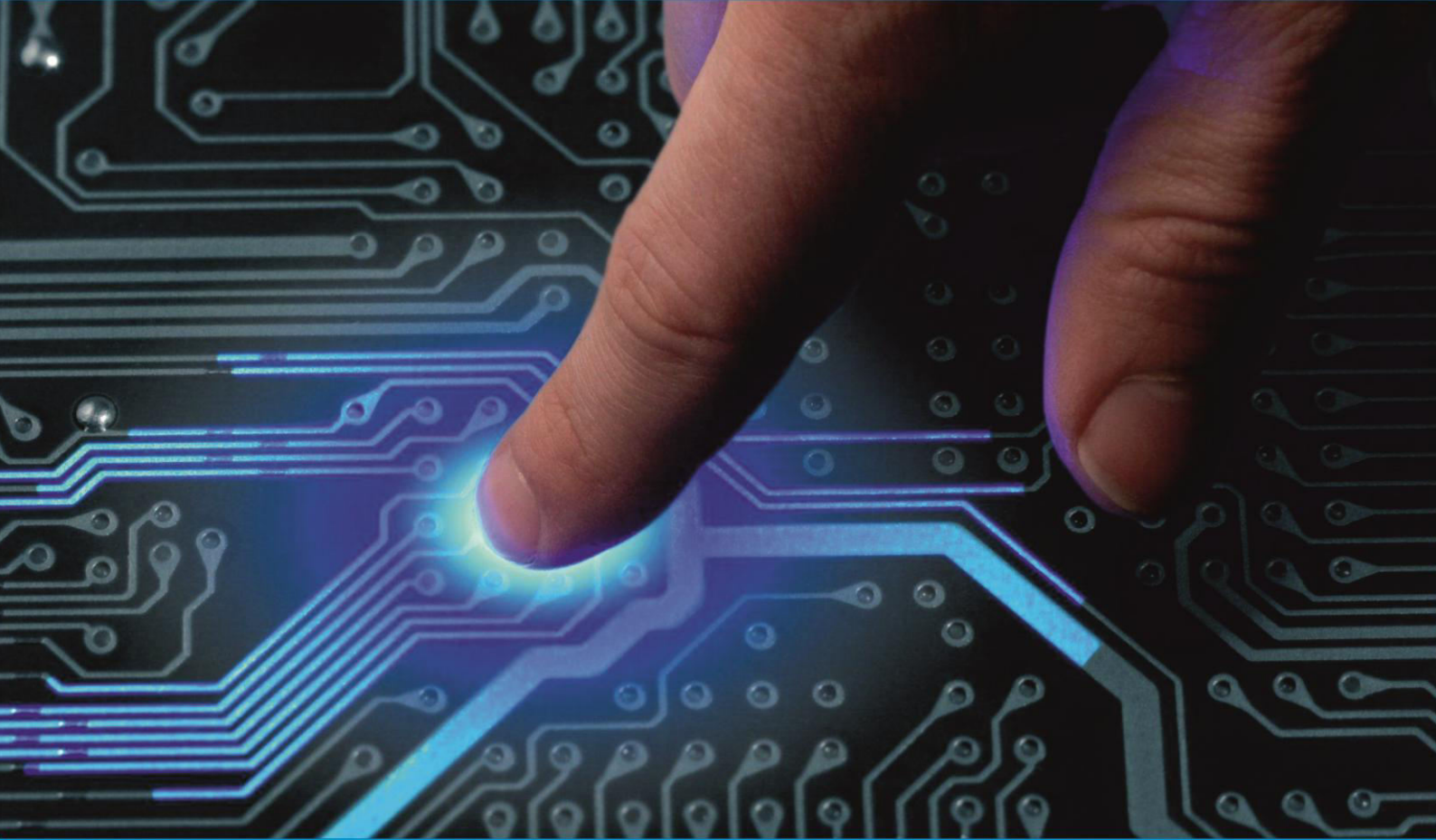




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Survey on Smart Street Lamp System

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ABSTRACT: Traditional Street Light System does not use IOT hence they are manual organized. In most of the states in India, Street Light system are controlled manually. In our proposed project the condition for street lamps is determined by surrounding light conditions. Using surrounding conditions, it is determined whether the street lamp should be powered ON or OFF. The primary objective of Smart Street Light System is to preserve the amount of energy that is being consumed by the traditional street lamps. When the IoT based Smart Street Light system is in well-lit environment it adjusts the lamps to shut down automatically, and power them ON when it detects less lightning conditions. The light intensity is adjusted by the environment to match the conditions. The energy is also conserved at night time also. As our project will be using IR sensor, which will detect movement of any objects or cars or vehicles in the surrounding, then the system will allow the lamps to glow more than usual. The intensity will be increased automatically by detecting the environmental conditions such as peoples, cars, animals, etc. When no one will be around at night, the LED lamps will glow in dim light Thus, the energy is conserved and it does not distribute the energy where it is not needed.

KEYWORDS: IR sensor, LDR Sensor, LED Bulbs, Arduino kit. IoT

I. INTRODUCTION

Essentially, street lighting is one of the most important parts of the city's infrastructure. The main task of a street light system is to light up city streets during the dark hours of the day. Previously, the number of roads in the city and town was very small, but now due to increase in population and technology, the infrastructure of country needs to be increased. Therefore, automated street lights are extremely important. There are a number of factors that need to be considered in order to build a IoT based Smart street lighting system such as night-time security of public and road users, providing affordable lighting system, reducing use of energy resources and reducing the impact on the environment. Initially, street lights were handled manually where every street lamp would have a control switch. It was called the first generation of road lightning. After that, another method used was the optical control method which uses a large sodium lamp in their system. It is evident that optical control method is widely used in the world today. Due to technological advances in modern times, street lighting can be categorized according to the installation, operation and use of it. For example, traffic light, street lighting and lighting of urban areas and public facilities. The drawback of traditional street light system is that in many places lights are illuminated until the sun rises, even when they are not really needed, causing wastage of the electricity

IoT based Smart Streetlight system works by implementing the visual control system with the use of a sensitive light dependent resistor (LDR) which controls the street lamps and are powered ON or OFF automatically at the evening and dawn respectively and during night times the IR sensor is used to control LED lamps. IR sensor will scan the surrounding by infrared rays and if any objects, person or vehicle is found, the LED will glow dark. Whole system will work automatically without any human interference. After setting up the IoT based Smart Street light system the government will be able to monitor the log report of the Smart Streetlight system for any security or technical purpose.

II. LITERATURE SURVEY

To sustain energy in street lights we need new and more intelligent systems that will provide us with the necessary lighting conditions and simultaneously reduce the energy consumption. Review of papers based on conservation of energy, solar powers-based lights, PIR sensor-based lights, more energy consumptions-based system, etc. are been reviewed below:

According to research paper [4], they made use of solar energy, to power up streetlamps. The papersuggests that with the use of light dimmer and other sensors approximately 15% -20% energy is saved. As human interference has been reduced the roads have become much safer. With the use of LED, the cost of repairs and rapid replacement of standard lights have also been reduced. The current sensor measures the current change and a comparative study of a single traffic light is performed. With the exhaustion of non-renewable resources, the negative impact on the environment and the need for automation, there is a need for a new range of Smart LED Street lights. The model proposed here is just the beginning. Using clean energy can be added to a solar panel that will provide power when the power is out. We can switch to solar panels to provide power during the night. A central monitoring system can also be introduced where all data from the sensors can be stored and used

According to research paper [3], it aims to demonstrate the evaluation and analysis of the proposed system. A feasibility study by the team describes the needs and constraints considered in the design of the system, as well as an overview of the solution. In addition, the successful implementation of a particular type supports the major development of the project. Lastly, it aims to introduce a holistic view of a profitable and green solution to the energy-saving problem set by street lighting. Urban areas around the world are facing increasing energy consumption and carbon emissions, which have a known impact on climate change. Due to insufficient blurring and low efficiency, the current light on the roads is detrimental in terms of energy use, accounting for a significant portion of government spending. Therefore, it has become a desirable and very important factor to design a new efficient and environmentally friendly lighting system.

According to research paper [1], street lighting system, where light is needed and illuminated when not needed. Currently, worldwide, most electric power is used by street lights, which are automatically turned on when it is dark and automatically turns off when it is light. This is a major pollution of the world and needs to be addressed. Our street lighting system consists of an LED light, a light sensor, a travel sensor and a short-distance communication network. The lights come on before pedestrians and cars arrive to turn off or turn off the electricity when no one is around. It will be difficult for pedestrians and motorists to separate our street lights from standard street lights, because our traffic lights turn on before they come.

According to research paper [5],The current research work is done to design and make high-quality improvements to embedded road energy saving systems. In India in many places a street lighting system is installed and maintained by the municipality. The evening before sunset the streetlights are on and off the next morning. Another feature of automatic timing is also the use of street lighting. In a few places after midnight all street lights are turned on. All of these situations end up wasting energy. To avoid problems associated with the street lighting system, a fully functional automatic system is recommended to perform ON and OFF functions only if required. And the system is smart enough to contact the municipal office if there is a need for adjustment. The proposed system is built using Arduino UNO and Bluetooth devices. Light Dependence Resistance (LDR) and Motion Sensors are used to design the system. The proposed plan has successfully achieved the design objective.

According to research paper [2], it shows use of PIR sensor which is costly. The paper also suggests that using these two ZigBee ideas and WSN's - PIR sensors can make energy more efficient, lower consumed street light systems. There is an easy saving and a high level of data transfer from the device to device in defined systems. ZigBee wireless communication technology communication between multiple devices in WPAN (Wireless Personal Network Network). Zigbee is used in devices where the data rate is low, long battery life, and secure communication is required. The Wireless Sensor Network (WSN) is a small collection of electronic devices containing a controller, IRF transceiver and sensors.

According to research paper [6], they monitor the activity of IoT devices which is installed in city such as traffic lights, CCTV cameras, etc. It reports on the results of the recently completed R&D project, SCALS (Smart Cities Adaptive



Lighting System), which aims to build all components of urban lighting systems / software that allow municipalities to control and control public street lights. The system is able to independently control traffic lights on the basis of the presence of vehicles (buses / trucks, cars, motorcycles and bicycles) and / or pedestrians in certain areas or sections of roads / roads that are of interest to reduce energy consumption. The main contribution of Street Light System is to design a low-cost lighting system and, at the same time, to define IoT infrastructure where each lighting pole is a network object that can increase its size. In general, the proposed smart infrastructure can be seen as the basis for a comprehensive technology development that aims to provide value-added services to sustainable cities. Intelligent design includes a variety of sub-systems (local controls, motion sensors, video cameras, weather sensors) and electronic devices, each of which is responsible for performing specific functions: remote road sections, traffic management, video lighting to detect traffic flow and separation, wireless and wireless data exchange, power consumption analysis and traffic testing. Two experimental sites were created in the project where fine art was tested and verified in real-world situations. Test results show that energy savings of up to 80% are possible compared to the traditional street lighting system.

III. PROPOSED METHODOLOGY

Through the literature survey, we found that most of the existing smart light systems uses a network sensor, which detects movements and transfers the information to all the connected lamps in the network, which results in unnecessary electricity usage by the lamps where object was never even detected. To overcome that we propose to implement the sensors individually around the lamps. Thus, ensuring that only the necessary amount of energy is being utilized.

This method uses two sensors namely LDR and IR. The LDR (Light Dependence Resistance) sensor is used to detect the intensity of the natural light through which we can discover whether the lamps should be powered on or not. And the IR (Infrared) sensor is used to detect the presence of any moving object in the vicinity. These two sensors controls how and whether the lamps should be illuminated.

VI. CONCLUSION AND FUTURE SCOPE

The paper has reached its final stage. The system has been developed with great care and the circuit and its code are flawless and at the same time efficient and achieve its ultimate goal of energy conservation. What is important is that the system makes good use of the available technology to make it work. Also, the program is a developed such that the hardware or code can be easily upgraded. The whole system is secure, no different from its active integration. This system can be very well integrated with various other technologies such as solar skills, counters, power detection, marking system, etc. and will be implemented soon.

This IOT module has a lot of potential and it can be further implemented into lighting systems for public and street lamps. The cost of integration for the project are very low. The high versatility of the module results in significantly reducing the maintenance cost compared to similar models proposed. Hence, this module will help in reducing the overall costs of producing and manufacturing making it functioning in many various lightning tasks and projects.

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