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AUTOMATIC STREET LIGHTS

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I.Introduction

I.1 Problem

On remote highways, it is often seen that the lights are on throughout the night even when there are no vehicles on the roads. This wastes a lot or valuable energy, which could have been used for other purposes. In today's world where the demand for energy is increasing and it's supply declining, it is wise to save electricity wherever possible.

I.2 Purpose

The project aims at saving maximum energy possible by switching 'on' the street lights only when vehicles are present on the road. The project also has a dim mode in which the lights will be in low intensity throughout and when the vehicle moves, the intensity in that region increases. Thus the project saves 80%percent of the energy per day. In the dim mode the lights need not be switched 'off ' completely but be kept 'on' at low intensity. Whenever a vehicle arrives it sends a signal to the microcontroller, which in turn sends a signal to the LEDs which are half a kilometer in front of the vehicle. The lights automatically go back to dim mode when the vehicle moves ahead thereby saving energy by 35%.This concept has not been used anywhere.

II. BACKGROUND

The circuit is carefully designed to avoid common problems like overloading, relay chattering and inductive 'kick back' in relay. The main advantage of this system is the reduction of the costs related to energy consumption and maintenance by integrating a vehicle detection algorithm. The introduction of a vehicle detection algorithm reduces the power consumption costs. The report outlines recommendations regarding street lighting, as well as technical specifications for replacement of existing light bulbs with LED fixtures. It provides ways to capitalize on the additional benefits of LED technology.

III. LITERATURE REVIEW

III.1 Hengyu Wu, MinliTang: proposed 'The core technology of the street light control system is an AT89S52 single-chip microcomputer'. It integrates a power circuit, a fault detecting circuit, an infrared detecting circuit, an LCD display circuit, a photosensitive detection circuit, a street light control circuit, a pressed key control circuit and so on. This system can automatically turn on or off the lights and controls the switches according to traffic flow. It expands the fault detect circuit and the corresponding circuit. It also has a convenient and flexible button control circuit to switch on and off functions mentioned above. Main weakness is that it didn't say anything about the working principle behind the system. It also said to use fault detection circuit which when damaged, causes the voltage to drop to zero, thereby creating a problem. Theoretic proof shows only simulation result but not as something that can be used in our daily lives.

III.2 A.C.Kalaiarasan: deals with solar energy based street light with auto-tracking system for maximizing power output. In order to maximize the power output from the solar panels, one needs to keep panels aligned with the sun. As such a means of tracking the sun is required. This is a far most cost effective solution than purchasing additional solar panels. It has been estimated that the yield from solar panels can be increased by 30 to 60 percent by utilizing a tracking system instead of a stationary array. This paper describes an automatic tracking system that will keep the solar panels aligned with the sun in order to maximize efficiency. The sun tracking sensor is the sensing device, which senses the position of the sun time to time and gives the sensing output to the amplifier based on light density of the sun. Here the sun tracking sensor is LDR(light dependent resistor). The amplifier unit is used to amplify the LDR signals, which makes the low level signal into high level signals and this output is given to the comparator. The LM324 IC is used as an amplifier. Comparator compares the signals and gives the command to the AT89C51 microcontroller. The system presented in this paper will be an efficient method to use the solar energy in remote areas. This system consumes very low power and high efficient lightning. We employ the auto sun tracking system; this can improve the energy stored in battery. This

system does not affect the environment because it is pollution free. The system also consists of automatic ON, OFF control of the LED lamp, so there is no manual operation.

III.3 Gong Siliang: describes a remote streetlight monitoring system based on wireless sensor network. The system can be set to run in automatic mode, which controls streetlight according to Sunrise and Sunset Algorithm and light intensity. This control can make a reasonable adjustment according to the latitude, longitude and seasonal variation. Also this system can run in controlled mode. In this mode, we can control streetlights through a PC monitor terminal. In addition, the system integrates a digital temperature-humidity sensor, not only monitoring the streetlight real-time but also temperature and humidity. The system is equipped with the high-power relay output and can be widely applied in all places which need timely control such as streets, stations, mining, schools, and electricity sectors and so on. But in this work a wireless network for streetlight remote control is discussed. In particular, the novelty of the proposal is in the location awareness of nodes, which cannot self-localize themselves. Prototypes have been built using costly hardware. The capability of the ranging measurements(the basis for localization) is not shows some problems in the order of one meter. In near future, location aware routing algorithms will develop that will improve the efficiency of the network.

III.4 GustavoW.Denardin: Street lighting system deals with a control network for a LED street lighting system. The use of LEDs is being considered to be a promising solution to modern street lighting systems, due to their longer lifetime, higher luminous efficiency and higher CRI. The proposed control network enables disconnection of the street lighting system from the mains during peak load time, reducing its impact in the distributed power system automatically decreasing the management cost and monitor the status information of each street lighting unit. Its network layer is implemented using geographic routing strategy, which provides slow overhead and high scalability features. However, due to well-known drawbacks of the existing techniques, a new routing algorithm is proposed. Simulations show that this algorithm leads to a significant improvement of routing performance when applied to large scale scenarios, which is, the case of street lighting system. The obtained experimental results show that the proposed control network is able to meet the requirements of a LED street lighting system. It mainly deals with safer roadways with intelligent light system to reduce power consumption. This system has automatic street light intensity control based on the vehicular movement and switching ON and OFF street lights depending on the light ambiance. This will help in reducing the power consumption during hours of meager road usage. The street light module is installed consequently for every certain distance. This paper also aims at reducing road accidents by detecting consumption of alcohol by the driver. This can be implemented using alcohol sensor module which contains skin sensor, breath alcohol sensor and proximity sensor. The skin sensor and breadth alcohol sensor detects the presence of alcohol content and the proximity sensor helps in detecting any kind of malpractice. The novelty of this paper is to effectively reduce the energy consumption of the street lights by controlling the street light's intensity, sensing both human as well as vehicular movement and preventing injury and death caused by drunk drivers. However this method was too costly and ineffective to be applied on a large scale.

III.5 RadhiPriyasree: explains a system to reduce the power consumption of street lights by avoiding inefficient lighting which wastes significant financial resources each year. This is done by dimming the lights during lighter traffic hours. For this purpose PIR sensors are used which detects any movement. This work aims at reducing the fatal crashes and road accidents caused due to alcohol consumption. This is done by using skin sensors placed in vehicle doors and also using breadth sensors inside the vehicles. By implementing this, death rates due to drunk driving can be reduced to a great extent. It aims at detecting consumption of alcohol by the driver and if it exceeds certain level it impairs the driver from entering into the Vehicle. The prototype has been not been implemented everywhere due to it's impracticality.

III.6 S.H. Jeong: describes the Development of Zigbee based Street Light Control System which control and monitor status of street lights installed alongside load. Lights are switched to ON/OFF by this system's control command. Its local status information is also monitored by control system via communication channel. Status information monitored is on/off status information, control group status information and safety related information energy saving mode status, etc. To transfer control command and status information between street control terminals, various communication media and communication protocols are used. As communication media, wireless or power lines are used generally. Various frequency bands from tens of MHz to Rebrands are

used for wireless case. This Street light control system can save maintenance time, costs and can improve safety level.

III.7 SomchaiHiranvarodom: describes a comparative analysis of photovoltaic (PV) street lighting system in three different lamps. A low pressure sodium lamp, a high pressure sodium lamp and a fluorescent lamp had been installed. All three systems had been mounted with the same module type and wattage in different places within the Rajamangala Institute of Technology, Thanyaburi district, Pathumthani province of Thailand. C ontrol circuit was experimentally done in this work. Protection of the battery from damage for deep discharge and overcharge by a controller was also considered. The life cycle cost analysis (LCCA) is the appropriate method for comparing three different lamps. LCCA was based on the key assumptions (year 2002). The results of comparative analysis of the PV street lighting systems with a fluorescent lamp have been the appropriate system for installation in a typical rural area of Thailand when the cost of lamps, system performance and possibility for purchasing the components of the system have been considered. The results of this work can he stated that the average luminance in lux of the fluorescent lamp at design location, Pathumthani province of Thailand, has a highest value compared to the low- pressure sodium and high-pressure sodium. On the other hand, the lifetime of the fluorescent lamp has a shortest time compared to other lamps. Nevertheless, the aim of this work is to determine the appropriate system to install in a typical rural area or a typical rural village of Thailand when the cost of lamps and system performance and possibility for purchasing the components of the system are compared. while considering in other areas it is difficult.

REQUIREMENTS OF THIS SYSTEM

The system would require the government to install infrared sensors on either side of the road and also have a control point at an interval of about 10 kilometers. The initial cost of setting up the system would be appreciable but the profits would outweigh the initial expenses.

REASONS WHY THIS METHOD IS SUPERIOR TO THE EXISTING METHODS.

Such a system once implemented on a large scale can significantly reduce power consumption by street lights. This initiative will help the government to save this energy and meet the domestic and industrial needs. The other advantages of the circuit are that it is simple circuit, avoids constant supervision and allows flexibility in design. After having implemented this system, what remains is the scope for improvements. Depending on the amount of traffic in a particular direction, necessary controlling actions could be taken.

APPLICATIONS OF THIS PROJECT

[1]. Highways
[2]. Museums
[3]. Corridors