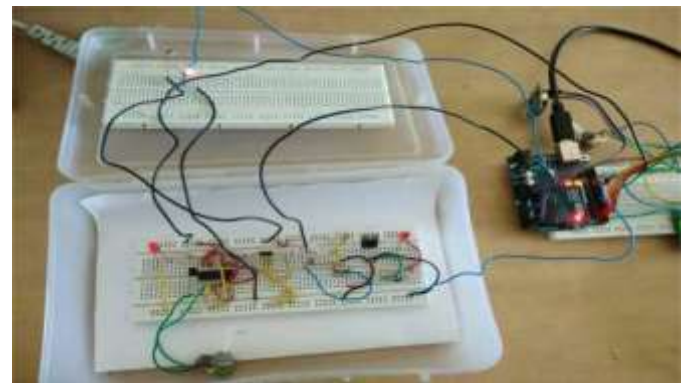

Fig -2: The IR sensor and LDR

Fig-3: The outer look of the Arduino UNO board

Now, we can see both the figures 2 and 3 who play a key role in our project, the final step which is left for us to perform is to connect the Arduino UNO board with the IR sensor and the LDR connected bread board. After making the desired connections we need to check whether our connections are all perfect or not after which we can go to further step of performing the experiment which we have discussed and are willing to perform as mentioned in this report.

4. EXISTING SYSTEM

There are many existing systems in this concept of project but many of them are with major drawbacks and some are with high initial cost and some doesn't have the use of proper software, and also no existing systems have used the IR sensor for object or motion detection and there by making use of it to reduce the consumption of electricity even during the night time, this will definietly bring a new revolution in the electricity consumption and will stand as first project to do so.

5. RESULT

The result of the system, as we have discussed in the earlier pages of the report, the LDR detects the light that has been falling on it, so does the IR sensor and as soon as they detect or obsorb light they will send an signal to the microcontroller which there by turns ON the street light, and also the IR sensor detects the vehicle motion which also sends an signal to the microcontroller when it detects an vehicle and again the microcontroller turns ON the street light. This will be the result of the proposed, Smart Street Light Control System.

6. CONCLUSION

So, we here by conclude that the proposed smart street light control system has many benefits while compared to the existing systems, even though we can't come to an conclusion without testing the project but with the provided flow charts and the diagrams and pictures, we can be confident that the proposed project will perform better han the existing projects and systems. Therefore we can be saving an enormous amount of electricity, this system also prevents the unnecessary wastage of electricity by the manual switching of the street lights which is made possible by the sensors available, this smart street light control system can be installed both in the urban and also in the rural areas. The advantges of this system are reduce in consumption of the electricity and also to increase the life span of the system.

REFERENCES

[1] Akshay Balachandran, Murali Siva, V. Parthasarathi, Surya and Shriram K. Vasudevan, "An Innovation in the Field of Street Lighting System with Cost and Energy Efficiency," Indian Journal of Science and Technology, Vol 8(17), DOI: 10.17485/ijst/2015/v8i17/61261, August 2015.

[2] Neha Patil,A.C.Wani, "Review on Energy Efficient Intelligent Lighting System", International Conference on Global Trends in Engineering, Technology and Management (ICGTETM-2016)

[3] Satwinder Singh,"Review of an energy efficient SmartStreet Lighting System," International Journal of Research (IJR) Vol-1, Issue- 5, June 2014 ISSN 2348-6848

[4] Kajal Ramchandra Mandave, Snehal Prakash Mane, Dhananjay Vinayak Govande and Amol Annapa Kempwade, "Automatic Street Light control",International Journal For Research In Emerging Science and Technology , Vol-3, Issue-4, Apr-2016.

[5] Samir A. Elsagheer Mohamed, "Smart Street Lighting Control and Monitoring System for Electrical Power Saving by Using VANET", Int. J. Communications, Network and System Sciences, 2013, 6, 351-360