Advance Street Light Based on IoT

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ABSTRACT: In today's world, more electricity is consumed due to street lights. This is due to continuous operation of lighting during the night time. In order to reduce the electricity consumption and wastage of energy, the system has to combine the existing network with intelligence to think for itself. This newly developed concept will enable the street lights to adjust automatically based on the real time traffic conditions and change according to naturalistic conditions (Full moon). This paper is concerned with the development and implementation of Low cost Sensor based Street Lights with dynamic which in turn reduces the energy consumption and CO_2 emission. It consists of IR sensor, PIR sensors, low cost embedded controller and storage device.

INTRODUCTION

Electricity is one of the world's popular demands for individuals, although it can be produced but does not meet the exact demand. In order to solve this, energy must be saved during idle hours and it is very difficult for humans to track and manage it. In today's world, because of its continuous activity during the night, 60% of the electricity generated is used for street lighting. In order to reduce energy use, the street lighting system must be introduced with rich technology. The Dynamic Street Lighting System, which reduces energy waste and CO2 emissions, is discussed in this paper. These lighting levels or intensity will be adjusted dynamically through the sensors and microcontroller according to the current density of the lane. An external feature has also been included in this system, so that street lights will adapt lightning based on the naturalistic features like full moon day, lights will glow half of its normal intensity. In previous days, street lamps where a control switch is set in each of the street lamps were operated manually[1].

The proposed scheme has replaced common bulbs with energy-saving LED lamps that can minimize energy consumption by up to 80%. As well as cars, the smart street light can sense daylight and vary the intensity of the LED street lamps. HID lamps are used as sources of light for illumination. To reduce the use of energy used by street lights, the power consumed by HID lamps and the amount of CO2 emitted from it has increased, the best option is to regulate the intensity of light. The system would need improvements not only in the way energy is supplied, but also in the way energy is consumed effectively, as the world is heading towards smart energy management.

Progress of civilization encompasses everything in human society, and the good transport network is one of the most critical indexes of civilization[2]. This involves bridges, roads and highways that must be properly illuminated so that the safety of people travelling on the

streets is assured to be sufficiently visible. However, even though there is no need for lights, these streets are lightened for almost 13 hours every day. Lighting national highways to small streets requires a great deal of electrical energy and absorbs about 30 percent of every country's total electrical power in lighting the roads and streets. The cost of electrical energy expended on lighting is high. In addition, CO_2 is produced from the use of mercury lamps and sodium vapor lamps, which increases emissions and is therefore not so effective for the life of the lamp. The Smart Street Lighting system is proposed in the view to overcome the drawback of the existing lighting system used. In the concept of smart lightning the energy is utilized in a conserved manner as much possible[3].

Currently, the street lights that are powered by the embedded brightness sensors consume enormous electric energy throughout the world. When it becomes dark, they automatically switch on and automatically switch off when it becomes light. This is and should be altered by the tremendous excess of energy in the entire world. There are several attempts at reducing the waste of electricity from street lights. Often a sensor light is used, which is controlled by the brightness sensor and the motion sensor. When the motion is observed in front of the light and it is dark. However, when a human or a vehicle comes in front of it, it's usually too late to turn the light on. Before a person or car enters, the light should be switched on. The street lighting system has become one of the key issues of people with the growth of the economy and urbanization. The efficient management and energy-saving operation of the lighting system is, however, very necessary in street lighting systems.

In a WSN-based device, information from pedestrians and on-road vehicles is sensed and collected by a sensor array consisting of numerous sensors. It also offers some other services, such as telemetry, noise, humidity, temperature and road information systems related services, smart transportation systems, and smart highways. Only by means of the embedded brightness sensors are current street lights controlled; they turn on automatically when it gets dark and turn off automatically when it gets bright. This is and should be altered by the tremendous excess of energy in the entire world. Some efforts are being made to reduce the waste of electricity from street lights. A light sensor, which is powered by a light sensor and a motion sensor, is often used to minimize the waste of energy. It only turns on for a while when the motion in front of the light is detected and it is dark. However, usually asensor light is too late to turn on when pedestrians or vehicles come in front of it. The light should turn on before pedestrians or vehicles come. Ideally, it is desirable that smart street lights look like usual street lights; no one notices that smart street lights are usual street lights. Smart street lights have turned on whenever anyone sees them.

Presently, in the recent world, a huge amount of electric energy is consumed by the street lights, which is monitored and controlled by means of various sensors. They automatically turn on when intensity of light is low and automatically turn off when intensity of light is high. This reduces the wastage of electrical energy in the entire world. A light sensor, which is operated by the motion sensor and brightness sensor, is used sometimes. It turns on for a while when the motion is observed in a range of motion sensors which are attached with the

light and the surrounding light intensity is low. The street light should turn on before a person or a car comes near the street light. Some industries and universities have designed centrally-managed smart street light systems with the help of centralized host computers. They might be suitable for being applied to a large area or a newly developed area based on the total plan. However, they might not be suitable for being applied to a small area. The smart street light controller, along with a separate sensor and wireless module, must be mounted on the light pole consisting of a microcontroller.

Depending on the object's movements in the street, the smart street light controller mounted on the street light pole can monitor LED street lighting. The captured data cane was moved to the base station where the energy is stored for controlling the smart device using wireless technology. It's possible to run the smart system either manually or automatically[4]. The control system can turn the street lights on and off at the appropriate timings and can also adjust the street light intensity according to the need. The towns are converted to smart cities in all respects, based on the latest technologies. Solutions for handling the underlying infrastructure of physical sensing and actuation resources are needed. So many solutions of this kind can be found within the Internet of Things, primarily at a lower (communication) level (IoT). Street lighting is a costly energy expenditure in a region. Municipal street lighting can be decreased by 50 percent through the Smart Street Lighting System (SSLS). The smart street lighting system is the one that, depending on the situation, automatically turns on and off the lights. It automatically senses the movements of the object within a particular limit. This SSLS proposes the installation of the wireless based system to remotely track and control the original energy consumption of the street lights and take appropriate energy consumption reduction measures through power conditioning and control[5].

In order for smart cities to harness the full potential use of LED street light systems, there still is an open research area we need to dig out. First of all, making the streetlight LED lamps smart and use of a web-based management system can further bring enormous energy savings. Secondly, incorporating energy-efficient electronic sensors and integration of wireless networked modules can furnish an optimal platform for an innovative LED streetlight application. Finally, the use of weather data aware CCT based smart LEDs in streetlights will be an incredible success towards building a user-friendly platform for smart cities, which is our subject in this article. Climate conditions such as rain, snow, and air pollution have serious impacts on road fatalities[6].

Weather risks associated with reduced driver visibility have critical effects on traffic incidents. In particular, urban areas have witnessed traffic accidents today that occur due to the low visibility impact of fog or pollution. Therefore, in order to detect a driver's blind spot when climate risks such as too foggy, rainy, snowy, etc. will cause traffic accidents due to low visibility, we are inspired to build a weather data conscious smart LED street light system. Most of the existing works studied LED streetlight system regulation without taking into account any weather data such as fog or emissions to account for traffic accidents. None of the current works have introduced the weather-conscious smart LED streetlight system to

the best of our knowledge. Works in and investigates the smart LED streetlight system, which also contributes to remote monitoring that is reliable, quick, correct and dynamic. The research proposes a smart streetlight system consisting of brightness sensors, motion sensors and communication networks for short distances that turn on when necessary and turn off or not[7].

CONCLUSION & DISCUSSION

The Word Smart is an acronym for the 5 unique, observable, attainable, important, and time-based elements. The vast and growing set of digital devices is identified by IOT as now numbered in the billions that operate through potentially global networks. As the world grows a little faster, people are drawn to this smart term. India is one of the world's fastest growing economies, taking this as a factor in transitioning to smart technology, namely the Smart Street Light System. The manual streetlight system shines with the full intensity from sunset to sunrise, even when power is available. Saved energy may be used for different uses, such as residential, industrial, etc. By using the LDR sensor, this is achieved. We may turn a light on/off, considering the strength of the light. The system's power supply is the primary supply and a relay is used to transform it. Each city must have an essential street light system. Via an IOT module, we use the project to save electricity. As the world is changing tremendously, it is turning into automation. This is a smart device for monitoring and intelligent decision-making based on reliable field data in real time.

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