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Centralized Monitoring System for Street Light Fault Detection and Location Tracking

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ABSTRACT: This work is about automation of street lighting systems and efficient application of street lights. A critical issue nowadays is the energy crisis taking place in India. The IoT (Internet of Things) is a blooming technology that mainly concentrates on the interconnection of devices or components to one another and the people. As the time being, many of these connections are changing as Device – Device from Human to Device. Finding the faulty street light automatically is become a vital milestone by using this technology. The primary goal of the project is to provide control and identification of the damaged street light automatically. The lighting system which targets the energy and automatic operation on economical affordable for the streets and immediate information response about the street light fault. In general, the damage of the street light is observed by getting the complaints from the colony (street) people. Whereas in this proposed work using sensors these lights working status is easily captured without any manual interaction. So that it reduces manual efforts and the delay to fix problems. So, to reduce such problem we come with the solution wherein automatic detection of street light issues i.e.; whether the street light is working or not will be found at night time and it should send the notification to the authorized person if there is a problem in particular streetlight and also the location of the place where the streetlight is damaged send the information through GSM module with help of GPS module.

KEYWORDS: Street Light, IoT, Control System, Sensors, Power Saving

I.INTRODUCTION

To need to save or conserve energy because of most of the energy sources we depend on, like coal and natural gas can't be replaced. In today's world we all are well acquainted with our nation's energy scenario. We are well aware of fact that not only available power is less than wasted on large scale The wastage is in form of unnecessary usage of lighting, low power factor and similar other factors. As we know major source of energy to produce electricity is hydroelectricity energy i.e. energy is generated using water force which is converted into potential energy which ultimately leads to increase the cost required to produce energy, instead if we use solar energy it would be cost efficient So it is necessary for efficient and renewable energy system that has greater advantages. Most of time we see street lights are ON even after sunrise thus by having an smart system which turns ON and OFF street lights of given time or when ambient light falls below a specific intensity. In our project we are using motion sensors i.e., IR sensors which detect the motion of the object passing through it, using this motion of object LEDs are turned ON using Arduino. Solar energy is the main renewable source utilized from biomass and solar collectors to provide ventilation specifically driven by solar power. To achieve the various concepts have been considered in order to optimize zero carbon emissions with regard to fossils fuel, over the life of a commercial sized building.

Home automation can be defined as a system implemented at a residential place whereby the intention is to make the place intelligent so that energy is conserved and security is maintained. It makes the life of the resident's flexible, healthy and comfortable. Initially systems were developed in this regard but those systems had to be deployed on Internet and heavy machineries like a big Personal Computer. Our system will be free from all these giant components, which, indirectly suggests that our system has a good quality of portability. Most systems would exchange data or would communicate with the help of Bluetooth, ZigBee and GSM. These systems have their own disadvantages. For example, system- implementing ZigBee has too low band width for the data communication whereas the GSM implementing system has too large bandwidth for the data communication. Thus, there is wastage of the essential bandwidth, which

goes without being used. The other systems, which were in use, are, for example Java Based Systems and SMS based systems. Java Based Systems still use web pages, which is a disadvantage if data intranet or Internet is off.

As we are moving towards the Internet of Things (IoT), the number of sensors deployed around the world is growing at a rapid pace. Market research has shown a significant growth of sensor deployments over the past decade and has predicted a significant increment of the growth rate in the future. These sensors continuously generate enormous amounts of data. However, in order to add value to raw sensor data we need to understand it. Collection, modelling, reasoning, and distribution of context in relation to sensor data plays critical role in this challenge. Context-aware computing has proven to be successful in understanding sensor data. In this paper, we survey context awareness from an IoT perspective. We present the necessary background by introducing the IoT paradigm and context-aware fundamentals at the beginning. Then we provide an in-depth analysis of context life cycle. We evaluate a subset of projects. Which represent the majority of research and commercial solutions proposed in the field of context-aware computing conducted over the last decade (2001-2011) based on our own taxonomy.

Finally, based on our evaluation, we highlight the lessons to be learnt from the past and some possible directions for future research. The survey addresses a broad range of techniques, methods, models, functionalities, systems, applications, and middleware solutions related to context awareness and IoT. Our goal is not only to analyses, compare and consolidate past research work but also to appreciate their findings and discuss their applicability towards the IoT.

II.EXISTING SYSTEM

The system has circuit that controls the switching in correspondence to the vehicle movement. The weight also plays a role, where the system controls all the switching activities by taking a note of the weight on the road and correspondingly controlling the brightness and the intensity. In concentration has been laid more on a machine driven system to stimulate the intensity control. Rather than using a IR sensor, an electrical device is used to detect the movement of a person or a vehicle. A microcontroller (msp430) is used to manage all the changes related to intensity control and movement detection. This paper focuses on the dominance of the solar energy considering the motion on the streets and roads. Block of road, that remains illuminated much before any vehicle passes. The system focuses on this problem so as to avoid the wastage of electrical energy. The observation that was made was that throughout the entire night, the street lights are switched on even if there is no vehicle, or a person to pass by that ultimately is a reason for high wastage of electricity. In this paper, two kinds of devices are used primarily which are the lightweight sensor, and the icon electrical device.

III.PROPOSED SYSTEMS

The street light control and fault damage detection with damaged send the information through GSM module with help of GPS module implemented through an Arduino program. The IoT allows for remote sensing and monitoring of machines. It is a sophisticated Artificial intelligence is used in an automation and analytics environment to deliver creative and automated products and services. There frameworks have more accountability, power, and efficiency. IoT has a variety of automation applications, such as smart homes, smart parking, smart highways, and smart lighting. In our country, the corporation street light (HID lamps) consumes more energy, most of the time street lights are switched ON when they are not in use (roads are bare) and there are chances we forget to switch them off and also, we have all seen street light turned ON during the day. However, with the increasing importance for energy conservation and well maintenance are leads to protection of the natural resources for the future. In order to overcome this issue, A smart street light (LED Lights) system can be used to replace conventional street lamp like HID (High-intensity discharge) lamps. Power savings due to increased current luminous efficiency, lower operating costs, high color building index, accelerated start-up, and durability are all benefits of LED lights over conventional technologies. It also makes out the Fault in any of the street light. However, with the increasing importance for energy conservation and well maintenance are leads to protection of the natural resources for the future. In order to overcome this issue, A smart street light (LED Lights) system can be used to replace conventional street lamp like HID (High-intensity discharge) lamps. Power savings due to increased current luminous efficiency, lower operating costs, high color building index, accelerated start-up, and durability are all benefits of LED lights over conventional technologies. It also makes out the Fault in any of the streetlight.
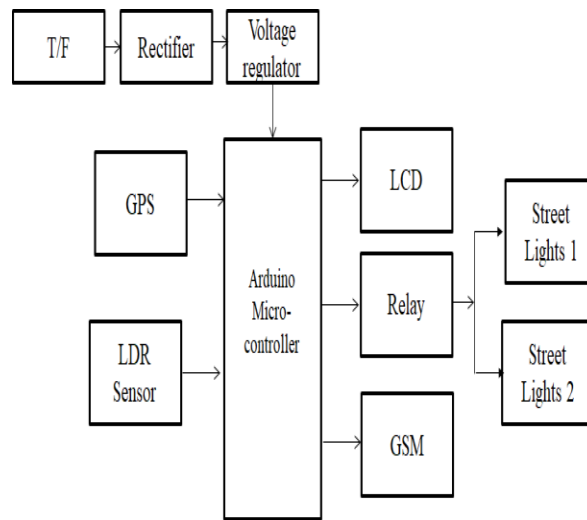
Figure.1.Block Diagram

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Figure.2. LCD

It also makes out the Fault in any of the street light. Since the resources we depend on, such as hydro, thermal, and coal, are finite. Introducing energy-saving elements such as LDR, Relays and LEDs can light up a wide area with high-intensity light whenever required is the primary goal of the device. The Relay is used as an automatic switch that eliminates almost all manual labour LDR (Light Dependent Resistor) is also known as photo resistor, this resistor works on the principle of photo conductivity. . GSM (Global System for Mobile Communication) module is used for texting messages and sending to required mobile number. Here the street light intensityis controlled by the controller.

When the LDRsenses the dark the lights turn ON automatically, if it fails to glow, the GSM module sends the message to respective authorized mobile number. A liquid crystal display (LCD) is a flat panel display, electronic visual display, or video display that uses the light modulating properties of liquid crystals. Liquid crystals donot emit light directly.
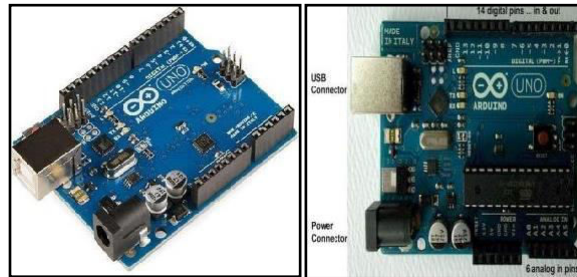

Figure.3. Arduino

Arduino is a computer hardware and software company, project, and user community that designs and manufactures microcontroller kits for building digital devices and interactive objects that can sense and control objects in the physical world. The project's products are distributed as open- source hardware and software, which are licensed under the GNU Lesser General Public License (LGPL) or the GNU General Public License (GPL)[1] .permitting the manufacture of Arduino boards and software distribution by anyone. Arduino boards are available commercially in preassembled form, or as do-it-yourself kits.
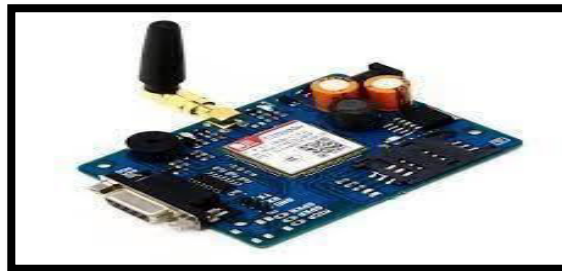

Figure.4. GSM Technology

This was expanded over time to include data communications, first by circuit switched transport, then packet data transport via GPRS (General Packet Radio Services) contemporaneously with GPS, but suffered from incomplete coverage of the globe until the mid-2000s. There are also the planned European Union Galileo positioning system, Chinese Compass navigation system, and Indian Regional Navigational Satellite System.
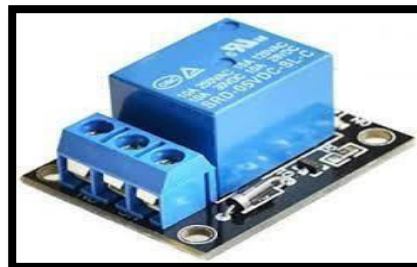

Figure.5.Relay

The working principle of and EDGE (Enhanced Data rates for GSM Evolution or EGPRS). Further improvementswere made when the 3GPP developed third generation (3G) UMTS standards followed by fourth generation (4G) LTE Advancedstandards. "GSM" is a trademark owned by the GSM Association.
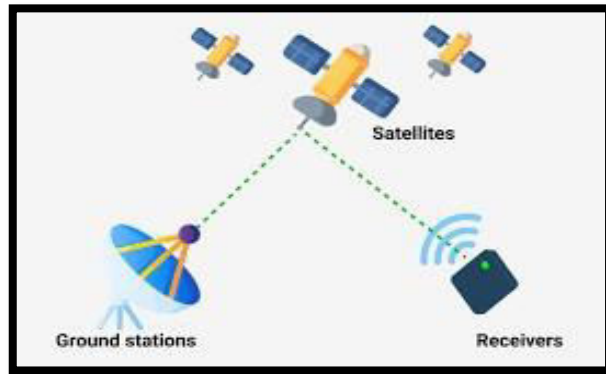
Figure. 6. GPS Tracking

In addition to GPS, other systems are in use or under development. The Russian Global Navigation Satellite System (GLONASS) was developed the relay is that when a certain input quantity (such as voltage, current, temperature, speed, pressure, etc.) reaches a predetermined value, it will work, change the working state of the control circuit, and achieve a given control or protection purpose.
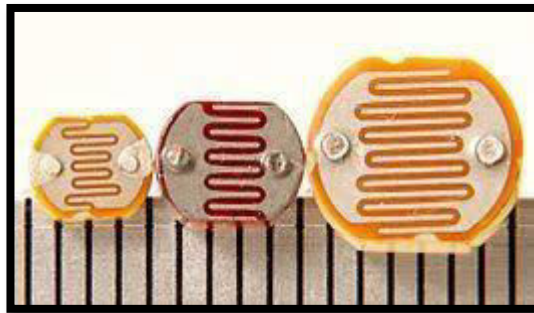

Figure.7.LDR

LDR is an acronym for Light Dependent Resistor. An LDR is a resistor whose resistance changes as the amount of light falling on it changes. The resistance of the LDR decreases with an increase in light intensity, and vice-versa.
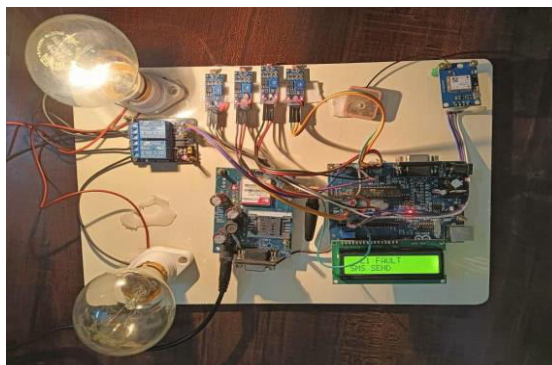

Figure.8. Hardware Model

IV.CONCLUSION

Street lighting has become an essential commodity for human life as it provides lighting in cities, towns and most

especially on roads to reduce risk of accidents at night. Though necessary, streetlight systems not properly managed can result in risk of accidents, excessive loss of energy, financial losses and dissatisfaction of customers. This paper proposes a smart system to manage streetlight operation, relying on sensors and internet of things technologies. The proposed smart streetlight system consisted of hardware and software design. While the hardware makes use of sensors, Arduino board and GPS devices to build an integrated system capable of reporting the state of the street light through available wireless network, the software aspect consisted of an online application, capable of remote monitoring and control.

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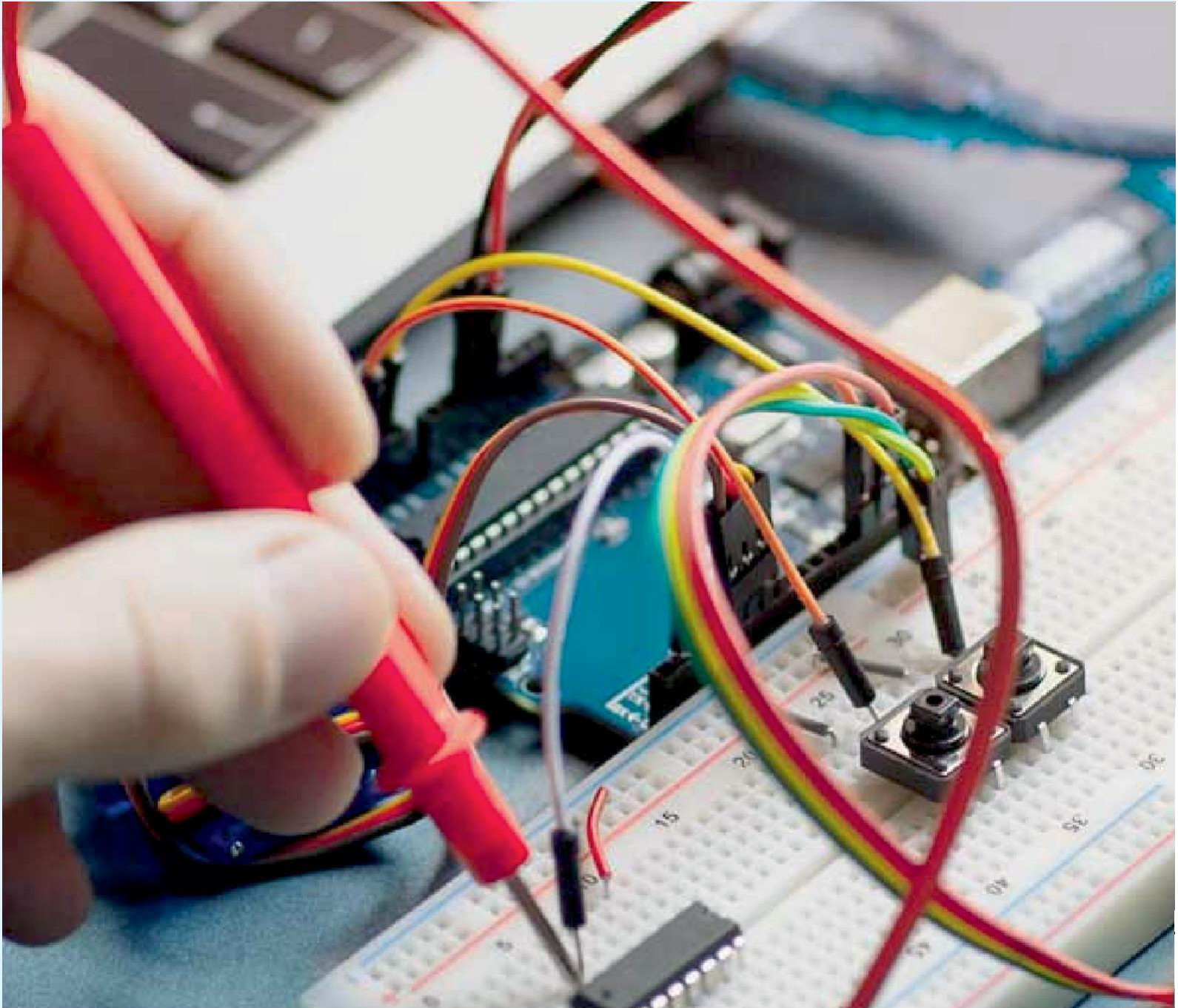
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