

## Automatic Driver Drowsiness Alert System using GSM

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Article Received: 21 June 2020

Article Accepted: 29 August 2020

Article Published: 22 September 2020

### ABSTRACT

*Drowsy is the motive for maximum of the road accidents. Manually tracing the drowsy motive force is not a clean venture, because every day heaps of vehicles are strolling at the roads. So we need a device that must include each vehicle and if it detects the sleepy driver it needs to prevent the automobile straight away. In addition to this if the driving force is slept the car may be stopped, and it monitors the coronary heart-beat, Respiration rate and temperature of the motive force and presentations it within the LCD. These three parameters are very crucial because it indicates the frame reputation of the driver. These parameters are monitored manually and in case of emergency the in-fee of the ward calls the health practitioner.*

### 1. Introduction

Many traffic-safety related investigations claim that there is a correlation between the road condition and the number of accidents. An internal study at Volvo Cars claim that 15% of all accidents occur owing to low tire-to-road friction. This is to be avoided by introducing many systems like Anti-lock Brake Systems (ABSs), collision avoidance systems, Advanced Driver Assistance Systems (ADAS). Among these systems ADAS is mainly used in this project to reduce the road accidents. For that, ADAS is utilizing the combination of three sensors like ultrasonic sensor, yaw rate sensor, and steering angle sensor. The above mentioned sensors are used to detect (i) The obstacles crossed in front of the vehicle (ii) Friction between the tire and road (iii) Steering fault respectively. The combination of three sensors which are controlled by one PIC microcontroller is producing an appropriate and effective result compared to the other systems.

#### 1.1 PIC 16F877A Microcontroller

Peripheral Interface Controllers (PIC) is one of the advanced microcontrollers which is developed by microchip technologies. These controllers are more advanced than normal microcontroller like INTEL 8051. PIC 16F877 is one of the most advanced microcontroller from Microchip. Because of its low price, wide range of applications, high quality, and ease of availability, this controller is widely used for experimental and modern applications. Main feature of this microcontroller is, it can be reprogrammable. The entire system controlled by this micro controller. All the sensors connected to the micro controller, based on the information given by the sensor the controller controls the vehicle. Power supply is 12v to the micro controller.

#### 1.2 Ultrasonic Sensor

This ultrasonic distance sensor gives stable and correct distance measurements from 2cm to 450cm. It has an accuracy of 2mm and focus of much less than 15 degrees. This sensor makes use of ultrasonic sound to degree distance similar to bats and dolphins do. Ultrasonic sound has this kind of high pitch that humans can't hear it. This specific sensor sends out an ultrasonic sound that has a frequency of approximately forty kHz. Ultrasonic sensor has essential components: a transducer this is used to create an ultrasonic sound and

every other one is used to listens for its echo. This sensor used to stumble on the item in the front of the automobile while the automobile transferring I any item is detected, it offers information to the controller unit. The controller unit controls the spoil or engine. Here, ultrasonic HC –sr04 sensor used for distance dimension up to 6m.

## 2. Experimental Setup

### 2.1 Block Diagram

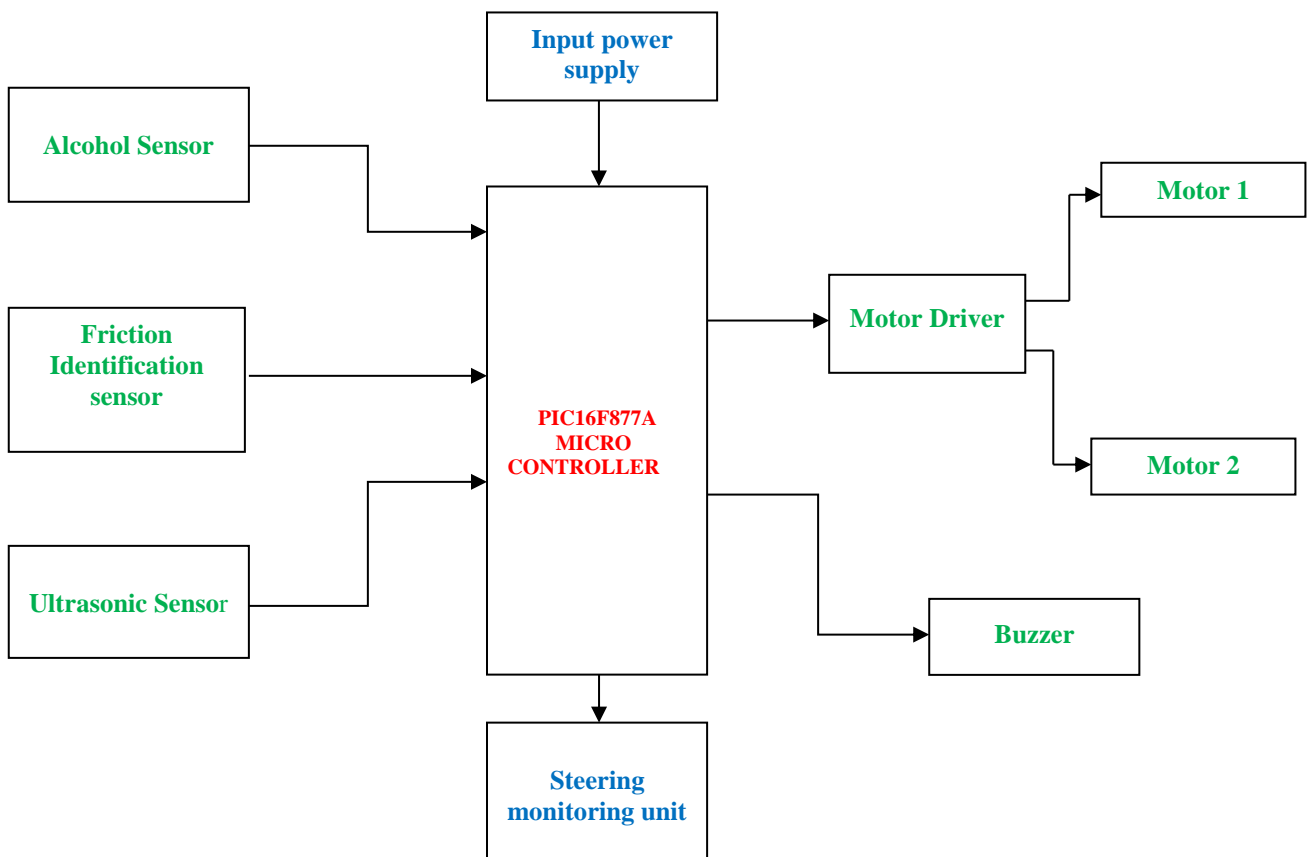


Fig.1



Fig.2

### 2.2 Friction Identification Sensor

When the vehicle is moving, sometimes there is a loss of friction between the tire and road. In that time, yaw rate sensor is used to detect the vehicle's angular velocity around its vertical axis. If there is a friction

between the tire and road, the sensor will transmit the information to the controller. Controller controls the break or engine. Here, Infinite G-35 yaw rate sensor is used for friction measurement.



**Fig.3**

### 2.3 Steering Sensor

Steering sensor is mounted on the steering shaft. It is mainly used to measure angle of steering wheel. Loss of control on steering can be estimated using this sensor. If any steering fault occurs, steering sensor intimates the micro controller and the controller control the break or engine.



**Fig.4**

### 2.4 DC Motor

In a dc motor, the stator poles are furnished via dc excitation current, which produces a dc magnetic subject. The rotor is furnished with the aid of dc present day via the brushes, commutator and coils. The interplay of the magnetic subject and rotor current generates a force that drives the motor. The magnetic discipline lines input into the rotor from the north pole (N) and go out closer to the south pole (S). The poles generate a magnetic field that is perpendicular to the modern carrying conductors. The interaction between the sector and the modern produces a Lorentz force.



**Fig.5**

### 2.5 Buzzer

A buzzer or beeper is a signaling device, typically electronic, usually utilized in automobiles, family appliances which include a microwave oven, or sport suggests. Another implementation with some AC-linked gadgets was to enforce a circuit to make the AC present day into a noise loud sufficient to force a loudspeaker and hook this circuit up to areas on ably-priced eight-ohm speaker. Nowadays, it's far greater famous to apply a ceramic-primarily based piezoelectric sounder like a Son alert which makes a excessive-pitched tone. Usually those have been installed to "driving force" circuits which varied the pitch of the sound or pulsed the sound on and off.



**Fig.6**

### 2.6 LCD

In recent years the LCD is finding sizeable use changing LEDs (seven- section LEDs or different multi segment LEDs). This is because of the subsequent motives: The declining prices of LCDs. The ability to display numbers, characters, and photos. This is in comparison to LEDs that are restricted to numbers and some characters. Incorporation of a refreshing controller into the LCD, thereby relieving the CPU of the mission of refreshing the LCD. In evaluation, the LED must be refreshed by way of the CPU (or in a few other manner) to maintain showing the information. □ Ease of programming for characters and images



**Fig.7**

## 3. Requirements

### 3.1 Software Requirements

- Mp Lab Ide
- Proteus Simulator
- Ccs C Compiler

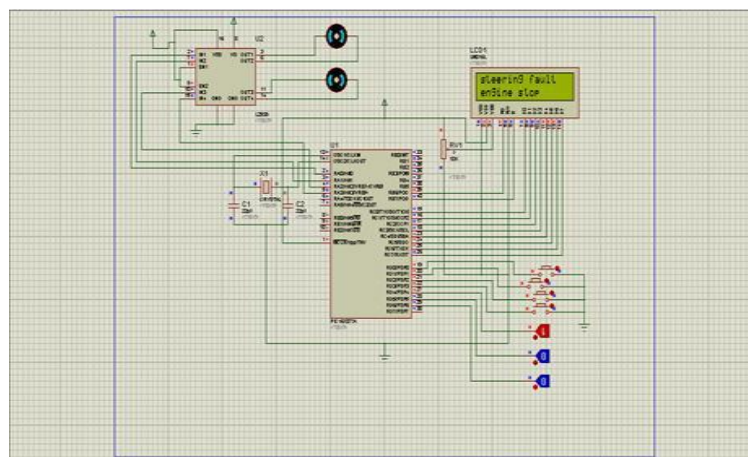
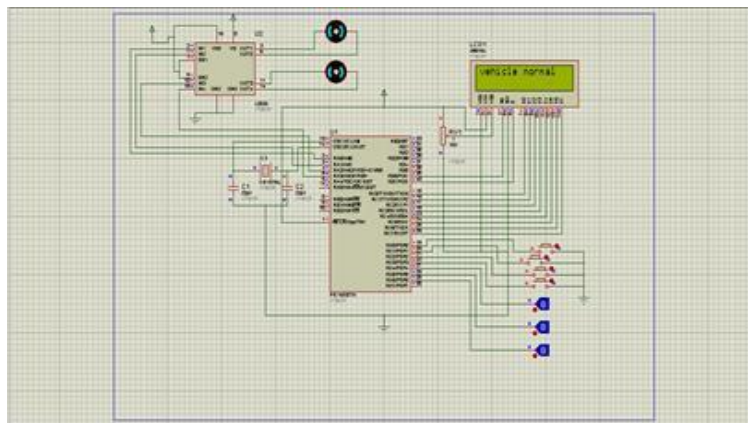
### 3.2 Hardware Requirements

- Pic16f877a Microcontroller

- Gsm
- Buzzer
- Dc Motor
- Usb Cabel
- Switch

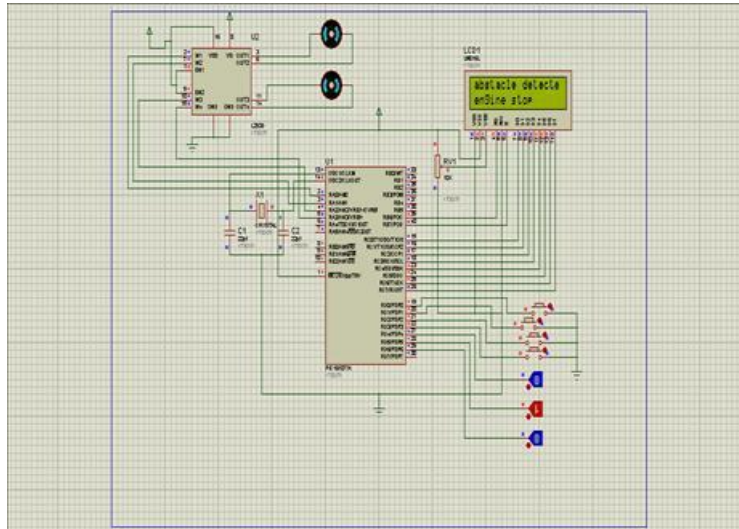
#### 4. Experimental Results

The sensible ADAS system is simulated the use of proteus ISIS-7 software program. Proteus is layout software program evolved through Lab middle Electronics for electronic circuit simulation, PCB design and schematic seize. Its simplicity and user friendly layout made it popular amongst electronics fanciers. Proteus is commonly used for digital simulations which include microprocessors and microcontroller.



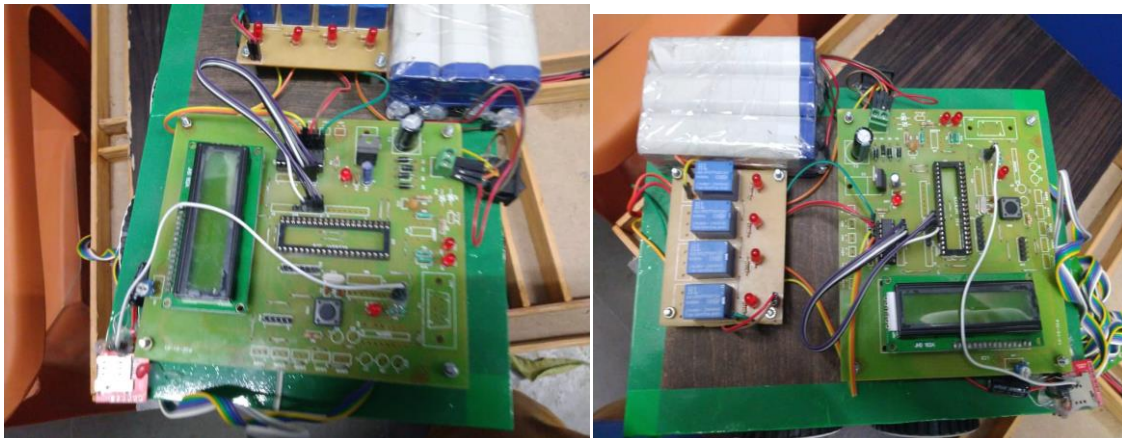
In the simulation, if guidance angle sensor is in lively country, the simulation is used to show the statistics to the driving force like steerage fault.

If ultrasonic sensor is in energetic kingdom method, the simulation is used to intimates the driving force by means of sending an alert message through LCD Finally, yaw charge sensor is in lively nation method, road friction, engine forestall" message is displayed on the LCD display. After the simulation the respective software is embedded in to the microcontroller IC PIC16F877A using PIC programmer kit.



The crystal oscillator of 20MHz frequency is attached to the microcontroller to generate required clock cycles. Microcontroller needs an electricity deliver of 12V that's furnished by battery.

## 5. Result



## 6. Advantages and Applications

- ✓ Simple methodology
- ✓ Easy implementation thanks to without delay offered hardware and code
- ✓ An inexperienced machine to choose out person alternativeness supported fatigue detection It is used in detect the Driver health monitoring.
  - Alcohol detection
  - Buzzer is used to alert the driver.

## 7. Conclusion

In fashionable, there are many avenue accidents as a result of street friction, steerage fault and obstacles crossed in front of the automobile. In order to decrease the road accidents this task implements an Intelligent ADAS to locate tire-road friction facts, obstacle crossed in the front of the automobile and extraordinary

steerage conditions for the duration of ordinary using. This machine is simulated correctly by means of the usage of Proteus and also applied the usage of hardware. From the simulation result, this machine effectively detects the abnormal elements together with tire street friction, limitations in front of the vehicle, guidance condition to keep away from road accidents.

### **Declarations**

#### ***Source of Funding***

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

#### ***Competing Interests Statement***

The authors declare no competing financial, professional and personal interests.

#### ***Consent for publication***

We declare that we consented for the publication of this research work.

#### ***Code availability***

The programming code that we have used for this research is available and authors are willing to share when it is required.

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