ZIGBEE BASED SMART STREET LIGHT CONTROLLING SYSTEM

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ABSTRACT:

Street light, a raised source of light that is commonly used along walkways and streets when the surrounding turns dark. Conventional street lighting systems in areas with a low frequency of passersby are on most of the night without purpose. The consequence is that a large amount of power is wasted meaninglessly. ZigBee based automatic street light system is smart and provides a safe night time environment for all road users including pedestrians. The smart Street light can reduce energy consumption and maintenance costs and also helps to reduce crime activities up to certain limit. For monitoring purpose, ZigBee transmitter and receiver used.

Keywords: Micro controller (ArduinoUno); ZIGBEE module, IR sensor, LDR sensor, light.

1. INTRODUCTION:

Street light, a raised source of light that is commonly used along walkways and streets when the surrounding turns dark. Conventional street lighting systems in areas with a low frequency of passersby are on most of the night without purpose. The consequence is that a large amount of power is wasted meaninglessly. ZigBee based automatic street light system is smart and provides a safe night time environment for all road users including pedestrians. The smart Street light can reduce energy consumption and maintenance costs.

At the beginning of the development of the street lighting system, the lights were turned ON manually at dusk and turned OFF manually. The existing system is commonly used in all streets of street light system. But in this method there is a loss of heavy electricity in the whole night. If the street light is not stopped after the night, the loss will continue throughout the day and also the street light is not necessary when there are no human movements in the street.

2. EXISTING SYSTEM:

So to come out of these disadvantages this paper is introducing a ZIGBEE

based street light controlling system Power consumption is very high

3. PROPOSED SYSTEM:

The purpose of the project is to implement a system to monitor and control the street lights via instructions which are given through the ZIGBEE. Whenever the human movements will be occurred beyond the street light then the light will be automatically controlled. After the sunlight has been reduced in the street then the Street light will glow. By using this project wastage of electricity will be reduced and human effect also reduced

4. BLOCK DAIGRAM:

A.STREET SECTION:
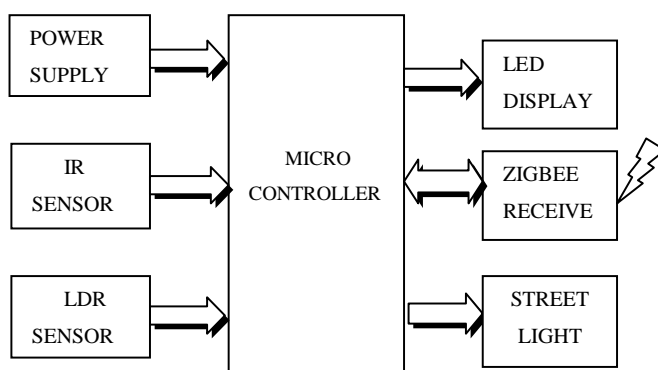
The block diagram of the zigbee based smart street light controlling system having the devices power supply, microcontroller, IR sensor LDR sensor, street lights, zigbee transmitter, zigbee receiver, LED and personal computer

B.MONITORING SECTION:

In the monitoring section we have the devices PC (personal computer) and the zigbee receiver.
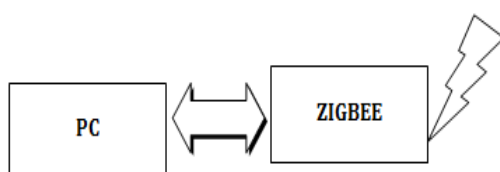
5. HARDWEAR DISCRIPTION:

POWER SUPPLY:

power supply *four different ways in which we can power up the Arduino Uno*. While making any Arduino projects, it is necessary to know these techniques, since there are instances when flexibility with regards to the power supply is required. Using USB cable, Using an AC to DC adapter plugged into the barrel connector, Using 5V input, Using batteries greater than 5V.

MICROCONTROLLER:

The Arduino Uno is an open-source microcontroller board based on the Microchip ATmega328P microcontroller and developed by Arduino.cc. The board is equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards (shields) and other circuits. The board has 14 digital I/O pins (six capable of PWM output), 6 analog I/O pins, and is programmable with the Arduino IDE (Integrated Development Environment), via a type B USB cable. It can be powered by the USB cable or by an external 9-volt battery, though it accepts voltages between 7 and 20 volts.
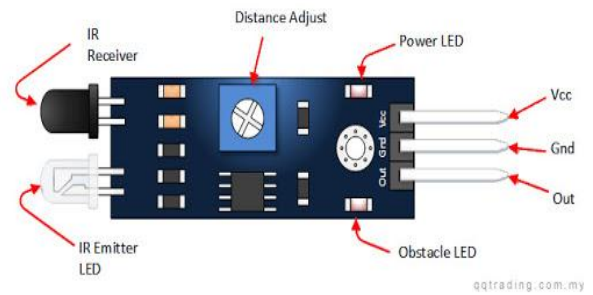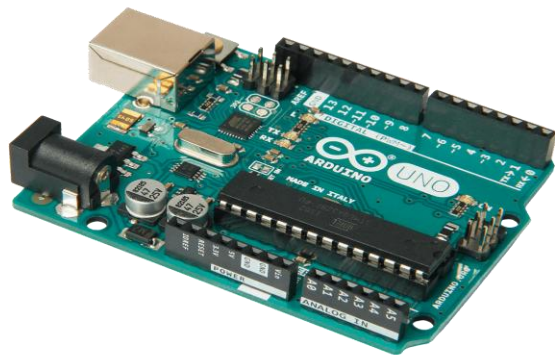
The **Arduino** Integrated Development Environment (**IDE**) is a cross-platform application (for Windows, macOS, Linux) that is written in functions from C and C++. ... The **Arduino IDE** supplies a software library from the Wiring project, which provides many common input and output procedures. Writing Sketches, File, Edit, Sketch, Tools, Help ,Sketchbook, Tabs, Multiple Files, and Compilation, Uploading ,Libraries, Third-Party Hardware, Serial
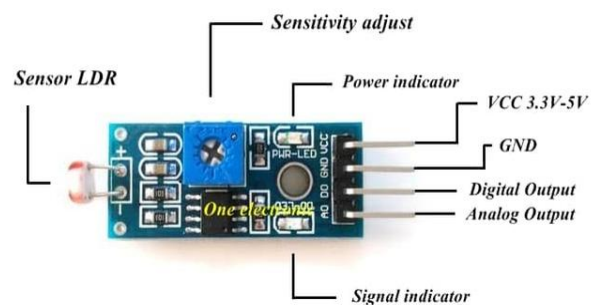

LDR SENSOR:

A Light Dependent Resistor (LDR) is also called a photo resistor or a cadmium sulfide (CdS) cell. It is also called a photoconductor. It is basically a photocell that works on the principle of photoconductivity. The passive component is basically a resistor whose resistance value decreases when the intensity of light decreases.

Monitor, Preferences, Language Support all are included in the software.

IR SENSOR

An infrared sensor is an electronic instrument that is used to sense certain characteristics of its surroundings.
It does this by either emitting or detecting infrared radiation. Infrared sensors are also capable of measuring the heat being emitted by an object and detecting motion
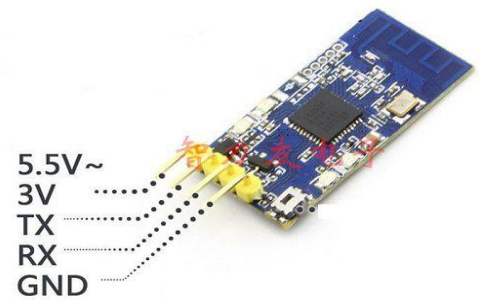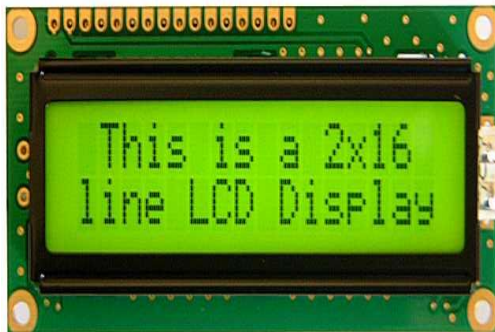
LCD DISPLAY

The term LCD stands for liquid crystal display. It is one kind of electronic display module used in an extensive range of applications like various circuits & devices like mobile phones, calculators, computers, TV sets, etc

ZIGBEE MODULE:

ZigBee is an IEEE 802.15.4-based specification for a suite of high-level communication protocols used to create personal area networks with small, low-power digital radios, such as for home automation, medical device data collection, and other low-power low-bandwidth needs, designed for small scale projects which need wireless connection.

STREET LIGHTS:

A street light, light pole, lamppost, street lamp, light standard or lamp standard is a raised source of light on the edge of a road or path. When urban electric power distribution became ubiquitous in developed countries in the 20th century.

6. WORKING PRINCIPLE:

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                        ┌─────────────────┐
                        │  POWER SUPPLY   │
                        └─────────────────┘
                                │
                        ┌─────────────────┐
                        │    ARDUINO      │
                        │  BOARD WITH     │
                        │     CODE        │
                        └─────────────────┘
                                │
                        ┌─────────────────┐
                        │   IR SENSOR     │
                        │    SIGNAL       │
                        │   DETECTION     │
                        │ ------------------ │
                        │   YES  |   NO   │
                        └─────────────────┘
                         │                │
              ┌─────────────────┐   ┌─────────────────┐
              │   LDR SENSOR    │   │  STREET LIGHTS  │
              │ SIGNAL DETECTION│   │      OFF        │
              │ ---------------- │   └─────────────────┘
              │   YES    |  NO  │
              └─────────────────┘
               │              │
     ┌─────────────────┐  ┌─────────────────┐
     │  STREET LIGHT   │  │  STREET LIGHT   │
     │      ON         │  │      OFF        │
     └─────────────────┘  └─────────────────┘
              │
     ┌─────────────────┐
     │ZIGBEE TRANSMITTER│
     │ TRANSMITTES THE │
     │SIGNAL TO RECEIVER│
     └─────────────────┘
              │
     ┌─────────────────┐
     │  LCD DISPLAY    │
     │   DISPLAYS      │
     │ COUNT OF VEHECAL│
     └─────────────────┘
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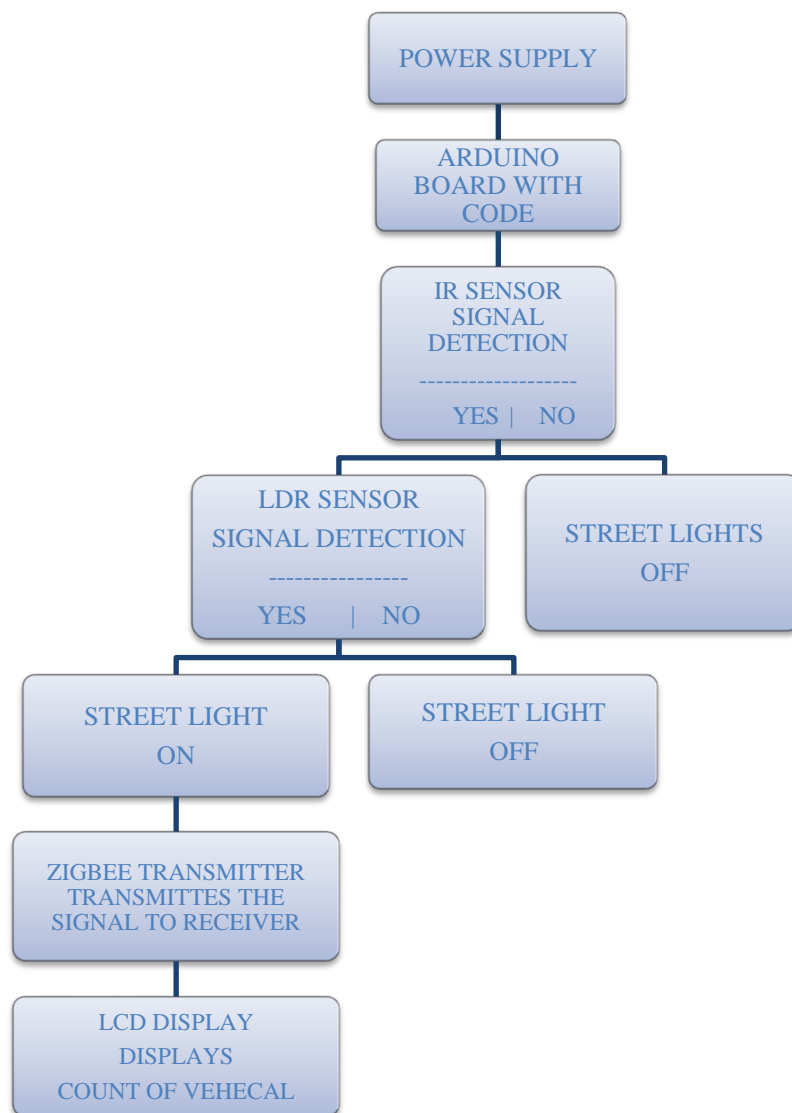
The above tree diagram explains the total operation the project. The both sensors active at a time then only the street lights will ON. If it is ON, LED displays the count of the vehivle passed on the road.

7. RESULT:

The Result of the project is when ever the object is passing on the road the street lights will blow. Other wise the lights will be in the OFF position. This is the one of the main aim of our project. And the other aim of the project is to make count the number of

vehicles passing on the road. The two aims are fulfilled by the project.

8. ADVANTAGES
- Low power consumption.
- Safety
- Not switched on earlier before the sun set.
- Its efficiency is high.
- Power saving and less installing cost when compared to conventional street light system.

9. APPLICATIONS:
- Electricity applications
- Industries power control systems.
- Wireless light switches.
- Electrical meters with in-home-displays, traffic management systems, and other consumer and industrial equipment.

10. CONCLUSION:
This project "Zigbee Based Smart Intelligent Lighting System " is a cost effective, practical, eco- friendly and the safest way to save energy and this system the light status information can be accessed from anytime and anywhere. It clearly tackles the two problems that world is facing today, saving of energy and also disposal of incandescent lamps, very efficiently.

11. FETURE SCOPE:
- The same project can be implemented by using solar energy instead of transmission system.

- This will reduce the overall running cost.
- This type of online street light control will be more efficient as the solar energy plays a major role in future.

- In future the scope of the project is high and implemented in most of the areas.
- Though the initial cost is increased, it can be reduced by the overall running cost.

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