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WINGS TO YOUR THOUGHTS.....

STREET LIGHT GLOW ON DETECTING VECHILE MOVEMENT USING SENSOR

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Abstract: *This paper illustrates the street light glowing system on vehicle detecting movement. Controlling of street light is of utmost importance in developing country like India to reduce the power consumption. This paper presents a street light control system which combines various technologies: a timer, a statistics of traffic flow magnitude, photodiodes, Light Emitting Diodes (LED), power transistors.IR Sensors used on either sides of the road send logic command s for the LEDs at the output to get glowing for a patch ahead Intensity control is also possible by pulse width modulation based on sensing the movement and density of vehicles. Thus this way of dynamically changing intensity or off to on helps in saving a lot of energy. A programmable microcontroller is engaged to provide different duty cycle for different intensities at different density conditions.*

Key Words: *Street light, Sensor, Movement of Vehicle.*

1. INTRODUCTION

An Embedded System is a combination of computer hardware and software, and perhaps additional mechanical or other parts, designed to perform a specific function. An embedded system is a microcontroller-based, software driven, reliable, real-time control system, autonomous, or human or network interactive, operating on diverse physical variables and in diverse environments and sold into a competitive and cost conscious market[1]. An embedded system is not a computer system that is used primarily for processing, not a software system on PC or UNIX, not a traditional business or scientific application. High-end embedded & lower end embedded systems. High-end embedded system - Generally 32, 64 Bit Controllers used with OS. Examples Personal Digital Assistant and Mobile phones etc .Lower end embedded systems - Generally 8,16 Bit Controllers used with an minimal operating systems and hardware layout designed for the specific purpose[2]. Examples are small controllers and VMicrowave Ovens, where they are embedded in. Embedded systems are widespread in consumer, industrial, commercial and military applications. Telecommunications systems employ numerous embedded systems from telephone switches for the network to mobile phones at the end-user. Computer networking used educated routers and network bridges to route data Consumer electronics include personal digital assistants (PDAs),mp3players,mobilephones, videogameco nsoles, digitalcameras, DVDplayers, GPS receivers, and printers. Many household appliances, such as microwave, washing machines and dishwashers, include embedded systems to provide flexibility, efficiency and features.

2. EXISTING SYSTEM

Industry of street lighting systems are growing rapidly and going to complex with rapid growth of industry and cities. Automation, Power consumption and Cost Effectiveness are the important considerations in the present field of electronics and electrical related technologies. To control and maintain complex street lighting system more economically, various street light control systems are developed. These systems are developed to control and reduce energy consumption of a town's public lighting system using different technologies. The existing work is use the High intensity discharge lamp (HID). HID presently used for urban street light are based on principle of gas discharge, thus the intensity is not been controllable by any voltage reduction method as the discharge path is broken.

Disadvantages of Existing System:

- HID lamps consume more power.
- The life time of the HID lamps is very less.
- It cannot be used in all outdoor applications.

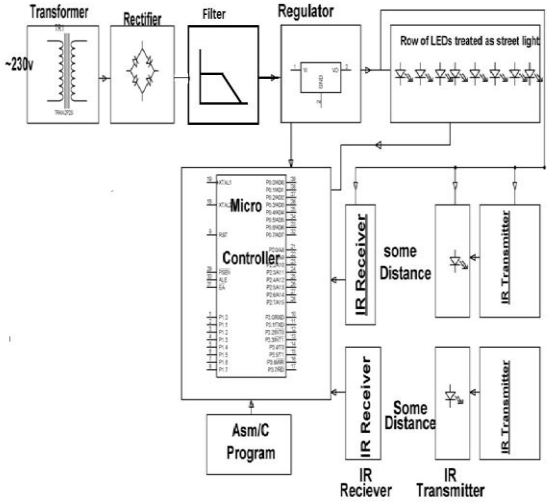
3. PROPOSED SYSTEM

Automation, Power consumption and Cost Effectiveness are the important considerations in the present field of electronics and electrical related technologies. Industry of street lighting systems are growing rapidly and going to complex with rapid growth of industry and cities. To control and maintain complex street lighting system more economically, various street light control systems are developed. These systems are developed to control and reduce energy consumption of a town's public lighting system using different technologies. The Proposed work is to control switching of street light automatically according to light intensity to develop flow based

dynamic control statistics using infrared detection technology and maintain wireless communication among lamppost and control terminal using ZigBee Wireless protocol.

This proposed system utilizes the latest technology for the sources of light as LED Lamps instead of generally used street lamps such as High Pressure Sodium Lamps, etc. The LED technology is preferred as it offers several advantages over other traditional technologies like energy saving due to high current luminous efficiency, low maintenance cost, high colour rendering index, rapid start up speed, long working life etc. This proposed system makes use of infrared photoelectric sensor (G12-3C3PA) for vehicle detection.

4. BLOCK DIAGRAM



5. Circuit working

The highway model consists of 14 led's as streetlights and 8 pairs of photodiodes-IR diodes used as sensors, variable resistors and a transistor which acts as switch as explained above. The IR diodes are placed on one side of the road and photodiodes are placed on the other side of the road, directly facing the IR diodes.

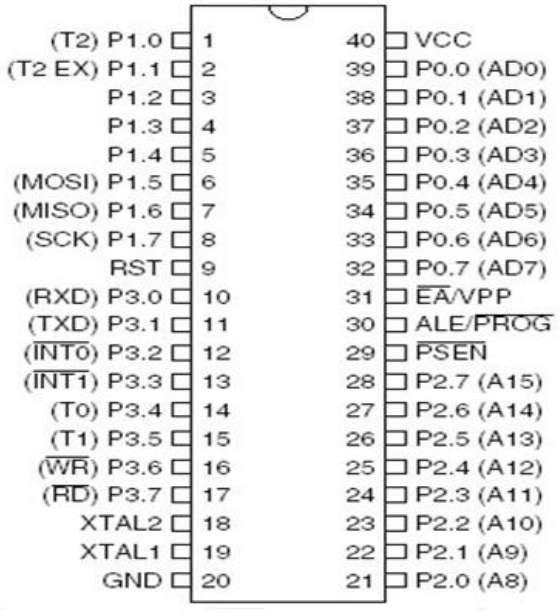
Consider the case when there is no vehicle on the highway. In this case, the IR radiation emitted from the IR diode directly falls on the photodiode which is exactly opposite to it. This causes the photodiode to fall in conduction state. This implies that photodiode conducts and current passes through it. The current passes through the photodiode and goes through the variable resistor and the base-emitter region of the transistor This in turn connects the collector of the transistor to the emitter. From the circuit diagram we can see that emitter is connected to ground which implies that the collector also goes to the ground. The collector region of the transistor is connected to the port 1 (input port) which in turn goes to ground i.e., logic ZERO. So, to summarize we can say that, when there is no vehicle on the highway, then all the inputs to the microcontroller port 1 is ZERO. Consider the case when a vehicle obstructs the IR radiation path. In this case, IR radiation is blocked and hence it does not fall on the photodiode. This in turn implies that photodiode doesn't conduct.

Hence there is no current flowing through this first transistor. So, the collector is at HIGH state. Let us assume that the first Photodiode-IR diode pair IR path is obstructed. This leads to a transition from ZERO to HIGH at P1.0 pin.

6. MICROCONTROLLER AT89S52

The AT89S52 is a low-power, high-performance CMOS 8-bit microcontroller with 8K bytes of in-system programmable Flash memory. By combining a versatile 8-bit CPU with in-system programmable Flash on a monolithic chip, the Atmel AT89S52 is a powerful microcontroller which provides a highly-flexible and cost-effective solution to many embedded control applications. The AT89S52 provides the following standard features: 8K bytes of Flash, 256 bytes of RAM, 32 I/O lines, Watchdog timer, two data pointers, three 16-bit timer/counters, a six-vector two-level interrupt architecture, a full duplex serial port, on-chip oscillator, and clock circuitry. In addition, the AT89S52 is designed with static logic for operation down to zero frequency and supports two software selectable power saving modes. The Power-down mode saves the RAM contents but freezes the oscillator, disabling all other chip functions until the next interrupt or hardware reset.

PIN CONFIGURATIONS OF AT89S52



7. INFRARED LED

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. It

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.

7.1 Features:

- Extra high radiant power
- Low forward voltage
- Suitable for high pulse current operation intensity
- High reliability

7.2 PHOTO DIODE:

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 fibre 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.

8. CONCLUSION

Street-lights are a large consumer of energy for cities using up to 50 percent of a city's energy budget. If every city installs the proposed system then a lot of power can be saved .Proposed system is power saving mechanism for street lights by using LED lamps as replacement of normal lamps and using special power savings mechanism for microcontroller rand ZigBee modules. It turns out most reliable and time efficient way to switch ON/OFF street-lights. It provides an effective measure to save energy by preventing unnecessary wastage of electricity, caused due to manual switching or lighting of street-lights when it is not required. It adopts a dynamic control methodology for traffic flow. The proposed system is especially appropriate for street lighting in remote urban and rural areas where the traffic is low at times. The system is versatile, extendable and totally adjustable to user needs.

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