

VEHICLE SPEED CONTROL AND ACCIDENT AVOIDANCE SYSTEM USING IOT

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ABSTRACT

Drowsy is the reason for most of the road accidents. Manually tracing the drowsy driver is not an easy task, because every day thousands of vehicles are running on the roads. So we need a system that must come with every car and if it detects the sleepy driver it must stop the vehicle immediately. In addition to this if the driver is slept the vehicle will be stopped, and it monitors the heartbeat, Respiration rate and temperature of the driver and displays it in the LCD. These three parameters are very important because it shows the body status of the driver. These parameters are monitored manually and in case of emergency the in-charge of the ward calls the doctor

Keywords: *LCD display, Temperature and Heartbeat Sensor, PIC Microcontroller, and GSM module.*

I. INTRODUCTION

Driver drowsiness detection is a car safety technology which helps prevent accidents caused by the driver getting drowsy. Various studies have suggested that around 20% of all road accidents are fatigue-related, up to 50% on certain roads. Some of the current systems learn driver patterns and can detect when a driver is becoming drowsy. The development of technologies for detecting or preventing drowsiness at the wheel is a major challenge in the field of accident avoidance systems. Because of the hazard that drowsiness presents on the road, methods need to be developed for counteracting its effects. The aim of this project is to develop a prototype drowsiness detection system.

The focus will be placed on designing a system that will accurately monitor the eye blink rate, heart-beat, respiration rate and temperature of the driver. In this project we use sensors to measure all these factors. The values measured will be sent to the microcontroller where the measured values will be compared with the reference values. If the values measured do not match with the reference values then the microcontroller will send a warning signal in the LCD display thereby preventing accidents.

II. PROPOSED DROWSINESS ALERT UNIT

This is a small system, so we can easily embed it on any vehicle. The Eye blink sensor is fixed to the driver. The eye blink sensor senses the movement of the eyeball. The sensor output is connected to a microcontroller. The car engine starting system is directly controlled by the microcontroller.

if the sensor detects the no output from the sensor because there no movement in the eyeball, it sends the signal to the microcontroller. The microcontroller immediately stops the engine or locks it from starting, also give warning signal and display the reason in a LCD [1].

The system is developed by interfacing a heartbeat sensor, eye blink sensor and a temperature sensor with an ADC which converts the analog readings to digital, thus extracted digital data is processed using a microcontroller [1] . The reference values of these three parameters and the phone number are stored in the microcontroller memory [2]. If anyone of these three parameter exceeds the reference value the microcontroller automatically calls the stored number. The microcontroller used here is PIC16F877 A, it has an inbuilt ADC and counters, and the counter is used to count heartbeat, respirator rate and ADC for converting analog to digital.

III. BLOCK DIAGRAM DESCRIPTION

3.1 Power Supply Unit

Supply of 230v, 50Hz ac signal from main supply board is given to a step down transformer. The transformer is selected such that its output ranges from 10v to 12v. Thus the main function of the power supply is to give the voltage supply required for the logic families, which is an output of +5v.5v regulated supply.

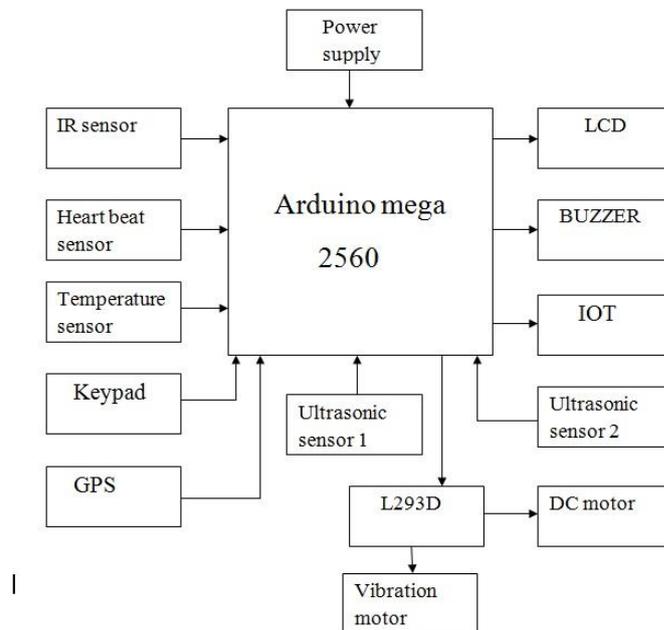


Fig: BLOCK DIAGRAM OF PROPOSED DROWSINESS ALERT SYSTEM

The ac voltage typically 230v is connected to the transformer, which steps the ac voltage down to initially filtered by a simple capacitive filter to produce a dc voltage usually has some ripple or ac voltage variation. A

regulator circuit can use this dc input to provide a regulated that not only has much ripple voltage. This voltage regulation is usually obtained using one of a number of proper voltage regulation IC units.

3.2 Arduino

version of Arduino board lacks this feature like Arduino Pro Mini doesn't come with DC power jack. ICSP header is a remarkable addition to Arduino Mega which is used for programming the Arduino and uploading the code from the computer. Arduino Mega 2560 is a microcontroller board based on Atmega2560. It comes with more memory space and I/O pins as compared to other boards available in the market. There are 54 digital I/O pins and 16 analog pins incorporated on the board that make this device unique and stand out from others. Out of 54 digital I/O, 15 are used for PWM (pulse width modulation). A crystal oscillator of 16MHz frequency is added on the board. This board comes with USB cable port that is used to connect and transfer code from computer to the board. DC power jack is coupled with the board that is used to power the board. Some.

3.3. GSM Module

GSM/GPRS RS232 Modem from rhydo LABZ is built with SIMCOM Make SIM900 Quad-band. GSM/GPRS engine, works on frequencies 850 MHz, 900 MHz, 1800 MHz and 1900 MHz it is very compact in size and easy to use as plug in GSM Modem. The Modem is designed with RS232 Level Converter circuitry, which allows you to directly interface PC Serial port. The baud rate can be configurable from 9600-115200 through AT command. Initially Modem is in Auto baud mode. This GSM/GPRS RS232 Modem is having internal TCP/IP stack to enable you to connect with internet via GPRS. It is suitable for SMS as well as DATA transfer application in M2M interface [3]. The modem needed only 3 wires (Tx, Rx, GND) except Power supply to interface with microcontroller/Host Pc. The built in Low Dropout Linear voltage regulator allows you to connect wide range of unregulated power supply (4.2V -13V). Using this modem, you will be able to send & Read SMS, connect to internet via GPRS through simple AT commands.

3.4. Temperature sensor

The LM35 is an integrated circuit sensor that can be used to measure temperature with an electrical output proportional to the temperature (in DC) [4]. If the temperature is high then the fan will on and vice versa. The scale factor is 0.01V/ 0C. The LM35 does not require any external calibration or trimming and maintains an accuracy of +/- 0.1% at room temperature and +/- 0.1% over a range of 0°C to + 100°C.

3.5. Eye Blink Sensor

The eye-blink sensor works by illuminating the eye and/or eyelid area with infrared light, then monitoring the changes in the reflected light using a phototransistor and differentiator circuit. The exact functionality depends greatly on the positioning and aiming of the emitter and detector with respect to the eye.

3.6. Heart Beat Sensor:

The sensor which measures heart beat is called heart beat sensor. Heart Beat can be measured based on optical power variation as light is scattered or absorbed during its path through the blood as the heart beat changes [7].

3.7. Vibration motor:

The primary function of the vibration motor is to alert the user to incoming calls. Vibration motors are normally classified into cylinder type and button type. Here, we will look at how the cylinder type works.

3.8.GSM:

GPS receiver takes the information from the satellite and uses the method of triangulation to determine a user's exact position. The working/operation of Global positioning system is based on the 'trilateration' mathematical principle. The position is determined from the distance measurements to satellites. From the figure, the four satellites are used to determine the position of the receiver on the earth. The target location is confirmed by the 4th satellite. And three satellites are used to trace the location place. A fourth satellite is used to confirm the target location of each of those space vehicles. Global positioning system consists of satellite, control station and monitor station and receiver.

3.9.IR Sensor:

In this project, the transmitter section includes an IR sensor, which transmits continuous IR rays to be received by an IR receiver module. An IR output terminal of the receiver varies depending upon its receiving of IR rays. Since this variation cannot be analyzed as such, therefore this output can be fed to a comparator circuit. Here an operational amplifier (op-amp) of LM 339 is used as comparator circuit.

When the IR receiver does not receive a signal, the potential at the inverting input goes higher than that non-inverting input of the comparator IC (LM339). Thus the output of the comparator goes low, but the LED does not glow. When the IR receiver module receives signal to the potential at the inverting input goes low. Thus the output of the comparator (LM 339) goes high and the LED starts glowing. Resistor R1 (100), R2 (10k) and R3 (330) are used to ensure that minimum 10 mA current passes through the IR LED Devices like Photodiode and normal LEDs respectively. Resistor VR2 (preset=5k) is used to adjust the output terminals. Resistor VR1 (preset=10k) is used to set the sensitivity of the circuit Diagram. Read more about IR sensors.

IV. CONCLUSION

In this paper, we have reviewed the various methods available to determine the drowsiness state of a driver. This paper also discusses the various ways in which drowsiness can be manipulated in a simulated environment. The proposed system is used to avoid various road accidents caused by drowsy driving and also this system used for security purpose of a driver to caution the driver if any fire accident or any gas leakage .This paper involves avoiding accident to unconsciousness through Eye blink. Here one eye blink sensor is fixed in vehicle where if driver lose his consciousness, then it alerts the driver through buzzer to prevent vehicle from accident.

The alcohol and temperature sensor are used for further safety system in the vehicle. Development of a hybrid microcontroller for a vehicle which also consists of an alcohol and temperature detector which will sense if the driver is drunk and would not start the vehicle. A complete study on road safety is going to be the next boom for the automobile industry for it to flourish and survive every human from the risk. The main advantage of this paper is the accuracy of using physiological parameters to detect drowsiness is really high. This helps in preventing most of the road accidents that occur due to fatigue.

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