IOT BASED VEHICLE ACCIDENT PREVENTION USING MULTIPLE SENSORS

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Abstract -*This project saves human lives by detecting an accident before it occurs or in case it happens. This idea is designed based on the ESP 8266 Microcontroller and helps in controlling accidents due to unconsciousness through different sensors. The sensors used here are ultrasonic sensor, MEMS sensor, Temperature sensor. If the driver is careless while driving, this idea helps in easy driving, through the indication of alarm and the LCD display. In case of accident occurs it helps in tracking the location and the image of that location will be shared to the concern person and their family's smart phone*

Key Words: Sensors, ESP8122 Controller, WI-FI, LCD display, cooling fan, Accident Detection, Smart phone

1. INTRODUCTION

Vehicle accidents are most common due to the imperceptibility of obstacles. Obstacles can strike the vehicle and causes severe damage. In order to reduce the number of crash and collision, 4 ultrasonic sensors are fixed on the four sides of the vehicle. These sensors detect the obstacles and gives notification through the LCD display and alarm sound. Temperature sensor is used to know the engine temperature. If the engine's temperature is above the predefined temperature, then it indicates through alarm and cooling fan will be turned ON. Micro Electro Mechanical System(MEMS) sensor first calculate the X,Y,Z co ordinate of the vehicle, if there is any significant form of changes occurs, then the image of that location will be shared to the concern person and their family's smart phone. The shared location helps for the Rescue team and the police control room for the rescue operation. By this idea human lives can be saved and prevents the vehicle from damage.
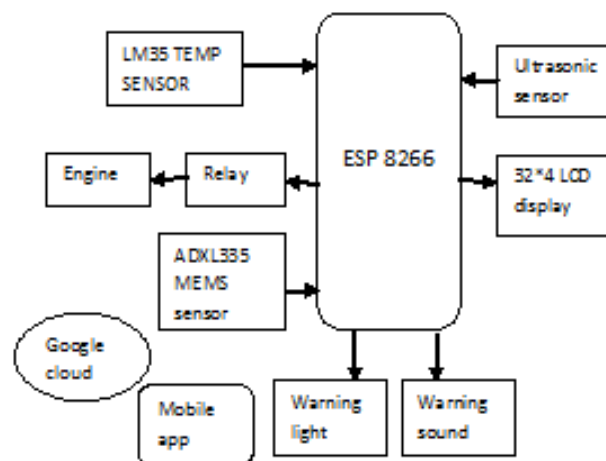
2. SYSTEM BLOCK DIAGRAM

FIG 1: SYSTEM BLOCK DIAGRAM

3. DESIGN METHODOLOGY

3.1 ULTRASONIC SENSOR

Ultrasonic sensor measure distance by using ultrasonic wave the sensor head emits on ultrasonic wave and receives the wave reflected back from the target. Ultrasonic sensor measure the distance to the target by measuring the time between the emission and reception. Ultrasonic sensor uses a single ultrasonic element for both the emission and reception.

Distance can be calculated with the following formula:

Distance L=1/2*T*C

Where L is the distance,

T is the time between the emission and reception,

C is the sonic speed.

Detection is not affected by the accumulation of dust or dirt. Ultrasonic wave can reflect off a glass or liquid surface and return to the sensor head, even transparent targets can be detected. 4 ultrasonic sensors are fixed on the four sides of the vehicle. If any obstacle is detected on any of these sides, the distance is measured and displays on the LCD display. Four blocks of display are created for respective four sides. If the vehicle is very nearer to the obstacle, then it reminds us through the warning sound.

Fig 2: Ultrasonic Sensor

3.2 TEMPERATURE SENSOR:

 LM35 is one kind of commonly used temperature sensor that can be used measure temperature with on electrical output comparative to the temperature (in °c). It can measure temperature more correctly compare with Thermistor. This sensor generates a high output voltage then thermocouples and may not need that the output voltage is amplified. The LM35 has an output voltage that is proportional to the Celsius temperature. The scale factor is 0.1V /° C.

The Temperature sensor is fixed on the radiator and it senses the temperature. If the sensed temperature is above the normal temperature required for running, which means it is heated it gives us an alarm, to slow the speed of the vehicle. If it is over heated, automatically cooling fan will be turned ON.

Fig- 3: LM35 Temperature sensor

3.3 MEMS SENSOR

Micro Electro Mechanical Systems are free scales enabling technology for acceleration and pressure sensors. It measures acceleration by measuring change in capacitance. Here we are using Adxl335, which is a small, thin, low power, complete three axis accelerometer with signal conditioned voltage outputs. The product measures acceleration with the minimum full scale range of ± 3g. It can measure the static acceleration of gravity in tilt sensing applications as well as dynamic acceleration

resulting from motion, shock or vibration. The user selects the bandwidth of the accelerometer using the C_X, C_Y, and C_Z Capacitors at the X_{out}, Y_{out}, Z_{out} pins.

Fig 4: Adxl335 MEMS Sensor

MEMS Sensor is the I2c interface which as using 2 wires SDA, SCL, it will send the data's of X, Y, Z, with the data lines, it will stores data in the goggle firebase and the mobile app with the help of unique Firebase ID, whenever the data's are not within valid limit then the GPS will be updated the location in the Mobile app.

4. EXSISTING SYSTEM.

The former project uses LPC2148 Micro controller, which needs separate GSM and GPS module to track the location.
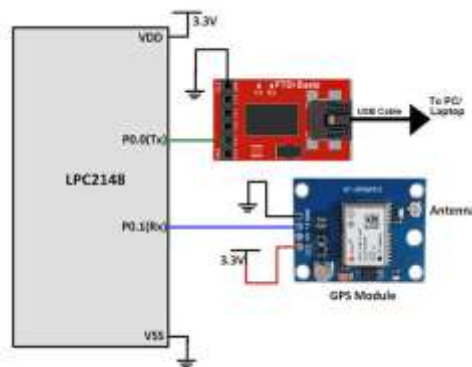
Fig 5: Connection of LPC2148 with GPS and GSM

5. PROPOSED SYSTEM

In this project we are using ESP8266, which is a low-cost WI-FI microchip with full TCP/IP stack and microcontroller capability

Fig 6: ESP 8266 Pin diagram

It doesn't require separate GSM and GPS to track the location. When location information is needed in an electronic project, we normally think about a GPS module. But we know that Mobile phones can get approximate location listening WIFI signals, when GPS is disabled or not usable because we are inside a building.

ESP8266 can get the location from the Goggle Geo location API, which we want to update from the Google.

7. ADVANTAGES

The ESP 8266 is a Micro controller with WI-FI module, need not be to use separate GSM and GPS. The project is low cost and less complexity .LM35 requires less voltage than other temperature sensors.

8. APPLICATION

Using this setup it is easy for us to drive, if there is any mist, rain or unconsciousness of the driver. It is used to detect the accident occurred area, which is helpful to track and rescue. Use of the temperature sensor helps to maintain the engine long lasting.

9. RESULT

The entire setup is made to be turned ON; the ultrasonic sensor senses the obstacle and displays the distance on the LCD display. When the temperature sensor gets the temperature above the normal, the cooling fan will be switched ON. In case of any accident occurs the image of that location will be shared to the concern person and their family's smart phone.

This is how the image will be shared to the concern person, indicates the location of the accident occurred area.

Fig6: Image of the location

10. CONCLUSION

We have proposed an intelligent vehicle system for accident prevention and making the world a much better and safe place to live. The outcome of the project is basically has three applications. One is to prevent and control the vehicle from the accidental situations due to drowsiness. Second is to detect the accident occurred area, which is helpful to track and rescue. Third is to indicate the overheating of the Engine.

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