Perspectives in Communication, Embedded-Systems and Signal-Processing (PiCES) – An International Journal
ISSN: 2566-932X

Survey On Enhancing the Vehicle Security Using IoT

Vaibhavi M
Student, Jyothy Institute of Technology, CSE, Bangalore, India

Sushma H S
Student, Jyothy Institute of Technology, CSE, Bangalore, India

Tejashree M
Student, Jyothy Institute of Technology, CSE, Bangalore, India

Pallavi K S
Student, Jyothy Institute of Technology, CSE, Bangalore, India

Manoj Kumar M
Assistant Professor, Jyothy Institute of Technology, CSE, Bangalore, India

Abstract: Accidents and drunk & driving are becoming the main sources of street mishaps. It causes heavy loss of property and death. In this framework, the driving vehicles consuming under the influence of alcohol can be prevented and the accidents that are suddenly caused while driving can be detected, immediately the alcohol sensors sense the limit of alcohol, a connection is made to the motor of the vehicle which is locked when the sensed value goes beyond the limit and the Vibration sensor will detect the signal, if the car rolls over, or if there is huge damage and informs the microcontroller respectively. The microcontroller will send this detected signal to the GSM module. The GSM module begins the transmitting of this accident data along with the accurate position of the person. So, the concerned person can instantly trace the location with the help of a GPS Modem.

Keywords: Arduino; Alcohol sensor; LCD display; GSM module; Vibration sensors

I. INTRODUCTION

The idea of the paper is to present a framework using IoT, which assists in recognize accidents and inform them instantly. These can be attained by integrating the smart sensors in a microcontroller within a vehicle which will trigger during the time of accidents. This complete framework has the advantage of a little volume and high dependability. Here we are building an Auto-Lock Framework. The contribution to this system is the Discovery of Sensors from Liquor Breath, vibration sensors, or some other equipment. The applications have been divided into modules based on functionalities. . This module was designed to build an integrated system to cover various aspects related to Automatic Alcohol and Accident Detection using the Android application. This application is designed using location tracking through GPS technology. This includes a GSM module, sensors, and LCD. All these systems focus on saving the driver's life who has consumed alcohol and will immediately give an update to emergency contacts about the location of the vehicle and inactivating the engine, in the process of saving precious lives.

II. RELATED WORKS

A. Alcohol Detection with Ignition Lock

Drivers can measure the alcohol level before entering the vehicle, thus it reduces the temptation to drive. And also, the device confirms that the gas is human exhaled breath and detects the alcohol level simultaneously, which is an improvement over the available device.

The water vapor sensor will identify the saturated water vapor from the human breath. When the breath is released on the sensors, an oxide insulator is sandwiched in between two electrodes, the insulator will absorb the water vapor, and then an electric current will flow in between the two electrodes. Furthermore, to extend the length of the electrodes and narrow the distance between the micro comb-shaped electrodes are used, which improves the sensitivity of the sensor. This sensor contains a heating layer that will stop condensation before the measurement. Since the detection area width is 1.5 mm, the device will detect the minimum amount of saturated water vapor. To improvise the accuracy of measurement, three kinds of semiconductor gas sensors are used, that is hydrogen specific (SB19), ethanol specific (SB30), and acetaldehyde specific (SB33) sensors to calculate gas concentration [9]. These three kinds of gases are the major components of breath after the consumption of alcohol. In regular exhaled breath, hydrogen gas is ppm level and derives from the activity of the intestines. Additionally, acetaldehyde—a metabolite of ethanol—exists in exhaled breath after alcohol is consumed. All of the remaining gases in exhaled breath are in sub-ppm concentration or are not detected by the sensors.

B. Accident Detection

Speed is an important and major risk factor for the driver. It increases the risk of being involved in a crash. People require processing time to decide whether or not to react and then to execute an action.

At high speeds the distance between starts to brake and a complete standstill is large. The Braking distance is proportional to the square of speed [4]. Hence, the possibility to avoid a collision is smaller as speed increases. A moving body contains Kinetic Energy. When an accident occurs, kinetic energy is transformed into destructive forces that cause injury to occupants. Here accelerometer (vibration sensor) detects the tilt of the vehicle. The X-axis of the accelerometer (vibration sensors) is taken for checking whether the bike has fallen or not. The output voltage of the accelerometer is made low when the angle of inclination is more than the critical value mentioned. Thus when a low signal output is being produced and send to the microcontroller, the microcontroller will confirm an accident being occurred [7].

III. LITERATURE SURVEY

A. Alcohol Detection with Ignition Lock:

a) This system uses the MQ3 alcohol sensor along with Arduino and the GSM module to send message alerts for emergency numbers and LCD Displays to notify that the alcohol is detected or not and the DC motor will sense the alcohol and automatically stops the motor.

   And the system checks the limit which is permissible; the sensor will trigger the processor about the respective voltage. Hence, the motor is automatically stopped by the system and message is sent to emergency contacts.

b) The complete framework has benefited with a little volume and high dependability. Here, we are building an Auto-Lock Framework. The contribution to this system is the Discovery of Sensors from Liquor Breath, vibration sensors, or some other equipment.

c) A system that would constantly monitor the drivers. It will detect the presence of alcohol. When the system detects the alcohol presence, it will control the engine. This system can be installed in all types of vehicles and also ensures the safety of drivers and passengers.

d) In this paper, the author suggested a method to sense the alcohol presence from the human breath and curtail the catastrophic effects it can have on peoples' lives. This system was designed and implemented successfully via the use of the Arduino Uno ATMEGA328 microcontroller and MQ-3 sensor.[8]

e) Using techniques in automobiles is feasible which will reduce accidents and injuries. The system will sense the alcohol from the driver's breath and stop the engine by interrupting the fuel supply. It proceeds with the development in the automobile industry regarding the accidents caused due to alcohol consumption.[9]

f) The project is developed by integrating an alcohol sensor with an Arduino board. The Arduino ATmega328 is able to handle more functions than a microcontroller.

   The alcohol sensor MQ3 will detect the alcohol presence in human breath. Since the sensor will have a sensitivity range of 2 meters, it will suit any vehicle and can be easily hidden from the suspects.[10]

B. Accident Detection:

a) The aim of this system is to detect accident and notify through message. Sensors and Wi-Fi-enabled processors are used for the system. The accident detection is done using the tri-axial accelerometer and the accident message notification is sent using the client and server-based system where the microcontroller is the client and the server is a web-based service. The accident detection system communicates with processor through vibration sensor values and erratic variations are constantly monitored. When there is an accident, the location and other details are sent to the emergency contacts with the help of cloud based service. The global positioning system will help to locate the vehicle [7].

b) The applications have been divided into modules based on functionalities. These modules helps in building of an integrated system for android based Automatic Accident Detection to cover various aspects. The accident locations are detected using GPS technology.[11]

c) These techniques include GSM and GPS technologies, Smartphone's, mobile applications vehicular ad-hoc networks. These systems focus on timely informing to emergency services about the location of the vehicle, in turn precious lives of occupants will be saved.[12]

d) This system will collect position information using GPRS by Google Earth to manage focus. Using GPRS

   Surplus vibrations of an accident are detected using MEMS sensors and it will activate the above framework and sends the message to a specific server and Black box. The Black box will record the voice immediately.[13]

e) The visual eccentricity effect on threat glance detection, and brake response times were analyzed. Hence, with increasing the task eccentricity, the brake response time increases when it is measured from the driver's gaze direction to the front road way.

f) This proposed solution is an IoT-based smart vehicle system. This system requires no user interaction while driving or going in through an accident. It gives real-time alert to the driver and automatically controls the vehicle's speed.

IV. PROPOSED SYSTEM

Existing methods are working on a separate workbench dependent on the requirement separately.

We in our project are trying to place all of them in one vehicle system by improving some components like, in alcohol detection, a GPS will make sure a message will be sent to the recipient's house and authority. In accident detection existing system just sends the accident location to the concerned person but, we are trying to send messages even to the nearest hospital as it will reach as fast towards the victim. Likewise, some of the improvements can be made to our project.

The objective of our proposed system is to detect the presence of alcohol concentration in the human breath and to ensure the safety of the person. This system can be broadened with more innovative and advanced methods and to make it accessible in a financially effective way and also help people to ensure that they don't be left in danger when the accident occurs and this will help them reach out to the hospitals.

V. SYSTEM REQUIREMENTS

If an alcoholic driver is detected, then a signal will be sent to the fuel blocker by the microcontroller for blocking fuel supply to the ignition system and the ignition system will turn off along with SMS on LCD with alarm. Automatic Accident Detection and Messaging System Using GSM and GPS Modem proposed a system that detects the accident using vibration sensors and sends an alert message to the emergency contact for rescue.

A. Arduino UNO:

ARDUINO UNO is a microcontroller board and it is based on ATmega328P.It has all the things required to support the microcontroller and they are,6 analog inputs, 14 digital input/output pins, a USB connection, a power jack, an ICSP header, a 16 MHz quartz crystal and a button to reset. All we have to do is to connect it to the computer through a USB cable or else we should power it with either an AC-to-DC adapter or battery to get started. We can make use of the UNO without worrying about doing something wrong; the worst thing that might happen is that we might end up replacing the chip and start over again.

B. Alcohol Sensor (MQ3):

The analog gas sensor- MQ3 is suitable for detecting the presence of alcohol, this sensor can also be used in a breathalyzer. It has a high alcohol sensitivity and benzene sensitivity. The adjustment of sensitivity can be done by the potentiometer-sensitive material of the MQ3 sensor that is SnO2; in the clean air it has lower conductivity. When the target alcohol gas exists, the sensor's conductivity is higher along with the gas concentration rising, it will use simple electric circuit to convert the conductivity change to the corresponding output signal of gas concentration.

C. Liquid Crystal Display:

The Liquid Crystal Display screen which uses liquid crystals in primary form of operation. It is an electronic display module. A 16*2 LCD display is a basic module and it is usually used in number of devices and circuits. Liquid crystal display is preferred to seven segments and other multi segments LEDs.

D. GSM Module:

The Arduino GSM shield will allow an Arduino board to connect to the internet, receive and send SMS Using GSM Library and GSM module is used for sending the coordinates to rider's emergency contacts by SMS.

E. Vibration Sensors:

The vibration or acceleration of motion of a structure are measured using devices called Vibration Sensors. The mechanical force caused by a change in motion or vibration is converted by transducer into an electrical current using the piezoelectric effect.

F. Motors:

The speed of a DC motor is directly relative to the supply voltage. Hence, if we reduce the supply voltage from 12 Volts to 6 Volts, the motor will run at half the original speed. This is achieved when the value of battery is at 12Volts, the speed controller works by changing the average voltage received by the motor. It can be done by manipulating the voltage sent to the motor

VI. CONCLUSION AND FUTURE WORKS

We have accomplished our proposition, an IoT-based smart vehicle system that will enhance vehicle security and may help to decrease the number of losing life by severe accidents. That is, the system will be functional and available all day. The continuous alert and notification function of a device is the reason behind its robustness. Our future vision is to enhance the system so that it suits vehicle models. GSM modules can easily be added to our system which will improve message alert systems. GPS modules are easy to integrate into this proposed system without much modification. This will help in roadside data mining. By this, an alert message can be sent to the nearby hospital. Therefore, the performance of the system might definitely increase in future versions.

REFERENCES

[1] Hakani Raj A Assistant Professor.,Department of Electronics and Communication,Community Innovation & Co - Creation Centre (CiC3),Gujarat Technology, University, Ahmedabad, Gujarat, India. 978-1-4799-9991-0/15/$31.00 ©2015 IEEE.

[2] Mubashir Murshed1 and Md Sanaullah Chowdhury Department of Computer Science and Engineering University of Chittagong Chittagong, Bangladesh. International Conference on Applications and Techniques in Information Science (iCATIS2019), 19-23 Jan 2019.

[3] S Nagakishore Bhavanam, Dept of ECE, ANUCET Acharay Nagrajun University, Gunture India. Vasujadevi M , Dept of ECE, Chalapathi Institute of Engineering &Technology, Gunture India. International Conference on Innovations in Electronics and

Communication Engineering (ICIECE 2014) 18th & 19th July 2014.

[4] Md. Syedul Amin, Jubayer Jalil Department of Electrical, Electronic and Systems Engineering Universiti Kebangsaan Malaysia 43600 UKM, Bangi, Selangor, Malaysia. M. B. I. Reaz Department of Electrical, Electronic and Systems Engineering Universiti Kebangsaan Malaysia 43600 UKM, Bangi, Selangor, Malaysia. 978-1-4673-1154-0/12/$31.00 ©2012 IEEE.

[5] Balveen Singh Sahota , Niraj Rajpathak ,Tanmay Kadam ,Student, Electronics and Telecommunication, Dr. D.Y.Patil School of Engineering, Maharashtra, India.IJARIIE-ISSN(O)-2395-4396,2020.

[6] Aishwarya S.R1, Ashish Rai1, Charitha1, Prasanth M.A1, Savitha S.C2 U.G. Student, Dept. of ECE, M S Engineering College, Bangalore, India Assistant Professor, Dept. of ECE, M S Engineering College, Bangalore, India. 10.15680/ijircce.2015.0304101.

[7] Nicky Kattukkaran,Dept of Electronics, Cochin University of Science and Technology, Kerala, India. Arun George, Dept of Electronics, Cochin University of Science and Technology, Kerala, India. Mithun Haridas T.P, Dept of electronics, Cochin University of Science and Technology, Kerala, India. 978-1-4673-8855-9/17/$31.00 ©2017 IEEE.

[8] V. Niranjani1, C. Prabhu2, P. Nithesh3, M. Nithish4, S. Mohamad Riyas5 1Assistant Professor, Dept. of computer Science and Engineering., Sri Eshwar College of Engineering., Coimbatore, India 2,3,4,5UG Student, Dept. of computer Science and Engineering., Sri Eshwar College of Engineering., Coimbatore, India. International Journal of Research in Engineering, Science and Management , March-2019.

[9] Department of Computer Engineering, University of Maiduguri, Maiduguri, Nigeria Department of Computer Science, Emmanuel Alayande College of Education, Oyo, Nigeria Department of Electrical Engineering, University of Ilorin, Ilorin, Nigeria Corresponding Author: Dada Emmanuel Gbenga, Department of Computer Engineering, University of Maiduguri, Maiduguri,Nova Explore Publicarions,2017.

[10] Pranjali Ingalepatil, Priyanka Barhate, Bhagyashri Nemade, Vijay D. Chaudhari B.E student at Godavari College Of engineering, Jalgaon, Maharashtra, India Assistant. Prof. E&TC Engineering dept., GF's Godavari COE, Jalgaon, Maharashtra, India p-ISSN: 2395-0072 e-ISSN: 2395 -0056

[11] Patil Ashish N.1, Yadav Abhilash Head and Assistant Professor, Department of Computer Science And Engineering, AGTI'S DACOE, Karad, India1 Student, Department of Computer Science And Engineering, AGTI'S DACOE, Karad, India. ISSN (Online) 2393-8021

[12] Usman Khalil and Tariq Javid Graduate School of Engineering Science & Information Technology Hamdard University, City Campus. 978-1-5386-1556-0/17/$31.00 ©2017 IEEE.

[13] Dr.J.L.Mazher Iqbal, S.Heena Kousar, Madanaoalle Inistitute of Technology & Science, Angallu, ISSN 0973-4562 International Journal of Applied Engineering Research.