Intelligent Street Light

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Abstract: This project efficiently defines the control of street lightning system and thereby saving electricity as well as helping in monitoring other aspects of environment which is a major concern worldwide. It also describes the use of a reader module for vehicle monitoring and control. The proposed system also has vehicle theft control is also integrated in the system. The proposed system also helps to monitor pollution levels, carbon emission also the sound levels of the vehicles in traffic. The efficiency of the system is designed such that it can be readily installed in present on road conditions with extra cost of controlling computer and the sensors.

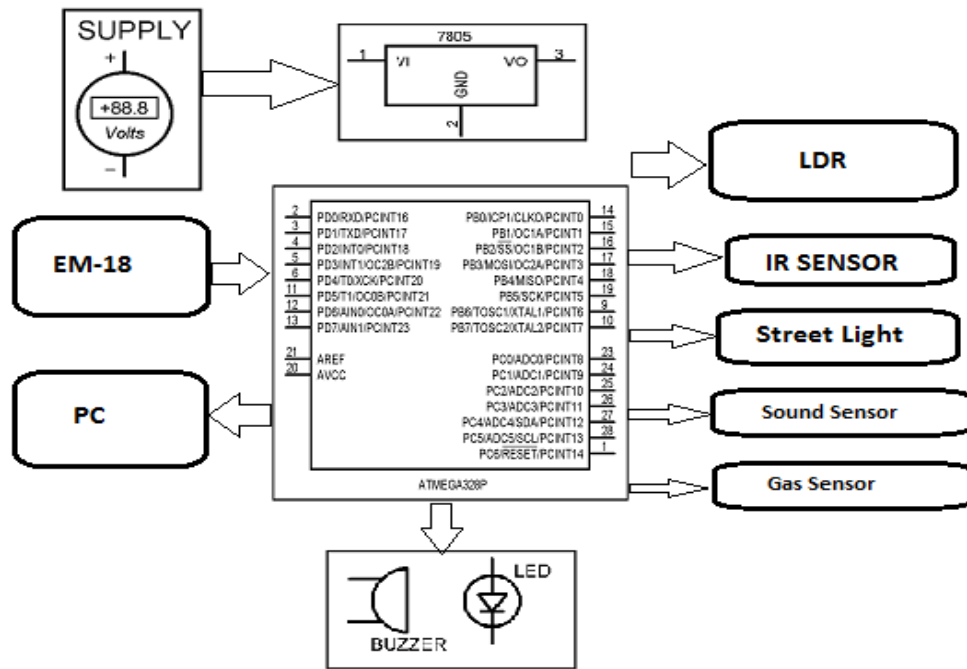*Keywords: Smoke Sensor, Fire Sensor, LDR, Automation etc.*

I. INTRODUCTION

Street light control systems will play an important role in the reduction of energy consumption of the lighting without impeding comfort goals. Energy related emissions are responsible for approximately 80% of air emissions and central to the most serious global environmental impacts and hazards, including climate According to study global grid based electricity consumption for lighting was about 2650 TW in 2005, Intelligent lighting control and energy management system is a perfect solution for energy saving, especially in public lighting management. It realizes remote on/off of lights, which can save energy by 40%, save lights maintenance costs by 50%.proposed system also consist of sensors like sound and smoke sensor which will provide the data for monitoring purpose of pollution and sound levels. System also consist of reader module which tracks the RFID of the vehicle and send the data to control room if the vehicle is stolen.

II. LITERATURE SURVEY

Now a days the various levels of pollution are increasing at a alarming rate may it be the contamination or may it be the sound levels there is need to constantly monitor these levels as of now there are no probable steps taken for such purposes. Currently there are cameras installed at junction but not the sensors which provide vast amount of data. In the proposed system there are two sensors which help in monitoring the sound and smoke levels which are necessary because they show what contamination how much contamination and also the decibels of sound .Also theft cases are increasing to stop this no technical solution is found yet except for the installed cameras, proposed system contains the reader module which help in vehicle tracking.

III.PROPOSED SYSTEM

The proposed system consist of EM 18 reader module which is the module that detects the unique id of a RFID tag which according to the proposed system will be built into the vehicle, as the vehicle passes across an reader module ,the module will display the number to a monitoring computer. This computer can be in a police HQ where a person can lodge a complaint and status of that vehicle no can be changed to stolen which when passes through a reader module will indicate on the screen using this system a stolen vehicle can be found. For the environment purposes there are sensors mainly sound and a smoke sensor these will also collect data and send to a computer for monitoring use, as the name suggest sound sensor will continuously feed the computer with current data of how many decibels of sound is being produced, also the smoke sensor will continuously feed the computer with current data of percentage of contamination in the air due to the smoke that is produced by the vehicles.

The proposed system contains a Light dependent resistor which detects a change in intensity of light on it and hence toggles the street light according to requirement also there are IR LED which help in motion tracking either of vehicle or of human presence according to the need both above component will toggle the street light as needed which in turn will save the amount of unnecessary electricity that is wasted on a daily basis which also help in decrease in harm to the environment.

IV.SYSTEM ARCHITECTURE
We have used ATMEGA328 controller. Among ports, port 4 to 9 are connected to the LCD, port 1 and 11 are connected to arduino adapter of the project .port 2 and 3 and 10are connected to led. We have used 16*2 LCD.LCD displays status of the project such as, message received from sensors which are the sound and smoke levels and also the RFID code of vehicle that has passed the street light. EM-18 Reader Module is used to read the data from RFID tags that are present in the vehicle according to the proposed system. The MAX232 is uses TTL logic. It interfaces the modem and Crystal circuit is used for generating frequency. This frequency is commonly used to keep track of time to provide a stable signal for circuit. Crystal circuit is also used for prevention in delay. So that it is connected near to the microcontroller. As more the distance, more the delay. Along with Crystal oscillator, two capacitor is connected for preventing crystal oscillator from damage. Reset circuit is used for resetting the whole circuit. After pressing the reset switch the whole circuit will be set to the initial position. Along with that one capacitor is used. And it prevent from any time resetting the entire circuit. In power supply section, 230 V are converted into 5 V using step down transformer. Bridge rectifier is used to convert the AC signal to DC signal. The capacitor is used to convert the pulsating DC to pure DC. 5 V are used for the LCD section. And 230 V are used for transmission section and fault section. there is a LDR present in the proposed system so that the street lights turn as sunsets and also there are ir led's which track the movement of vehicles or human activity and sends this data to microcontroller so that the area in which there is activity the lights of that specific areas light up. Also when the RFID tags surface across the reader module the RFID serial no is stored jond can be used to find the vehicle that might be stolen. This serial id can be seen on 16*2 LCD display as well as in the control room .New systems must provide the following features

- Pollution monitoring
- Sound level monitoring
- Theft control
- Energy(electricity) saving

4.1 Description of Modules.

- ATMEGA328 microcontroller

   The Atmel ATmega48/88/328 is a low-power CMOS 8-bit microcontroller based on the AVR enhanced RISC architecture. By executing powerful instructions in a single clock cycle, the ATmega48/88/328 achieves throughputs approaching 1 MIPS per MHz allowing the system designed to optimize power consumption versus processing speed. Some features of ATMEGA328 are

   1. Scalable
   2. Same powerful AVR microcontroller core
   3. Low power consumption
   4. Both digital and analog input and output interfaces
   5. 28-pin AVR Microcontroller
   6. Flash Program Memory: 32 Kbytes.
   7. EEPROM Data Memory: 1 Kbytes.
   8. SRAM Data Memory: 2 Kbytes
   9.

- RFID MODULE

   Radio Frequency Identification, or RFID, is a rapidly-emerging identification and logging technology. Whether or not you have come across RFID systems in your work, you have probably encountered RFID in your daily life, perhaps without even being aware of it. At their simplest, RFID systems use tiny chips, called "tags" to contain and transmit some piece of identifying information to an RFID reader, a device that in turn can interface with computers. To begin understanding RFID, think of a conventional Point-of-Sale barcode reader scanning grocery barcodes. In its simplest form, an RFID system is much the same: it also can identify a package. However, unlike barcodes, RFID tags don't need a direct line of sight: within limits, we can now scan an unpacked skid of boxes. Next, think of RFID tags as mini databases, or as barcodes that can accumulate information as they travel. At this point, RFID diverges qualitatively from bar-coding, giving it great new potential. Radio-frequency identification (RFID) is a technology that uses communication through the use of radio waves to exchange data between a reader and an electronic tag attached to an object, for the purpose of identification and tracking

- IRLED

   An IR LED, also known as IR transmitter, is a special purpose LED that transmits infrared rays in the range of 760 nm wavelength. Such LEDs are usually made of gallium arsenide or aluminum gallium arsenide. They, along with IR receivers, are commonly used as sensors. The appearance is same as a common LED. Since the human eye cannot see the infrared radiations, it is not possible for a person to identify whether the IR LED is working or not, unlike a common LED. To overcome this problem, the CAMERA on a cell phone can be used. The camera can show us the IR rays being emanated from the IR LED in a circuit.

   Features of IRLED
   - Extra high radiant power
   - low forward voltage
   - suitable for high pulse current operation intensity
   - high reliability
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- Photodiode

   A photodiode is a type of photo detector capable of converting light into either current or voltage, depending upon the mode of operation. Photodiodes are similar to regular semiconductor diodes except that they may be either exposed (to detect vacuum UV or X-rays) or packaged with a window or optical fiber connection to allow light to reach the sensitive part of the device. Many diodes designed for use specifically as a photodiode will also use a PIN junction rather than the typical PN junction.

CONCLUSION

In this paper of "INTELLIGENT STREET LIGHT SYSTEM" we have concluded that it is a cost effective, practical, eco-friendly and the safest way to save energy. It clearly tackles the two problems that world is facing today, saving of energy and also disposal of incandescent lamps, very efficiently. The system also reduces man power and in addition provides security. The idea can also be implemented in highways to light up the lights. They can also be implemented in check posts. According to statistical data we can save more than 40 % of electrical energy that is now consumed by the highways. Initial cost and maintenance can be the draw backs of this project. But, with the advances InTechnology and good resource planning the cost of the project can be cut down.

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