



# **iJRASET**

International Journal For Research in  
Applied Science and Engineering Technology



---

# **INTERNATIONAL JOURNAL FOR RESEARCH**

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

---

**Volume: 5      Issue: IV      Month of publication: April 2017**

**DOI: <http://doi.org/10.22214/ijraset.2017.4049>**

**[www.ijraset.com](http://www.ijraset.com)**

**Call:  08813907089**

**E-mail ID: [ijraset@gmail.com](mailto:ijraset@gmail.com)**

# **Advanced Arm Based System for Road Safety**

B. V. Ramana<sup>1</sup>, M. Sai Kumar Achari<sup>2</sup>, B. Shiva Teja<sup>3</sup>, D. Mahendra<sup>4</sup>, E. Kranthi Chaitanya<sup>5</sup>  
<sup>1,2,3,4,5</sup>ECE, JNTUA

**Abstract:** *Safe Journey is the important thing while travelling in vehicle. This paper explains about alerting the driver and make the vehicle to stop to prevent accident, if driver consumes alcohol and exceed the speed limit even the vehicle is ahead. The vehicle speed can also be controlled when it enters the over speed zones. Even though the accident occurs after taking the precautions the by using GPS and GSM accident location is send to family members and concerned authorities immediately to rescue them*

**Keywords :** *Sensors, GSM, GPS, Accident Detection, Speed Control.*

## **I. INTRODUCTION**

The important theme in this paper is to prevent accidents on roads. Accident preventions can be controlled with help of automatic breaking system using ultrasonic sensor. Ultrasonic usually performs to calculate the distance of the ahead vehicle by using ultrasonic waves. The transmitter transmits the wave will reflect when obstacle detected that is vehicle is ahead and received by receiver. The main aim of this paper Is vehicle can automatically apply brake due to presence of obstacles when the sensor detects the obstacles. Presently, many accidents are taking place because of the alcohol consumption of the driver or the person who is driving the vehicle. Major cause of accidents is due to drunk and driving. To avoid it, we have developed, "alcohol detection". By using alcohol sensor, we can know whether driver consumes alcohol or not. Once it is detected, system will send message to family member. Though we are using these prevention measures, there are some chances for occurring accidents. Today, it is very difficult to find the position of where the accident has occurred. It's more difficult for the lives of victims until any person know the information and informed it to the emergency vehicles like ambulance or to hospitals and if it occurs in urban areas it will becomes no hope to survive. To avoid these, different technologies like GSM/CDMA and Global positioning systems (GPS are used. The GPS based accident identification module contains a, vibrating sensor and a GPS module connected to the processor unit. If accident occurs vibration sensor gives intimation to micro controller which process information and takes further step, switch on the buzzer unit and sends the information to the ambulance, police and owner/parents through GSM network. The system will also continuously track the location of the vehicle; this will be useful when the user requires current information. The vehicle position can be located with the help of latitude and longitude values which we get the values through mobile. The vehicle speed is also controlled at zone areas using RF transmitter and receiver. The main aim of this project is to identify the vehicle accident and send the location of the accident with the information of vehicle driver.

## **II. LITERATURE SURVEY**

Existing system is an automatic vehicle accident detection system using GSM and GPS modems. The system can be interfaced with the car alarm system and alert the owner on his/her mobile phone. This detection and messaging system operation is carried out by a GSM Modem, Microcontroller and a GPS Receiver. GPS Receiver gets the accident location information from the satellite in the form of longitude and latitude. By using GSM modem the microcontroller will send information to user mobile phones. A GSM modem is interfaced to the MCU with respective pin. The GSM modem sends an SMS to the particular mobile number and informs about the accident, so that the family members or rescue team will save the life of accident people. The system was designed with the AT89S52 micro controller from Atmel. There are no sensors included for alcohol detection, zone identification and speed control.

## **III. PROPOSED SYSTEM**

In the proposed system we are included alcohol sensor, vibration sensor, ultrasonic sensor, RF transmitter and receiver for performing respective operations to prevent accidents. Alcohol sensor detects whether the driver consumed alcohol or not. If he consumes alcohol a message is sent to concerned authorities and ignition of the vehicle is automatically turned off. The speed control in specified areas like school zones, a hospital zones will be provided by RF transmitter. The vehicle contains RF receivers and if the vehicle enters the zone automatically transmitter will synchronize with the receiver and speed is controlled. Ultrasonic sensor detects the ahead obstacle and make the vehicle to slowdown automatically. A vibration sensor is used to intimate that

## International Journal for Research in Applied Science & Engineering Technology (IJRASET)

vehicle is met with accident if collision occurs. The entire operations will be processed by LPC2148 microcontroller and particular operations will be done

### A. Implementation

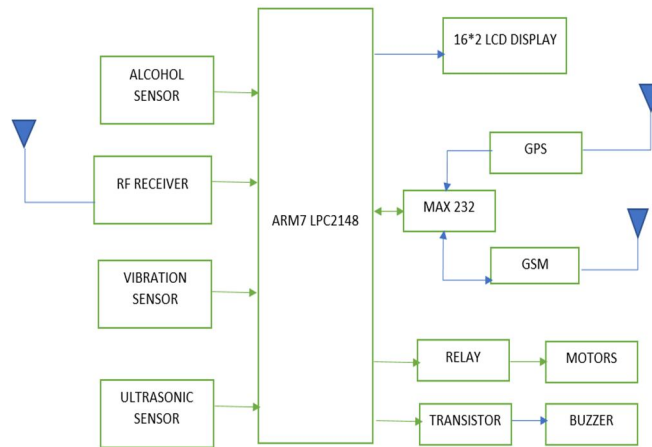


Fig.1. Building Block Diagram

### B. Features of LPC2148 Controller

Embedded Artists LPC2148 Education Board with NXP's ARM7TDMI LPC2148 microcontroller lets you get up-and-running quickly. The small form factor board offers many unique features that ease your learning curve and program development.

- 1) NXP ARM7TDMI LPC2148 microcontroller with 512 KByte program Flash and 32+8 KByte SRAM
- 2) 12.0000 MHz crystal for maximum execution speed and standard serial bit rates – Phase-locked loop (PLL) multiplies frequency with five;  $5 \times 12 \text{ MHz} = 60 \text{ MHz}$
- 3) 32.768kHz RTC crystal
- 4) On board Peripherals
- 5) 2x16 character LCD with background light
- 6) Joystick switch
- 7) UART-to-USB bridge interface on UART #0
- 8) USB 2.0 device interface (on the LPC2148)
- 9) RGB-LED, each color can be controlled via PWM sigma
- 10) 8 LEDs
- 11) Temperature sensor (LM75) on I<sup>2</sup>C bus – Pushbutton on P0.14 (interrupt input)
- 12) 2 Kbit I<sup>2</sup>C E2PROM for storing non-volatile parameters
- 13) On board low-dropout voltage and reset generation.
- 14) Generates +3.3V (and +5V if 9-15VDC is used to power the board)
- 15) +3.3V available for external circuits, up to 300 Ma
- 16) Power supply
- 17) 9-15 VDC,  $\geq 200 \text{ mA}$  from 2.1 mm power connector
- 18) Can also be powered directly from any of mini-B USB connectors



Fig.2. ARM7

## International Journal for Research in Applied Science & Engineering Technology (IJRASET)

### C. Alcohol Gas Sensor - MQ-3

Alcohol sensor MQ3 is senses the alcohol content in the vehicle if driver consumes alcohol. Sensor provides an analogy resistive output based on the alcohol concentration. MCU is the Micro Controller Unit which performs operation of each functionality lock present in the system. Alcohol sensor is connected to the MCU through the comparator and the comparator compares the analog value with reference value and send data to MCU. MCU receives data from the comparator and performs operation ,if alcohol content is more it send command to stop the motor



Fig.3. MQ3 Alcohol Sensor

If the alcohol is detected the motor that is connected in NC (Normally closed) mode is turned off indicating that the trigger coil of the relay is energized and the connection in the relay has shifted from NC (Normally Closed) mode to NO (Normally Open) mode.

### D. Vibration Sensor

The vibration sensor is used here is a mercury liquid type vibration sensor. If mercury liquid is tilted the vibration sensor which is connected to micro controller will send logic 1 that logic is treated as accident occurred to vehicle ,the micro controller alerts the neighbours on road by alarm and intimate the accident to particular members by sending information as accident occurred with location using GSM and GPS. Vibration sensor plays a major role in this system

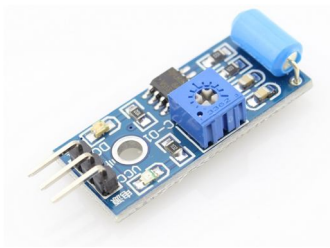


Fig.4. Vibration Sensor module

### E. Ultrasonic Sensor

HC-SR04 Ultrasonic Sensor is used for distance measuring .it contains 4pins vcc pin, ground pin, trigger pin, echo pin. The range of this sensor is 2 to 4cm. The trigger pin act as transmitter which generates sound waves for every 10 micro seconds. In addition to this 8 micro second clock is generated to increase the echo sound. If any obstacle is ahead the sound waves reflected back and the wave signal was received by echo pin which gives logic 1 for microcontroller to do further operation for prevention in our system especially. If the obstacle is not detected then for every 10 micro second waves are generated simutanously.



Fig.5. HC-SR04 Ultrasonic Sensor module

### F. RF Transmitter and Receiver

The RF module is known as radio frequency which operates at 434 Mhz. The module contains transmitter and receiver section. The transmitter section contains data pin, ground pin, vcc pin, antenna pin. It also contains HT12E encoder. The data is transmitted to



# International Journal for Research in Applied Science & Engineering Technology (IJRASET)

## IV. RESULTS

### A. Alcohol Sensor

When alcohol is detected automatically motor will stop and an SMS alert is sent to mobile number



Fig8. Alcohol Detection Condition.

### B. Vibration Sensor

If vibration sensor is tilted, it treated as accident occurred and message is sent to respective mobile numbers and buzzer is on to alert people on road.



Fig9. LCD displaying vibration sensor is on and alert message sent to mobile

### C. HC-SR04 Ultrasonic Sensor

When the obstacle is ahead the buzzer is on to warn the driver and if he neglects the warning, the motor automatically stops



Fig 10. When no obstacle is ahead speed is maximum



Fig11. When obstacle is detected ahead speed is minimum

### D. Zonal Area Speed Control

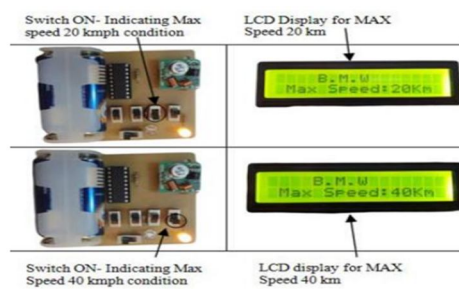


Fig12.Zonal speed control

## International Journal for Research in Applied Science & Engineering Technology (IJRASET)

Project Kit Screen Shots



Fig 13. Equipment Board

### V. CONCLUSION AND FUTURE SCOPE

We are seeing many accidents in newspaper and in Television mainly due to over speeding of vehicle i.e. rash driving and driver drunken state. In order to prevent by implementing the above mentioned sensors in the vehicles with ARM controller one can have a safe journey while travelling. So that many accidents can be reduced on roads. This project is gift for the society to prevent accidents in this crowded environment. Hope this project is of no doubt to save precious life. In future by implementing eye blinking sensor so that if driver feel drowsy it alert the driver.

### REFERENCES

- [1] Zutao Zhang, Jiashu Zhang, "A Novel Vehicle Safety Model: Vehicle speed Controller under Driver Fatigue", "IJCSNS International Journal of Computer Science and Network Security", VOL.9 No.1, Januar [2] M. Bertozzi, A. Broggi, M. Cellario, A. Fascioli, P. Lombardi, and M. Porta, "Artificial vision in road vehicles," Proceedings of the IEEE, vol. 90, no. 7, pp. 1258–1271, 2002.
- [2] S. Tsugawa and Sadayuki, "Vision-based vehicle on japan: Machine vision systems and driving control systems," IEEE Trans. on Ind. El.???, vol. 41, no. 4, pp. 398–405, 1994.
- [3] Vehicle-highway automation activities in the United States. U.S. Dept. of Transportation, 1997.
- [4] C. Thorpe, J.D. Carlson, D. Duggins, J. Gowdy, R. MacLachlan, C. Mertz, A. Suppe, and C. Wan, "Safe robot driving in cluttered environments," 11th International Symposium of Robotics Research, 2003.
- [5] Qian Martin Eriksson, Nikolaos P. Papanikolopoulos, Eye-Tracking for Detection of Driver fatigue. Proceedings of the international Conference on intelligent Transportation System, Boston, MA, November 1997, pp.314-319.
- [6] Qiang Ji, Zhiwei Zhu, and Peilin Lan, Real-Time Nonintrusive Monitoring and Prediction of Driver Fatigue. IEEE Transactions on Vehicular Technology, VOL. 53, NO. 4, July 2004, pp.1052-1068.

### BIBLIOGRAPHIES



Mr. B. V. RAMANA has pursued his B.Tech from St JOHNS college of Engg, & Tech .Yemmiganoor and M.Tech from Sree Vidyanikethan Engineering College, Tirupathi Presently he is working as Asst.Prof in Dept. of ECE of Brindavan Institute of Technology & Sciences, Kurnool. His research areas of interest are Electronic Circuit Analysis & Design, Linear Integrated Circuit Design, Fault detection and testing of digital circuits, Fault Model Analysis



Mr. M. Sai Kumar Achari is pursuing his B. TECH in Brindavan Institute of Technology & Science. He is from Dept. of ECE from BITS, Kurnool. His research area of interest are Embedded Systems and Wireless Communication.

## International Journal for Research in Applied Science & Engineering Technology (IJRASET)



Mr. B. Shiva Teja is pursuing his B. TECH in Brindavan Institute of Technology & Science. He is from Dept. of ECE from BITS, Kurnool. His research areas of interest are embedded systems and VLSI Design



Mr. D. Mahendra is pursuing his B. TECH in Brindavan Institute Of Technology & Science. He is from Dept. of ECE from BITS, Kurnool. His research areas of interest in embedded systems and VLSI desi

Mr. E. Kranthi chaitanyaa is pursuing his B.TECH in Brindavan Institute Of Technology & Science. He is from Dept. of ECE from BITS, Kurnool. His research areas of interest in embedded systems and VLSI design





10.22214/IJRASET



45.98



IMPACT FACTOR:  
7.129



IMPACT FACTOR:  
7.429



# INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089  (24\*7 Support on Whatsapp)