

IMPLEMENTATION OF INTELLIGENT AUTOMATIC VEHICLE ACCIDENT PREVENTION AND DETECTION SYSTEM

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Abstract— A safe driving system of vehicle for drunk and driving cases, in this project we have used an accident detecting sensor in vehicle which detects accident and sends messages continuously within every 5 minutes. In this process LPC 1768 is connected with GSM and GPS modules. GPS module gets the position of vehicle with longitude and latitude then via GSM it sends the messages. In which the vehicle is tracked from the remote places around the ground. GSM modem and GPS module are communicated by the ARM LPC1768 processor. This processor is kept in the mobile vehicle. This processor will communicate with GPS module in regular time slots and transmits the geo information to the central main station which has the longitude and latitude information through the GSM network. ARM lpc1768 gets the accidental information through the ADXL sensor. This sensor detects the accidental information by the vibrations and mechanical forces of the vehicle. By making use of GPS, the accidental location is got. And this geo location is sent to the 108 and authorized members using GSM module. The goal of the project is to secure the vehicles and to save it from the interlopers. Combination of Ultrasonic sensor, Eye blink sensor and Speed sensor are used for accident prevention and detection.

Keywords— GPS module, GSM Module, ARM LPC1768, ADXL sensor, speed sensor, eye blink sensor.

I. INTRODUCTION

Now a days in the heavy traffic, the accidents are quite common and it is necessary to aid the victims of the accidents. Hence it is very important to identify the location of the accident as fast as possible. In the remote places if no human has seen the victims of the accidents, it is difficult for the victims to survive. So, to save victims and to inform ambulances or to nearby hospitals, a GSM/CDMA and GPS are employed. This accidental detection module using GPS consists of speed sensor, infrared sensor, eye blinking sensor, GPS module, ultra-sonic sensor are linked to the processor. When the accident happens, the sensors detect the accidental information and transmit to the LPC 1768 and LCD displays the information, buzzer is switched on and gives message

to the hospitals or ambulances or police by using GSM network. Then the ambulance system can track the accidental location using GPS. Here the main theme of the project is to identify the accidental location of the vehicle and to inform the location of the victims of the accident to the ambulances or police control room. Hence the police control room and ambulances will trace the perfect location of the accidents using GPS. Here an eye blink IR sensor is used. The infrared rays in the eye are transmitted using IR transmitter. This technique is used to determine that the person is having conscious or not. The IR output is given to the logic circuit which switches on the alarm.

II. BLOCK DIAGRAM

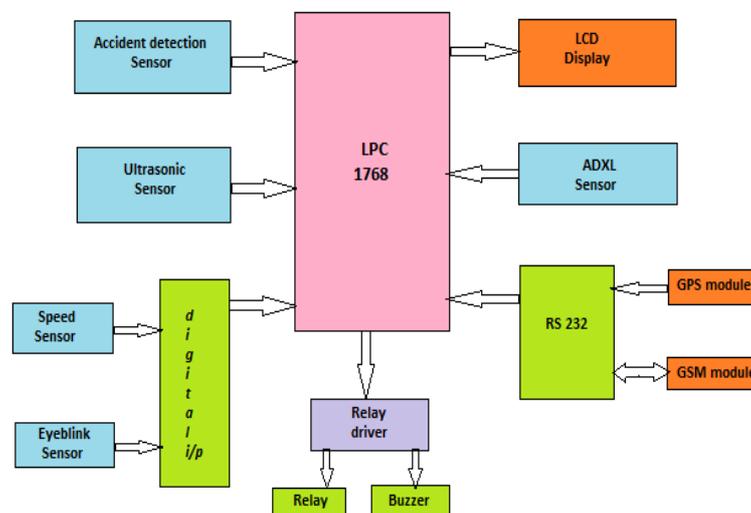


Fig.1. Block Diagram

Here the main theme of the project is to identify the accidental location of the vehicle and to inform the location of the victims of the accident to the ambulances or police control room. Hence the police control room and ambulances will trace the perfect location of the accidents using GPS. Here LPC 1768 processor is employed for the development of the project. In the time of accident, the ADXL has got disturbed and transmits a signal to the LPC1768 processor by that GPS captures the location. Here an eye blink IR sensor is used. The infrared rays in the eye are transmitted using IR transmitter. This technique is used to determine that the person is having conscious or not. The IR output is given to the logic circuit which switches on the alarm. In this project car simulator is also developed. This car simulator spots the physiological data to validate this technology. Here drowsiness of the driver is also detected and an algorithm is also developed for the detection of the drowsiness of the driver. A development models are presented to identify these constraints.

III. COMPONENTS

3.1. Ultrasonic Sensor

These ultrasonic sensors are very similar to the sonar's or radars just because of their working principles. This sensor identifies the target's characteristics just by analysing the echoes obtained from the sound or radio waves correspondingly. This sensor sends a high frequency sound waves and calculates the received echo their by identifying the distance between the target and itself. Ultrasonic sensors basically make use of microphones to find out ultrasonic sounds or noise.



Fig.2. Ultrasonic Sensor

3.2. ARM processor based LPC 1768

These LPC 1768 microcontrollers are based on ARM processors. It is of 16/32 bit processor. It is having embedded trace support and real time evaluation module. It is having the flash memory of range from 32KB to 512KB. A wide memory interface of 128bit and has the capacity to execute 32 bit code at high clock rates.

3.3. Ultrasonic Sensor

GSM stand for Global System for Mobile communications. It is a free source technology. This cellular digital technology is making use for data facilities and for voice facilities in the mobile phone to transmit the data.



Fig.2. GSM Module

In this project the gsm module is used to send the message to the ambulance services or police control rooms. It has the feature of short message services. The network of computers makes an architecture of GSM. It has the range of 900MHz basically, later it is also developed for the range of 1800 MHz spectrum. The architecture of 1800 MHz is very much similar to 900 MHz spectrum band.

3.4. GPS Module

(GPS) Global positioning system uses satellites for tracking that delivers consistent locating, map reading; service to users in an uninterrupted universal foundation, the system will provide time and location, with the help of GPS receivers. GPS gives correct time and location updated for an unconstrained folk in all situations irrespective of timings, wherever in the biosphere.

A GPS (**Global positioning system**) consists of following three main shares:

1. Revolving earth followed by satellites
2. Monitoring and control places on the Earth
3. Users own the GPS handsets.



Fig.4. GSM Module

1) GPS Receivers:

- GPS receivers determines the speed, location, direction and time.

- Three satellite signals are necessary for locating the receivers in 3D space
- 4th satellite is also used for time accuracy.
- A minute cm scale position is calculated

A main concept of GPS device is to tracking (searching) the respective automobile for each 5 min and sending the location of automobile.

3.5. AXDL Sensor

The ADXL335 sensor has some specifications low power, very small, accelerometer of triple axis with voltage outputs of signal conditioned. A +/-3g range of acceleration is measured by the sensor. And also sensor can calculate tilt-sensing, dynamic acceleration obtained from shock, motion A CZ, CX, and CY capacitors are at the ZOUT, XOUT, and YOUT pins used to select the bandwidth of accelerometer. Bandwidths should be selected for best application, the X and Y axes ranges from 0.5 Hz to 1600Hz, and a Z axis ranges from 0.5 Hz to 550 Hz.

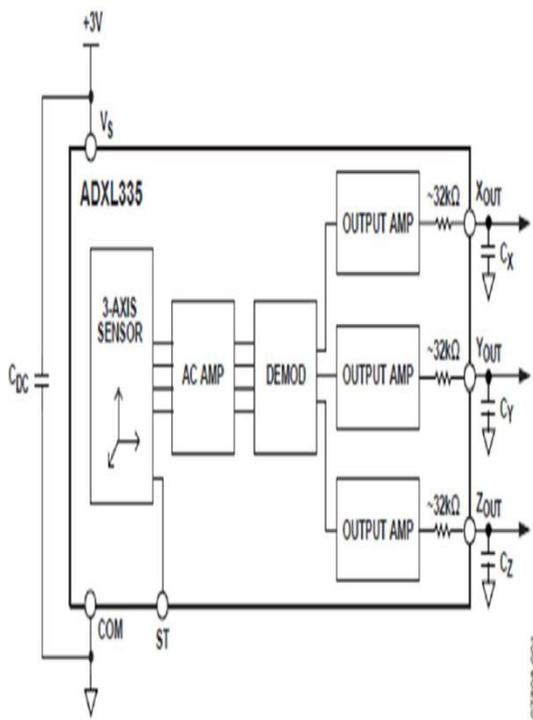


Fig.5. AXDL Sensor

3.6. Eye Blink Sensor

Eye blink sensor is a type of infrared sensor and this LED. This infrared rays are emitted by the LED which is an IR transmitter. In the same way the IR receiver is used for the reception of IR rays conveyed by the IR source. Significant fact here is, equally spreader and receiver must be in line of sight. Here an eye blink IR sensor is used. The infrared rays in the eye are transmitted using IR transmitter. This technique is used to determine that the person is having conscious or not. The IR output is given to the logic circuit which switches on the alarm.

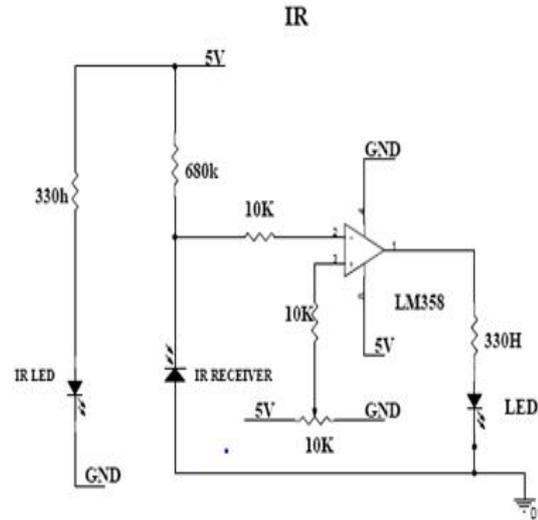


Fig.5. Eye blink Sensor

IV. CIRCUIT DIAGRAM

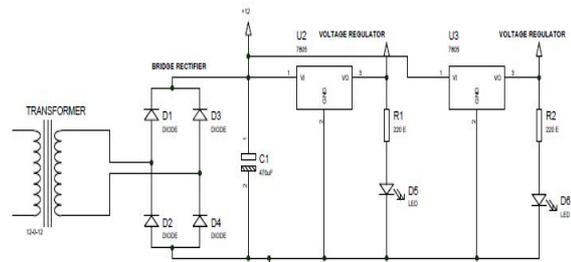
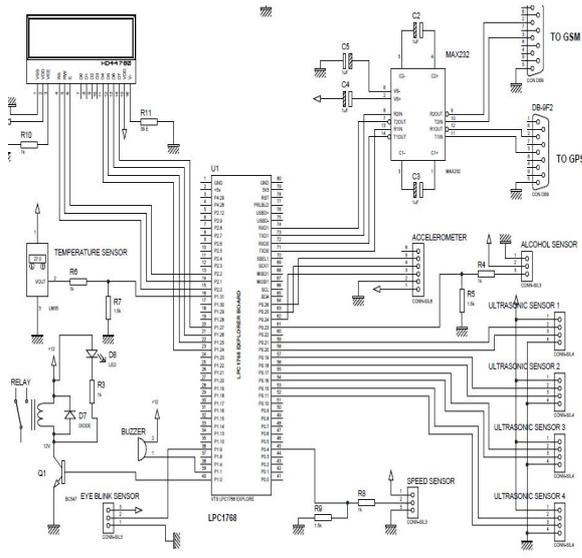


Fig.6. Power supply circuit diagram

Using rectifiers, filters, and then voltage regulators used to build the Power Supply circuits. Early with voltage of AC, the ac voltage has rectified to obtain to a steady dc voltage, and after dc level is filtered, and lastly, a desired fixed dc voltage obtained by regulating. A voltage regulator IC unit usually provides regulation, which grosses a voltage of DC and delivers a slightly inferior voltage of DC, which leftovers the similar level if a load output is linked to the voltage of DC changes or input dc voltage varies. The step down transformer step-downs to 0-6V from 0-230V of power supply. A precision rectifier connected to the secondary of potential transformer, which is designed using with help of (op-amp) operational amplifiers. Using precision rectifier has advantages of considering DC output of top voltage, remaining of the circuits may provide some root mean square output. The appropriate polarity of DC at the time of input to a circuit and regardless of line polarity of telephone preserved by Bridge Rectifiers. This bridge rectifiers formed by four diodes. This practices the full alternating current wave. A 1.4V was castoff in the bridge rectifier since all diode usages 0.7V so 1.4 V used up in the bridge rectifiers, there are always two diodes conducting while conducting



The LPC21418 microcontroller consists of 32 bit ARM7TDMI-S CPU with embedded trace support and real-time emulation, the microcontroller combines with embedded high speed flash memory ranges from 32 kb to 512 kb. 32-bit code execution (The maximum clock rate) enabled by a (128-bit) wide memory interface and a unique accelerator architecture. The alternative 16-bit Thumb mode reduces code by more than 30 % with minimal performance by considering the critical code size application. Because of their low power consumption and small size, LPC2148 are ultimate for all applications, here miniaturization is must require key, and also considered as access control.

Here a serial communication interface is used. It has the static RAM of 8-40kb. It has the USB port of 2.0 version. Also it has the UARTs, Timers of 32 bits, DAC of 10 bit pulse width modulation channels, 45 GPIO pins. The NMEA requirements are configured by hardware interface with GPS (GLOBAL POSITIONING SYSTEM) design. Most of the serial ports of computer are compatible with RS232. Though it strictly says that RS232 is not NMEA standard. Those elements that sustenance NMEA at a bps of 4800, user had easy option to send more data. Due to this for every two seconds it will transmit the information. And preserve the data for future use. It will store the data for every two seconds and transmit data to the remote location.

This consists of vehicle unit and the management system. The device should be able to interface with the car's system. The accident prevention technology

works with ultrasonic sensor when it hits less than distance which pre determines in system then it will be active and message shown that accident occurs. The system also send SMS to driver's relatives or nearest police station or ambulance.

V. APPLICATION AND ADVANTAGES

This should be used in VIP Vehicles, Fire engines, Ambulance and security of defence.

ADVANTAGES

- Operation is easy
- Sophisticated security will be sophisticated
- Reliable and simple design
- Separates both GPS and GSM signals

CONCLUSIONS

User from the observation confirms performance of accident identification and discharge of air bags using Global positioning system, Eye blink sensor, speed, ultrasonic sensor ,GSM(Global system for Mobile communication) and ADXL (3 Axis Accelerometer with high resolution. It is useful in finding the location of vehicle and victim's life is saved by locating accidental place. This technique can be employable in ambulances and fire engines. The victims from major injuries can be avoided by releasing the airbags. Lastly user can conclude that that the concept of project advantages and therefore this can be used for the future purpose for accident detection.

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