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Sensor Based Automatic Accident Prevention of Vehicle

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Abstract:
The objective of this project is to develop a system to keep the vehicle secure and protect it by the occupation of the intruders. The main aim of this project is to develop a system automatic speed control of vehicle and accident avoidance using eye blink sensor and ultrasonic sensor. Using LDR the headlight (LED) intensity has been controlled. The alcohol sensor detects the attentiveness of alcohol gas in the air and an analog is an output reading. Crash sensor works in a milli second in an event of accident where the sensor activates the airbag

Keywords: Eye blink sensor, Ultrasonic sensor, LDR, Alcohol detection sensor, Crash sensor

1. INTRODUCTION.

The aim is to prevent accidents by providing receiver unit in vehicle along with transmitter unit at necessary places. The accidents due to the drowsy state of the driver is prevented using eye blink sensor, similarly accident due to the drunken state is prevented using alcohol sensor which detect the alcohol from breath and stops the engine. The arduino signal conditioner and other components are powered by separate power supply which converts the 230v AC to 5v and 12v. Using LDR the headlight (LED) intensity has been controlled. To avoid the accident warning system, which contain alarm and display system can arrange at rear side of each and every vehicle. The Arduino Mega is a microcontroller board based on the ATmega1280 (datasheet). It has 54 digital input/output pins (of which 14 can be used as PWM outputs), 16 analog inputs, 4 UARTs (hardware serial ports), a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. 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 pins that may be interfaced to various expansion boards and other circuits. The crash sensor is a miniature snap-action switch, also trademarked and frequently known as a micro switch. It is an electric switch that is actuated by very little physical force. Micro switches are very widely used: among their applications are appliances, machinery, industrial controls, vehicles, and many other places for control of electrical circuits. The alcohol gas sensor detects the concentration of alcohol gas in the air and outputs its reading as an analog voltage. The concentration sensing range of 0.04 mg/L to 4 mg/L is suitable for breathalyzers (the legal limit of breath alcohol concentration, or BrAC, in most US states is 0.08 grams per 210 liters, or 0.38 mg/L). The sensor can operate at temperatures from -10 to 50°C and consumes less than 150 mA at 5 V. The ultrasonic sensors measure distance by using ultrasonic waves. The sensor head emits an ultrasonic wave and receives the wave reflected back from the target. Ultrasonic Sensors measure the distance to the target by measuring the time between the emission and reception. An optical sensor has a transmitter and receiver, whereas an ultrasonic sensor uses a single ultrasonic element for both emission and reception. This Eye Blink sensor is IR based; The Variation Across the eye will vary as per eye blink. If the eye is closed means the output is high otherwise output is low. This can be used for project involves controlling accident due to unconscious through Eye blink. An LDR is a component that has a (variable) resistance that changes with the light intensity that falls upon it. This allows them to be used in light sensing circuits. ZigBee is an open global standard for wireless technology designed to use low-power digital radio signals for personal area networks. ZigBee is used to create networks that require a low data transfer rate, energy efficiency and secure networking. GSM is an open and digital cellular technology used for transmitting mobile voice and data services operates at the 850MHz, 900MHz, 1800MHz and 1900MHz frequency bands. GSM system was developed as a digital system using time division multiple access (TDMA) technique for communication purpose. A light-emitting diode (LED)is a semiconductor light source that emits light when current flows through it. Electrons in the semiconductor recombine with electron holes, releasing energy in the form of photons. This effect is called electroluminescence. The color of the light (corresponding to the energy of the photons) is determined by the energy required for electrons to cross the gap of the semiconductor. A DC motor is any of a class of rotary electrical machines that converts direct current electrical energy into mechanical energy. The most common types rely on the forces produced by magnetic fields. Nearly all types of DC motors have some internal mechanism, either electromechanical or electronic to periodically change the direction of current flow in part of the motor. An LCD is made with either a passive matrix or an active matrix display display grid. The active matrix LCD is also known as a thin film transistor (TFT) display. The passive matrix LCD has a grid of conductors with pixels located at each intersection in the grid. A current is sent across two conductors on the grid to control the light for any pixel. An active matrix has a transistor located at each pixel intersection, requiring less current to control the luminance of a pixel. For this reason, the current in an active matrix display can be switched on and off more frequently, improving the screen refresh time.

2. HARDWARE & SOFTWARE REQUIREMENTS

Hardware- Arduino Mega, Arduino Uno, LCD, ZigBee, GSM, Crash sensor, Ultrasonic sensor, LDR, LED, DC Motor, Eye Blink sensor, Alcohol sensor.
Software- Arduino IDE, Embedded C

Block Diagram Vehicle Section

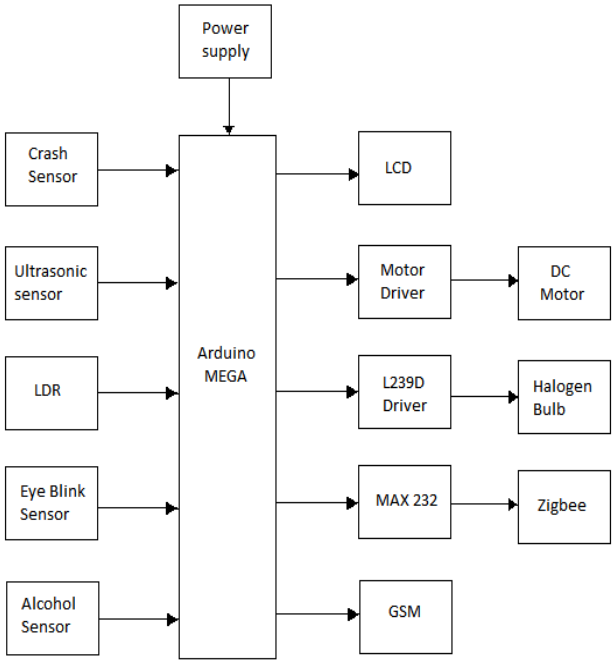

Figure.1. Block diagram.

Other Car Section

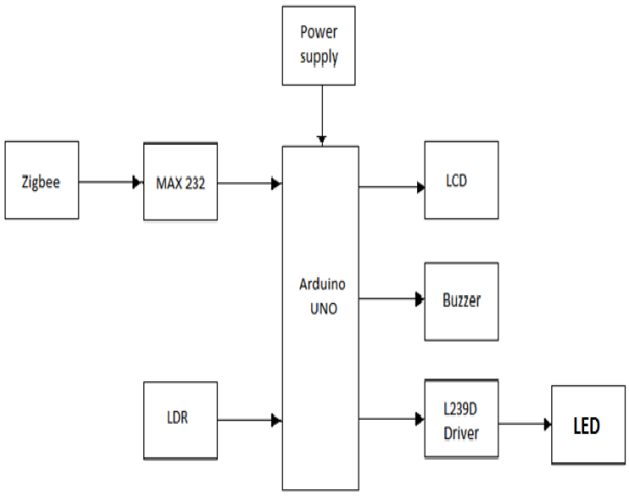

Figure. 2: Block Diagram.

Arduino Mega

Arduino is an open-source physical computing platform based on a simple i/o board and a development environment that implements the Processing/Wiring language. Arduino can be used to develop stand-alone interactive objects or can be connected to software on your computer.

Arduino UNO

The Arduino Uno is a microcontroller board based on the ATmega328. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. The Uno differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip. Instead, it features the Atmega8U2 programmed as a USB-to-serial converter.

ZigBee

Zigbee is for low-data rate, low-power applications and is an open standard. This, theoretically, enables the mixing of implementations from different manufacturers, but in practice, Zigbee products have been extended and customized by vendors and, thus, plagued by interoperability issues. In contrast to Wi-Fi networks used to connect endpoints to high-speed networks, Zigbee supports much lower data rates and uses a mesh networking protocol to avoid hub devices and create a self-healing architecture.

GSM Modem

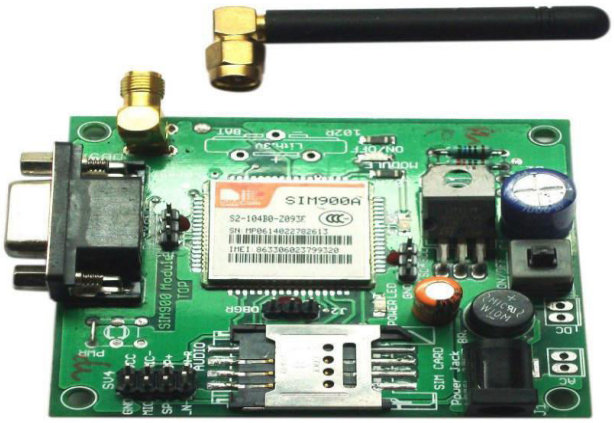

Figure.3. GSM Modem

A **GSM modem** is a specialized type of modem which accepts a SIM card, and operates over a subscription to a mobile operator, just like a mobile phone. From the mobile operator perspective, a GSM modem looks just like a mobile phone. When a GSM modem is connected to a computer, this allows the computer to use the GSM modem to communicate over the mobile network. While these GSM modems are most frequently used to provide mobile internet connectivity, many of them can also be used for sending and receiving SMS and MMS messages.

LCD Interfacing

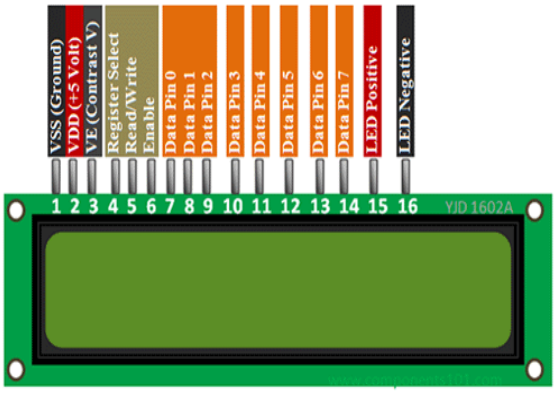

Figure.7. LCD

This is an LCD Display designed for E-blocks. It is a 16 character, 2-line alphanumeric LCD display connected to a single 9-way D-type connector. This allows the device to be connected to most E-Block I/O ports. The LCD display requires data in a serial format, which is detailed in the user guide below. The display also requires a 5V power supply. Please take care not to exceed 5V, as this will cause damage to the device. The 5V is best generated from the E-blocks Multiprogrammer or a 5V fixed regulated power supply. The potentiometer RV1 is a contrast control that should be used to adjust the contrast of the display for the environment it is being used in.

3. WORKING

Crash sensor is used to find the accident. If accident is find it takes the coordination from GPS and send to the care center and also relatives with help of GSM and Zigbee. Accident occurs vehicle motor will stop automatically. The LDR is used to detect the light using PWM. Accident information will send to the other vehicle through ZigBee device using ad-hoc method. The alcohol sensor is used to detect the attentiveness of alcohol gas in the air and make the motor to stop. The Eye blink sensor is IR based, the variation across the eye will vary as per eye blink. The Ultrasonic sensor is used to make safe drive in obstacle path by sensing the distance of obstacle and make the motor to stop.

4. CONCLUSION

This project is to prevent accident in crowded environment. This project has no doubt to save precious life. Both evaluation and experiment has been performed to verify the proposed system. People have become more inclined to accident. Consequently, as an engineer need to take some stroke against this and provide the desired way out.

FUTURE SCOPE

This technique can be further enhanced to notify in two wheelers and 4 wheelers through a GPS module.

6. REFERENCES

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