ISSN (Online) 2394-6849

International Journal of Engineering Research in Electronics and Communication Engineering (IJERECE)
Vol 3, Issue 8, August 2016

Vehicle to Vehicle Safety Device – An Ease for Safe Driving and Theft Control

[1] Dadam Gurunath Reddy, [2] Mr.V.Viswanadha, M.Tech. (Ph.D.)
[1][2] Electronics &Communication Engineering
Siddharth Institute of Engineering & Technology

Abstract: **-- Human life is more valuable than anything else, timely help is more important than lending a helping hand. The proposed system is basically on an electronic device which can be used at the time of emergency while driving a vehicle. It has embedded the concept of wireless communication i.e. ZIGBEE and GSM and many other sensors by the help of which immediate help can be delivered to the person who has met with an accident and need help it. Research content uses the technology of ZIGBEE for the transmission of message to the other vehicle in the time of need of their help as well as for serving the prospective of safe and sound driving the functions like drivers alcohol detection, then vehicle speed slowing and automatic vehicle lock with collision detection is used at the same time send message to owner mobile number. I.e. Vehicle doesn't meet with in accident but human life is safe so there are no needed emergency medical facilities. The GSM technology is used to send the position of the vehicle as a SMS to those numbers and the position of the vehicle can be obtained by the owner of the vehicle. When vehicle reaches speed limit Jones like schools, hospital and crowed places, vehicle get alert through Zigbee so that speed of vehicle can be decreases. The overall structure is controlled based on the ARM7 (LPC2148) microcontroller.**

Key Words: **ARM7, ZIGBEE, GSM, sensors**

I. INTRODUCTION

The vehicle communication technology has gained the popularity in industrial field. By the use of V2P (vehicle to person) communication and V2V (vehicle to vehicle) communication they can be used for the purpose of serving safety and security. The proposed system senses any alcohol consumption of driver in the vehicle and intimates' pre-programmed numbers like the owner of the vehicle alert to opposite vehicle as well as owner of mobile number etc. the ZIGBEE technology is used to send the message to near vehicle from due to the accidents. The GSM technology is used to send the position of the vehicle as a SMS to those numbers and the position of the vehicle can be obtained by the owner of the vehicle

The system is developed for safety and security for a vehicle driving controlled by the safety devices system. The vehicle driving due to the accident caused as human error or lack of concentration on the while driving by applying sudden break on front vehicle on the roads. In the last year in India only during the time period of April 31, total accidents approximate 6000 to 75000 in the 44 percent drunk and driving cases according with NDTV NEWS report.
According above news survey 45,158 accident cases by the over speed of the vehicle driving, so overcome this problem we are introduce one technology such as An easy to identify the important places and crowed places through the ZIGBEE technology because to prevent accident and easy to reached the need of place.

Now a day's vehicle theft cases are increased according in the registered on police station. So, their problems overcome this technology an easy vehicle theft control through the GSM (global system for mobile communication) and vibration sensor used from near to owner of the vehicle. So above developed technologies are controlled through the ARM7 (LPC2148) microcontroller. It is very fast data transformation between the sensors and technology modules to V2V (vehicle to vehicle communication) and V2P (vehicle to person communication) by LCD display.

II. TECHNOLGYIMPLEMENTED

A. ZIGBEE is a spine of Wi-Fi technology. It is a RF modem from digital international is a wireless transceiver. The ZIGBEE uses a fully implemented Protocol for data communications. It is very suitable for high level communication protocols. ZIGBEE also known as WPAN (wireless personal access network).it is based on IEEE 802.15.4 standard technology. ZIGBEE is like Bluetooth technology whose area of communication is up to 20 meters with line of sight communication with low power consumption. Zigbee communication range can be increased up to 100 meters with high power consumption. ZIGBEE

ISSN (Online) 2394-6849
International Journal of Engineering Research in Electronics and Communication Engineering (IJERECE)
Vol 3, Issue 8, August 2016

Works on 2.4 GHz radio frequency to transport the reliable and easy to use standard across the world Zigbee network use mesh network with 128 bit symmetric encryption keys. The transfer rate of Zigbee is around 250 kbps which is very suitable for intermittent data transmission from input devices like sensor. Zigbee chip include radios and microcontroller that have 60 – 256 kb flash memory. Zigbee mesh networking between broadcast communications, every time smart car read a new RFID tag, Zigbee module will be broadcast once, and broadcasting is According to CSMA / CD Sense Multiple Access / Collision Detection Technology. Specific workflow is: Uploading underlying Dashboard update RFID tag information; advanced control panel for data encapsulation process, sending encapsulated data to the Zigbee module; Zigbee module query the current usage of the channel, if it is idle, a connection is established, then transmit data. If the channel is occupied, the system would delay period of time, then testing whether the channel is idle.

- Zigbee are stated below:
- Home automation
- Home entertainment
- Industry control system
- Medical field
- Smoke warning

Figure1: ZigBee Applications

Brand Name	Wi-Fi IEEE 802.15.11b	Bluetooth	Zigbee IEEE 802.15.4
Battery life	Several hours	Several days	Several years
Maximum network capacity	32 nodes	7 node	64,000 nodes
Communication distance	100m	10m	>30m
Communication speed	11Mbps	1Mbps	250Kbps
Security method	SSID	64bit, 128bit	32,64,128bit AES
Applications	Wireless LAN	Wireless speech	Remote control system

Table1: Comparing the aspects of Zigbee with others

Figure2: Zigbee Module

There are three types of Zigbee are available out there in Global market namely Zigbee coordinator (Zc), Zigbee router (ZR) and Zigbee end device (ZED).

B.GSM:

The GSM (Global System for Mobile communications) is an open, digital cellular technology used for transmitting mobile voice and data services. GSM differs from first generation wireless systems in that it uses digital technology and time division multiple access transmission methods. GSM is a circuit-switched system that divides each 200 kHz channel into eight 25 kHz time-slots; GS supports data transfer speeds of up to 9.6 Kbit/s, allowing the transmission of basic data services such as SMS (Short Message Service). Another major benefit is its international roaming capability, allowing users to access the same services when traveling abroad as at home. This gives consumers seamless and same number connectivity in more than 210 countries. GSM satellite roaming has also extended service access to areas where terrestrial coverage is not available.

ISSN (Online) 2394-6849
International Journal of Engineering Research in Electronics and Communication Engineering (IJERECE)
Vol 3, Issue 8, August 2016

Figure3: GSM Modem

The working of GSM modem is based on commands, the commands always start with AT (which means AT tension) and finish with a <CR> character. For example, the dialing command is ATD <number>; ATD3314629080; here the dialing Command ends with semicolon. The AT commands are given to the GSM modem with the help of PC or controller. The GSM Modem is serially interfaced with the controller with the help of MAX 232.

C. Alcohol sensor

The Alcohol Sensor a complete alcohol sensor module for ARDUINO OR SEEEDUINO. It is built with semiconductor alcohol sensor. It has good sensitivity and fast response to alcohol. It is Suitable for making Breathalyzer. This Grove implements all the necessary circuitry forMQ303A like power conditioning and heater power supply. This sensor outputs a voltage inversely proportional to the alcohol concentration in air.

Figure4: Alcohol sensor

Specification

Detection Gas: Alcohol
Power requirements: 5 VDC @ ~120 mA (for heater on)
Concentration: 20-1000ppm
Alcohol Interface: a TTL compatible input (SEL) for enabling heater, a 5V compatible ADC output (DAT)
Dimension: 40mmX20mmX12mmHeater
Voltage: 0.9V ± 0.1V AC or DC Heater Current: 120±20mA **Applications -Ideal**
Breathalyzer - Alcohol over-limit detection
Environmental monitoring equipment

D. Vibration sensor (SW-420 NC)

If the module does not vibrate, the vibration switch was closed on state, output of low output, the green indicator light The product vibrates, vibration switch momentary disconnect, output is driven high, the green light does not shine. The output can be directly connected with the microcontroller, which to detect high and low level, so as to detect whether the environment exist vibration, play a role in the alarm.

Feature: Using SW-420 normally closed type vibration sensor Comparator output, clean signal, good waveform, strong driving ability, >15MaWorking voltage 3.3V ~ 5V.
Output format: digital switching output (0 and 1).

Using a wide voltage LM393 comparator with bolt holes for easy installation Small PCB size: 3.2 x 1.4cm

Figure5: Vibration sensor

Note: Power direction cannot be reversed, otherwise it is possible to burn the chip Signal LED light is output Low, and signal LED OFF output is High the output levee close to the input voltage

Application

various vibrations trigger: Adriano, Smart car, Earthquake alarm, Motorcycle Alarm, Theft alarm
Package

1 x Vibration sensor module

ISSN (Online) 2394-6849
International Journal of Engineering Research in Electronics and Communication Engineering (IJERECE)
Vol 3, Issue 8, August 2016

III. BLOCK DIAGRAM

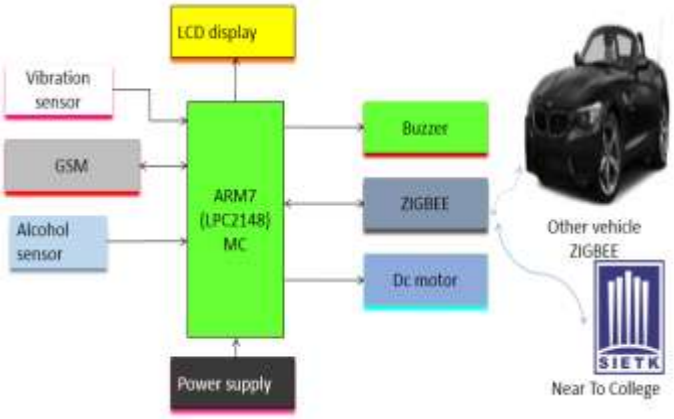

Figure6: Block diagram of proposed system

The proposed system consists of different modules which are interfaced to the ARM (32bit) controller. The input power is step down to 12v DC from 230v AC power line by the power supply unit. The main module is the ARM processor having the high speed processing of the data because of the pipelining instruction bit of handling technique and ability to be used as a 16 bit controller.

The research content uses the technology of ZIGBEE for the transmission of message to the other vehicle. i.e. In the time of need of their help as well as for serving the respective of safe and sound driving the functions like drivers alcohol detection (618ppm) then, vehicle speed slowing and automatic vehicle lock with collision detection is used at the same time alcohol detection message send to owner mobile number by GSM technology. The GSM technology is used to send the position of the vehicle as a SMS to those numbers and the position of the vehicle can be obtained by the owner of the vehicle and if interest of owner can reply with command "**T**" then vehicle is locked at same time owner get a acknowledge message by "vehicle is locked in control "needed emergency at the place in proposed method.

In the ZIGBEE is used to easily identify the important crude places and to prevent the accident and an easy reached to destination i.e. schools, colleges and hospitals.

IV. FLOW CHART

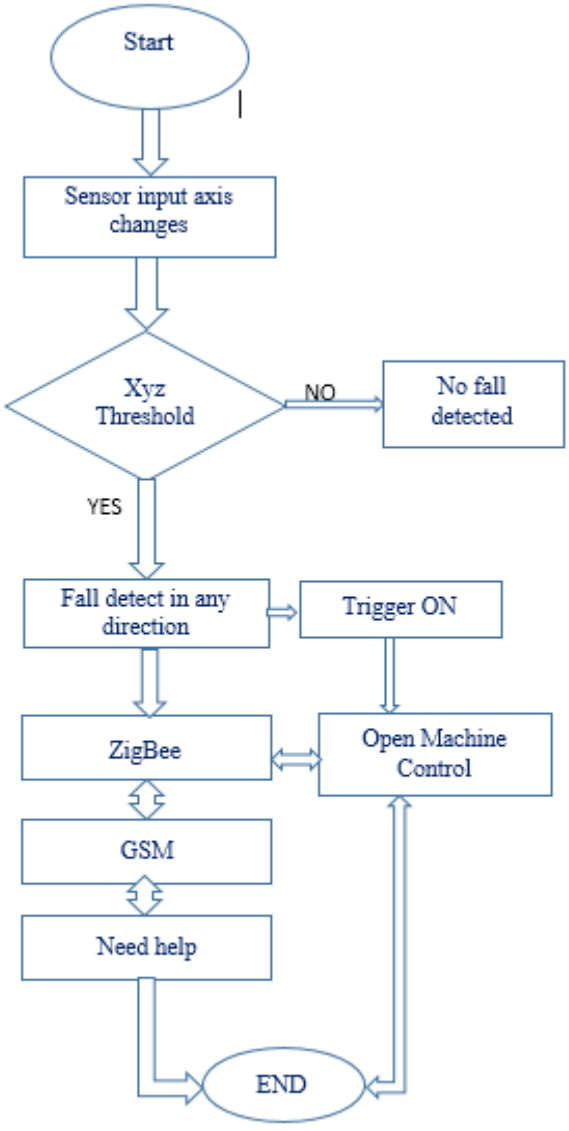

Figure7: Flow chart of working process

V. SIMULATION AND VALIDATIONS

ISSN (Online) 2394-6849
International Journal of Engineering Research in Electronics and Communication Engineering (IJERECE)
Vol 3, Issue 8, August 2016

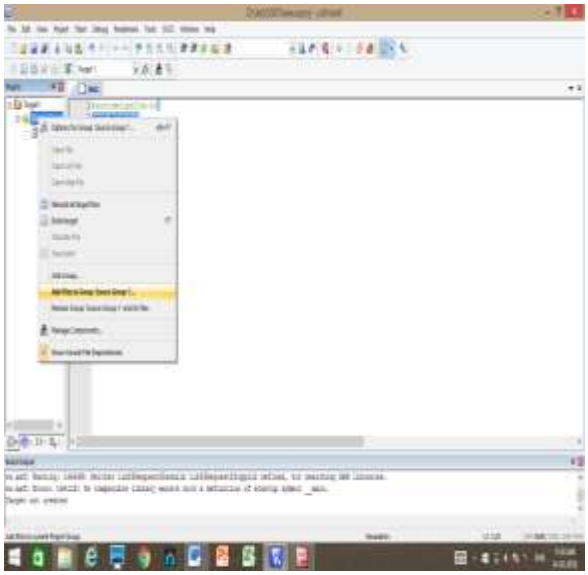

Figure8: Simulation validation

In developed by keil micro vision4 software. This is purely embedded c codding.

VI. WORKING ALGORITHM

The infrastructure of the device is on ARM7 (LPC2148) Microcontroller. The device has two phases. In the first phase the device is manually turned on by the user and the device algorithm will start searching for the collision by the help of flex sensors and then the cycle will move towards the Decoder having multiple assets linked to it like Alcohol sensor, which will check the drowsiness level of the driver and also the speed limiter set pre manually in the device so that if anyone else is driving the vehicle he cannot cross the threshold set by the vehicles owner and thereafter it will shift towards the checking of manual key , if the message sent to controller then send a message to Zigbee after Zigbee send a message to near vehicles as well as send massage to owner of the mobile number through the GSM by the pre- program numbers. i.e.in case of the collision of the vehicle with any tree or vehicle the device will generate an Interrupt INT0which will further generate the Zigbee module attached with it and all the nearby going vehicles will be informed about the mishap occurred in their area and can help the person. Also the decoder is further connected to the buzzer and vehicle Switch off device so that the device will be turned off or an alarm will be activated reminding the driver to not drive the vehicle as he is drunk or feeling sleepy. Also in the case of manual switch a Zigbee module has been attached so the user will be in need of help of which going to near to crowed places and thus an immediate support will be provided to him as the message will be send to them respectively. Whereas in the second cycle of the device which is basically a Security flow i.e. when the user wants to control the vehicle from a distance he has to Control the vehicle alert then control the message like command '**T**' then received by the acknowledgment by the vehicle through the i.e. switching the lock of vehicle or decrease the speed or to send the location he can press the button in the DTMF kit he has. Through which TIMER0interrupt will activate and thus the microcontroller processes and the user can utilize this device.

VII. APPLICATION & FUTURE WORK

A. Security

The new path for vehicle is opened in field of communication, the security for itself and near to owner of the vehicle has been increased. In case of vehicle theft, one can simply send message to it and position of the vehicle.

B. Safety

Accident alert to nearest help vehicles, road condition warning
Etc as comes under the safety of passenger. The condition of overtaking accident can be overcome through the vehicle to vehicle communication. Warning of car failure can be transmitted throughout the wireless communication area so that the accident can be prevented and easy to identify the places.

C. Future Advancement

The advancement in the vehicle to vehicle communication, the application can be increase in our daily life as an easy to identify location and easy to theft control by using vibration sensor. The development is going in further advancements so that the vehicle can communicate to as many as possible at the same time.

VIII. CONCLUSION

Vehicle to Vehicle Safety Device is a device indulge with the recent technology and includes the methodology based on the combination of ZIGBEE, GSM and many other modules by the help of which immediate support can be provided to anyone in need of it. The system is designed for

this has the advantages of low cost, portability, small size and easy expansibility. The platform of the system is ARM7 (lpc2148) along with ZIGBEE and GSM, interfacing which shortens the alarm time to a large extent and locate the site of accident accurately .As a part of as a part of studying the analysis circuits and programs were simulated on Micro vision 4 KEIL; Hardware implementations are done using PCB layouts and express PCB. Also the results and implementation is being discussed here.

REFERENCES

[1] Mohan R Akella, Wireless vehicular Accident Detection and Reporting System, vol. 95, no. 2, pp. 388-396, 2007

[2] S.P. Bhumkar, V.V. Deotare, R.V.Babar, " Intelligent Car System for Accident Prevention Using ARM-7", International Journal of Emerging Technology and Advanced engineering ISSN 2250-2459, Volume 2, Issue 4, April 2012

[3] Prof. Abhay P. Bagade, "Cell Phone Usage While Driving Avoidance with GSM-RF Based Accident Emergency Alert System", ISSN (Print): 2319-5940 ISSN (Online): 2278-1021, Vol. 2, Issue 5, May 2013 International Journal of Advanced Research in Computer and Communication Engineering.

[4] "The role of Zigbee technology in future data communication system" by Dr.S.S.Riaz Ahamed.

[5] "Security Architectures in V2V and V2I Communication" by Rens van der Heijde