Hybrid Driver Safety, Vigilance and Security System for Vehicle

STUDENT Name : **Voruganti Hymavathi**

B. Tech + M.tech (ECE): Vathsalya institute of science & Technolog (Embedded systems)

GUIDE Name: **Penthala Mahender**

M. Tech (VLSI design) - Vathsalya Institute of Science &Technology

B.tech (ECE)-JJ Institute of Information Technology-

Abstract— **Accidents mainly occur due to driver carelessness. The main aim is to provide awareness and safety mechanism for the driver. Main reason of an accident is due to drowsiness, alcohol consumption and abnormal pulse rate of driving person. In addition to this theft detection, security system and person level identification is determined. In this paper alcohol detection and heart rate monitoring system, person level identification system, eye blink that is drowsiness level, theft detection and mobile free auto reply method is used to avoid an accident. Password authentication, calls divert method, pulse level and eye blink checking mechanism is processed. Each method is used to rectify the carelessness of the driver and immediate intimation technique is developed by use of GSM technology. Their simulation output is viewed by LABVIEW and the hardware module is obtained.**

Index Terms— **MQ3 sensor, IR sensor, Heart rate monitoring system, Passive infrared sensor, Password authentication and auto reply SMS GSM.**

I INTRODUCTION

Road accidents and collisions occur frequently. Every hour, 40 people under the age of 25 die in road accidents. Most of the city accidents are due to carelessness of driver but outside the city, accidents occur due to drunken driving only. Due to health condition accident may occur, that is if there is a less pulse level then person may lead to unconscious stage. Loss of person is mainly due to heart attack, drunken driving only so this can be reduced by using different techniques. Alcohol detection method, Heart rate monitoring system, Human level identification methods are used to minimize the level of an accident. Apart from this due to driver vigilance within a fraction of second accident may occur. Most of the accidents occur, if person attends a phone call while driving.

To avoid this problem many technique have been used. For Heart rate heartbeats are typically expressed as beats per minute. Sensor is a device that detects changes or events in quantities and provides an output corresponding to the input the signal generally is in optical or electrical signal. Sensors obey certain condition and rules. It is sensitive to the measured property only. It is insensitive to any other property likely in its application. An individual PIR sensor detects changes in the amount of infrared radiation. Their value varies on the temperature and surface characteristics of the objects in front of the sensor. The sensor converts the resulting change in the incoming infrared radiation into a change in the output voltage, and this triggers the detection. For counting the eye blink and detecting the drowsiness level by use of IR sensor. Every year nearly 1.4 million people have been killed because of the wireless customers. There is a highly efficient automatic system for early detection of incoming and outgoing call. Detecting the causes such as alcohol consumption, range pulse level, person and drowsiness level identification, theft detection and security systems are handled in the hybrid driver safety awareness method.

II HYBRID MEHODS

Generally Hybrid word is used for combining more number of components in a single system. Likewise there are pulse level monitoring, drowsiness detection process are present. Different process combined together to provide an awareness for the driving person. Hybrid driver safety method consist of different methods. Vigilance method is nothing but drowsiness detection method. Safety method is based on theft detection system this is identified by use of the password authentication process.

III ACCIDENT AVOIDANCE SYSTEM

In accident avoidance system: Drunken driver prevention, human level detection and heart rate measurement method is used. These preventive methods are mainly used for avoiding accident. If a driving person consumes any alcohol or drug this made the person to become an unconscious stage due to this accident occurs. Accidents occur due to loss of health conditions or without the knowledge of owner that is due to less oxygen level inside the vehicle is reduced then person die. Three methods namely drunken driver prevention, human level

detection and heart rate measurement methods are used. These three methods are mainly used to avoid the accident.
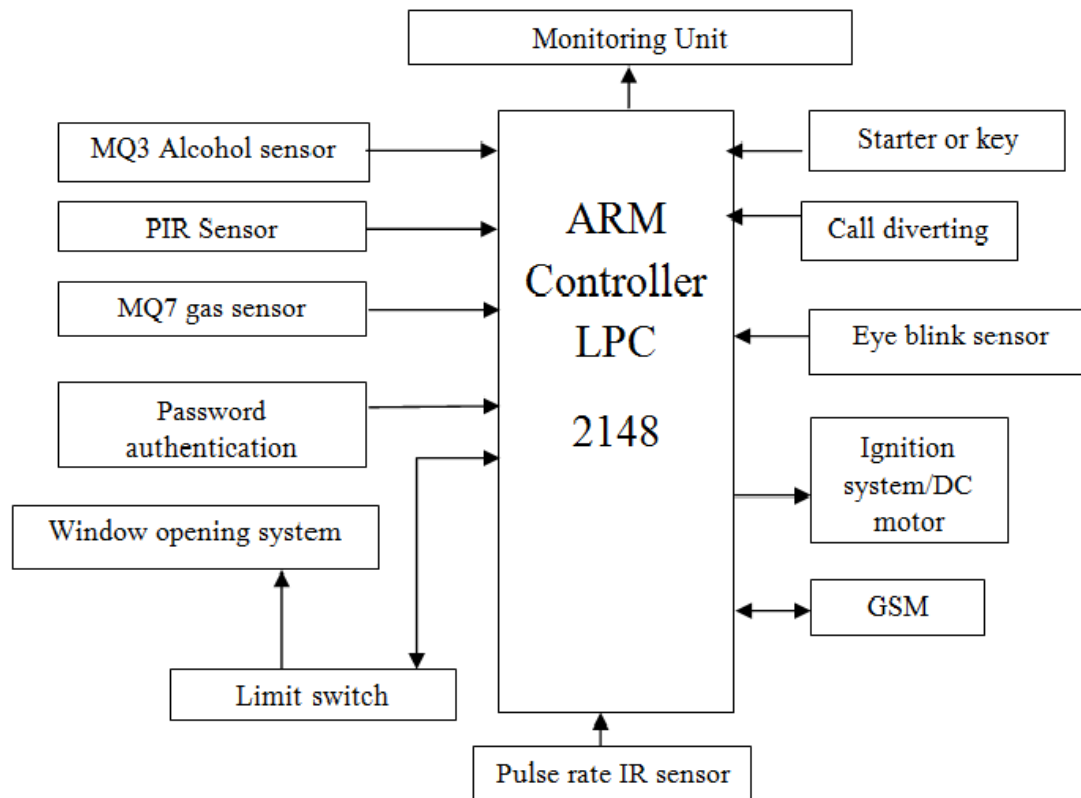

Fig 1 : Hybrid safety and security system for vehicle

This Figure 1.Hybrid safety and security system for vehicle uses different sensors such as alcohol sensor, passive infrared sensor, MQ7 gas sensor. These methods are mainly used to sense the signal and these signals are controlled by the controller.ARM controller LPC 2148 is programmed based on alcohol condition, human level detection and pulse rate monitoring.

In addition to this three method driver vigilance level is detected and if the person is in abnormal condition then for driver side alarm is given then for the theft detection method theft is identified by use of the password matching method. For security system password method is used. Then accident occurs due to attending phone call to avoid this process call diverting technique is used. These varieties of methods are used in the hybrid driver safety and security method.

Each signal from the sensor is received by the controller then comparing with the different inputs then output is obtained. Alcohol sensor instructs the driver to blow air into the sensor unit and checks the alcohol content present in the driver breath. Heart rate sensor is used for measuring the pulse rate. If pulse level is high even in that case if driver drives the

vehicle then the system will apply brakes automatically to slow down and halt the vehicle. By use of MQ7 sensor when person is inside carbon-di-oxide level is determined and there is an automatic anti locking system for window opening process. For eye blink sensor IR sensor is used to sense the signal. If Eye Blink range is less then automatic intimation is given. Theft detection and security system are present in the hybrid model. This hardware module is laced in vehicle side and intimation is passed through use of GSM technology and these outputs are viewed using LABVIEW software through interfaced process.

A.Alcohol Detection Method

Alcohol Detection system is used to measure the alcohol content present in our body. If alcohol content is high, then there is a reduction in breathing level, due to this accident may occur. The amount of alcohol in blood is called blood alcohol level. Alcohol level is measured by use of the gas detecting sensor. There is an MQ3 gas sensor, which is used to detect the alcohol level and their values are sent to controller. If the value is higher than the threshold value then ignition system is not yet started.

There is an alcohol testing feature which instructs the driver to blow air into the sensor unit and then it checks the alcohol content present in the driver breath. If the value has crossed a certain limit the vehicle ignition will be locked which prevents a drunken driver from starting the vehicle. Alcohol Detection Method used to detect the alcohol content, in this MQ3 alcohol sensor unit is used to check the breath of a person whether the alcohol consumed or not. Here the analog signal is converted to the digital form then the signal is given to the ARM circuit because controller consumes only the digital form. The ARM is programmed with certain threshold voltage. The low medium and the high threshold level of an alcohol condition are programmed into the ARM circuit, if higher then alarm obtained at the vehicle side. If the alcohol consumption is less, then the condition is verified.

If the driver consumes more alcohol thereby the condition is not satisfied. Therefore power supply insufficient to the controller and the relay switch. Hence the ignition system is not connected and the DC motor turned to OFF condition. Alarm sound is obtained. Alcohol consumed by the driver is measured and the output graph viewed in LABVIEW for different values. From this alcohol consumption of driver is checked hence the crash or accident is avoided and for different ranges of input values the output is obtained.

B. Heart Rate Sensor Method

Heart rate sensor method is a simple device that receives a sample of signal in form of pulse rate and calculates the heart beat signal as beats per minute. Normally human heart rate is about 70 beats per minute for adult males and 75 beats for adult females. Generally there are different types of condition for heart rate. If the heart rate signal is of normal conditions is called as bradycardia and if it is in abnormal condition then it is known as tachycardia.
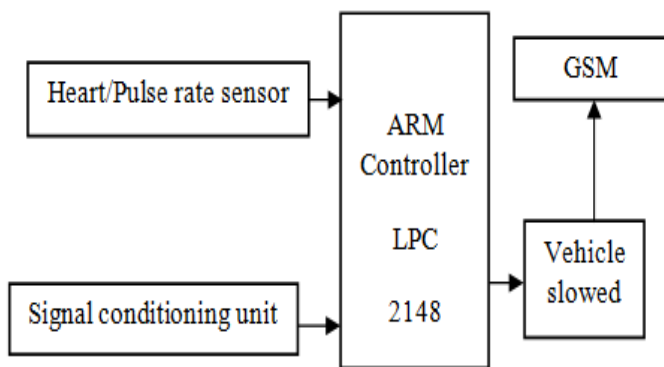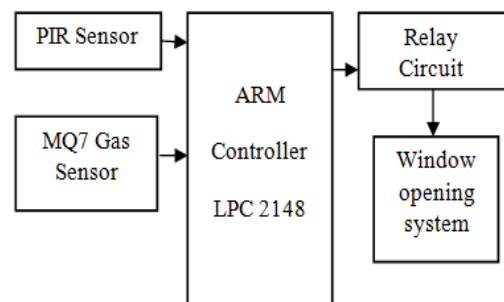
controller receives the amplified signal and if abnormal then the pulse rate is high. Then the vehicle slowed and stopped based on the conditioned programmed to the controller.

If ignition is started or in ON condition then the pulse rate is calculated for every 20 seconds as programmed to the controller. Normal pulse rate range is of 72 beats per minute. If the calculated value is higher or lower than the threshold value, then it is known as abnormal condition. In this case vehicle is stopped and intimation is sent by use of GSM. If pulse rate is in normal condition then the vehicle is moved without any restriction. Due to this checking process accidents can be reduced. Mainly if the value of pulse rate is abnormal it indicates that the driving person is very serious condition then information is sent to nearby hospital or relatives, this saves the human life. Heart rate sensing method used for the measuring heart rate the first the pulse rate is measured through the sensor based on the input and output signal the variation is determined.

If range of the pulse is high then condition is checked if higher than the threshold value then by use of relay switches the vehicle is slowed and stopped, then in an emergency condition information is send to the predefined number through the GSM technology.

C. Human Level Identification Method

In this case if any person inside the vehicle human level identification method is used to identify number of person inside the vehicle and then intimation is send to the owner of vehicle. The main use of human level identification method is to identify the person inside the vehicle. Passive infrared sensor is used this detects the human level. If vehicle is not in use in that case window of the vehicle is in closed condition in such situation if any person is inside the vehicle without the knowledge of the owner then the person inside the vehicle will lose their oxygen level, here the carbon-di-oxide level is increased due to this person may die.

Fig 2 : Heart Rate Sensor Method

This Figure 2.Heart rate sensing method is used to measure the pulse rate. The normal and abnormal condition of the pulse level organized. If the pulse level is in abnormal condition then the amplified signal is fed to the controller. The

Fig 3: Person level identification

This Figure 3.Person level identification uses MQ-7 gas sensor consists of two parts. One is heating circuit having time control function in which there is a high and the low voltage.

Then second is the signal output circuit. Passive infrared
B.Theft detection system sensor is a pyroelectric device
which is used to detect the

person by use of infrared sensor. Relay switch works based on
the input signal. If the value of input signal is in abnormal
then switch is opened condition. Limit switch is used to
indicate gate is in lock or opened. If there is a person inside in
this cased limit switch is used to open the window.

IV DETECTING METHOD

Detection methods include two ways. One way is Eye
blink sensor method, next is theft detection process. These two
methods are used to avoid accident and protect the vehicle.

A.EYE Blink sensor

Driver fatigue resulting from sleep deprivation or sleep
disorders is an important factor in the increasing number of
accidents on today's roads. Most of the accident occurs due to
drowsiness. This drowsiness level is detected by use of eye
blink sensor. IR sensor is used detect the blink of an eye. In
this IR transmitter is used to transmit the infrared rays in eye.
The IR receiver is used to receive the reflected infrared rays of
the eye. If the eye is closed means the output of IR receiver is
high otherwise the IR receiver output is low. This to know the
eye is closing or opening position. The signal is given to IR
transmitter whenever the signal is high, the IR transmitter
LED is conducting it passes the IR rays to the receiver. The IR
receiver is connected with comparator which is constructed
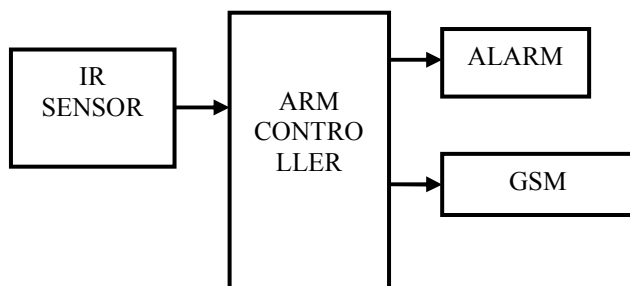with LM358 operational amplifier.

The vehicle anti theft system consists of different layers
such as password detection and the matching process .Theft
occurs based on which the doors are opened. Once the vehicle
is turned ON then with the mechanical keys along with correct
key number door is opened. Vehicles theft is identified by use
of the password method.

If the password is matched then only the vehicle is started
and then intimation is send to the owner of the vehicle.
Keypad switch is used for authentication process. If Password
matched - intimation is send to owner, ignition is started. The
password is given to the ARM controller from the keypad
switch the password is given. If the password is matched then
the intimation is send to the owner hence the vehicle is started.
If password is not matched then vehicle is not started then
intimation is send to the owner. Thus theft of the vehicle is
identified and hence security system is provided.

V RESULT

Hardware module and LABVIEW simulation for driver
authentication and accident avoidance system was done and
output was obtained. Figure 5. Hardware module for hybrid
driver safety system is obtained with three methods namely
alcohol detection, heart rate monitoring system, person level
identification method, eye blink sensor and theft
identification. Based on alcohol consumption different values
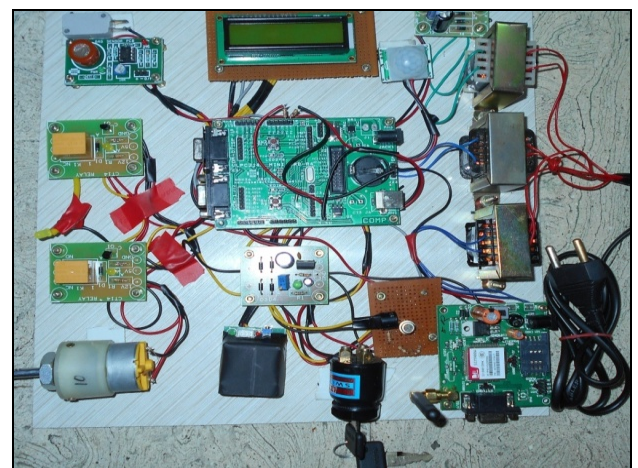are ranged with the inputs such as normal and abnormal
conditions.

Fig.4 Eye blink detection

There is an inverting and non inverting input terminal in
which based on the reference signal and input signal the
output is obtained. In figure 4. Eye blink detection sensor is
used to identify the blink of person while driving and their
range is compared . The compared output is give to the ARM
controller and if their value is greater than the threshold value.
If the value is high then alarm sound is produced. Counting of
an eye blink is calculated. For every 20sec eye blink is
counted and if the count of eye blink is less than the threshold
value then alarm sound is produced and immediately
intimation is send to owner of the vehicle. For each power
supply is given and their outputs are viewed in module.

Fig 5: Hardware module for hybrid driver safety system

If the alcohol consumed by the person is above threshold value
then it is said to be abnormal condition. For alcohol detection
method, if the consumption of alcohol value is above abnormal
then ignition system is not yet started by use of DC motor and

hence alarm is obtained and intimation is send to the owner of vehicle.

For the heart rate monitoring system pulse rate is measured, if the pulse rate is higher than the normal pulse value then it indicates as abnormal condition then ignition or running vehicle is slowed and stopped and then automatically intimation is sent to the prescribed number through GSM modem.

Then for person level identification, passive infrared sensor this is used to check whether any person is inside the vehicle and then automatically intimation is send to the owner. For the alcohol detection and heart rate monitoring system the output graph is obtained in hardware module and using LABVIEW software. Output viewed in mobile phone through GSM technology.

1.ALCOHOL DETECTED
2.H.PULSE NORMAL
3.H.PULSE ABNORMAL
4.CO GAS DETECTED
5.CO GAS DETECTED SOME ONE PRESENT IN CAR

In LABVIEW there are two sections such as block diagram and front panel. Nearly 14 values are prefixed from this true or false conditions are checked and for this value alcohol waveform and the heart beat waveforms are obtained.
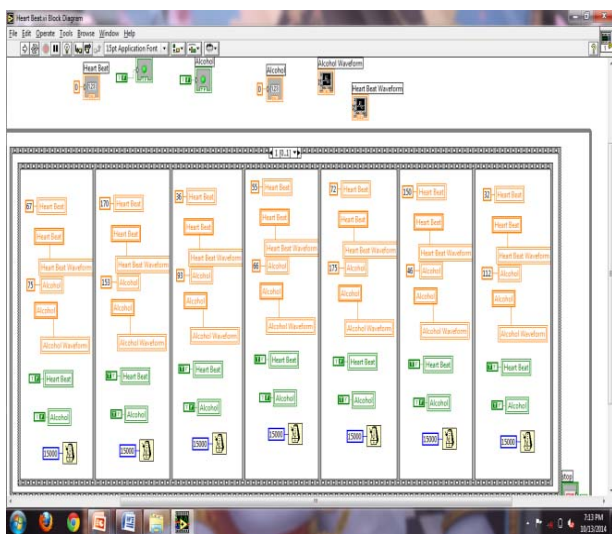

Fig 6: Block Diagram of LABVIEW

This Figure 6.Represents the Block Diagram of LABVIEW software contains heart rate and alcohol with certain value. In this different values are used for heart beat and alcohol detection. There is delay for each input and the corresponding output waveforms are obtained. In LABVIEW there is a

Figure 7 represents front panel in this the output waveforms are obtained for the heart rate and alcohol consumption value. In this the Heart beat and alcohol output waveforms are obtained. If the pulse rate is below certain value then it is an abnormal condition. In this heart beat value is 70 and the alcohol range is 90.
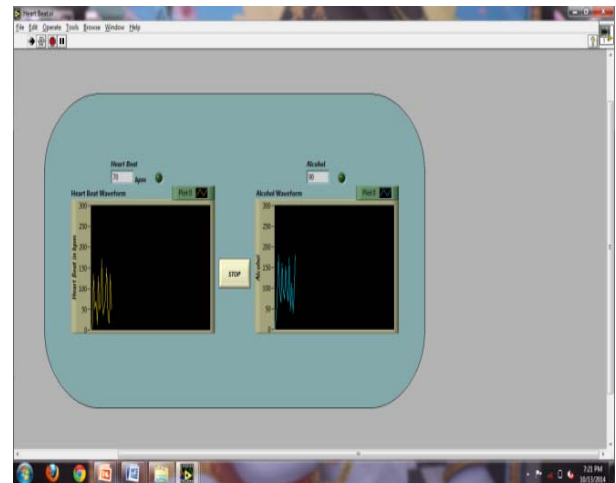

Fig 7 : Output waveform

This is normal condition and graph is for the heart beat in beats per minute and alcohol consumption.Figure6. output waveform for heart beat 72 is the normal condition the alcohol consumption should be less than 100 if the value is above threshold then it is an abnormal condition.
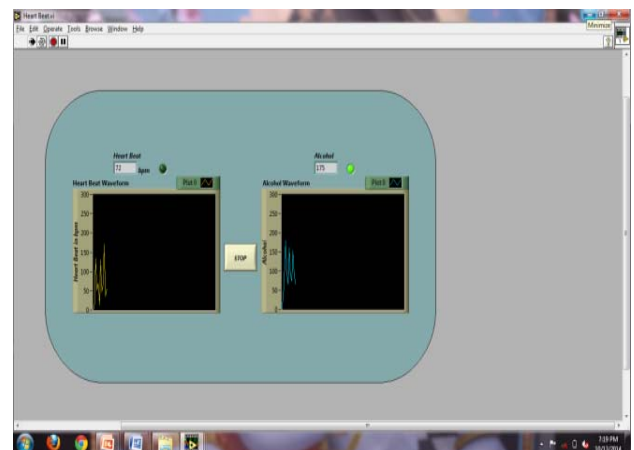

Fig 7: output waveform for abnormal

The Figure7 represents output waveform for abnormal condition. In this heart rate and alcohol consumption is of 170 and 150, so it is abnormal condition. Thus for different value

of input the output waveforms are obtained. Thus in this section for different input values output waveforms are obtained.

CONCLUSION

The presented work is used to avoid the accident by use of heart rate monitoring system, alcohol detection and person level identification method in addition to this three method there is detection method such as eye blink sensor, theft detection, security system is used. LABVIEW simulation is obtained by giving different input to the process. Mobile hand held system and face recognition techniques can be used for future application.

REFERENCES

[1] Alexander M. Chan, Nandakumar Selvaraj, Nima Ferdosi,andRavi Narasimhan,(2014)'Wireless patch sensor for remote monitoring of Heart Rate Respiration, Activity and Falls.

[2] AartsL.andSchagen, (2005)Driving Speed and the risk of roadcrashes',AccidentAnalysis and Prevention.

[3] Byon Y, Shalaby A. and Abdulhai B, 2006'Travel time collectionandtraffic monitoring via GPS technologies.

[4] Chin Teng Lin, 2014'Wireless and Wearable EEG System for Evaluating Driver Vigilance', IEEE Transactions on biomedical circuits and systems, Vol.15,No.8,pp.230-255.

[5] Chuan L. and Hong,'Method of Freeway Incident Detection Using wireless Positioning', in proceedings of the IEEE International Conference on Automation andLogistics.

[6] Chi Zhang, Hong Wang and Rongrong Fu,'Automated Detection of Driver Fatigue Based on Entropy and Complexity Measures',IEEE Transaction on intelligent transportation systems.

[7] Dai, Jin Teng, Xiaole Bai, Zhaohui Shen(2010),'Mobile PhonebasedDrunk Driving DetectionPervasiveComputing TechnologiesforHealthcare',InternationalIEEEConference

[8] ElviR,Christensen and Amundsen,2004,'Speed and road accidents An evaluation of the Power Model', Institute of Transport Economics, Oslo.

[9] Khaled Hossain M. and Sayed Samial,2013,'Detection of Car Pre-Crash with Human, Avoidance System & Localizing through GSM',International Journal of Scientific and Research Publications.

[10] Martinez F,Toh, Cano J.C, Calafate C. and Manzoni P, 2010,'Emergency services in future intelligent transportation systems based on vehicular communication networks', IEEE Intelligent Transportation Systems Magazine.