

An Electronic Improvisation Embedded Technology in Automobiles for Run-of-Roads

Chilumula Sudheer Kumar¹, Ch. Kalyani²

¹M.Tech Student, ECE, SVS Group of Institutions, Telangana, India

²Assistant Professor, ECE, SVS Group of Institutions, Telangana, India

Abstract: *Traffic crashes are among the world's biggest public health insurance and injuries prevention problems. Based on the World Health Organization (WHO), greater than a million individuals are wiped out in road accidents, every year, around the globe. From simple driver inattentiveness, to fatigue, callousness, to driving under the influence, is accountable. Simple sensors could be fitted inside automobiles embedded with assorted features like, automatic collision notification, vehicle security, speed control which could give impetus for an efficient road safety system. Every year, you will find 1000's of highway deaths and many 1000's of significant injuries because of "Run-Off-Road" accidents. The characteristics which are suggested within this work are: Automatic collision notification that provides notification towards the victim's relative, Sore point traffic control ensures vehicle doesn't break signal, Speed control alters speed in numerous zones, Horn control prevents honking in horn prohibited zone, Alcohol recognition detects driving under the influence and Vehicle security can be used to avoid thievery.*

Keywords: Road safety, Embedded System, Collision Notification, GSM (Global System for Mobile Communication), GPS (Global Positioning System)

1. Introduction

Presently Road safety systems can be found in high finish luxury cars for example Audi, Mercedes Benz etc. to mention a couple of. Example: OnStar Corporation provides subscription-based communications, in-vehicle security, hands-free calling, turn by turn navigation, and remote diagnostics systems through the U . s . States, Canada and China. A study printed through the WHO in '09 says more and more people die on streets in India than elsewhere on the planet. The data for India are chilling. A minimum of 13 people die every hour in road accidents in the united states the most recent report from the National Crime Records Bureau unveils. In 2007, 1.14 lakh individuals India died in road incidents. Poor road infrastructure, failure to conform with speed limits, growing consuming and driving habits are some of the primary factors adding to deaths from road crashes, WHO stated in the set of 'Decade of Action for Road Safety 2011-2010'. An identical service is called Chevrolet Star in Latin American marketplaces [1]. OnStar FMV grew to become open to the general public on This summer 24, 2011. It offers a few of the features an OEM system has, for example Automatic Crash Response, Stolen Vehicle Monitoring, Turn-by-Turn Navigation, and Curbside Assistance. The motivation behind the work Revolution is definitely an make an effort to make an embedded system which would be to bring an optimistic difference in the area of road safety and road discipline. The work takes up some major reasons of road accidents for example breaking traffic signals and drunk driving. Additionally, it includes a major purpose of working out road discipline for example speed control in numerous areas and horn control in horn prohibited zones. The advantages of embedded systems is the necessity of the hour in developing nations & particularly with the harsh statistics in our country, the necessity is imminent. Thus incorporation of those features ought to be mandatory in most cars soon without cutting in to the customer or even the manufacturer's pockets. The characteristics put in the work

are: Vehicle Speed Control in Variable Zone- within this feature, speed from the vehicle is controlled in numerous areas for example flyovers, bridges, freeways, schools, metropolitan areas and internal areas. Horn Charge of Vehicle in No Honking Zone- Control undesirable disturbances in horn prohibited zones for example hospitals, public libraries, courts, schools etc. Sore Point Traffic Control- Within this feature the automobile is controlled on traffic signal, when signal is red the automobile is instantly stopped. Automatic Collision Notification- Within this feature when vehicle talk with any sort of accident, the machine of the project transmits messages (SMS) via GSM Modem to manage room and also the nearest relative from the victim. Vehicle security- Within this feature, when the vehicle is stolen or someone attempts to burglary, thievery sensor is triggered and message is distributed towards the police control room and also to the dog owner when the vehicle via GSM modem. Alcohol Control- The alcohol sensor prevents the ignition key from working when the driver breathes in it along with a significant volume of alcohol is detected. Consequently message is distributed towards the RTO.

2. Methodology

Within this work the chips and ICs used are- encoder nick, decoder nick, Transmitter-Receiver module, microcontroller, relay driver, alcohol sensor, relay contactor, GSM modem, Gps navigation receiver and Liquid crystal display. HT12E is really a 212 number of encoder employed for remote programs and RF programs. It forms some with HT12D decoder IC. It features a wide current vary from 2.4Volts-12 Volts and it has a built-in oscillator which needs a small exterior resistor. It encodes the 12 bit parallel data into serial data for transmission with an RF transmitter. These 12 bits are split into 8 address bits and 4 data bits. The transmitter/receiver (Texas/RX) pair works in a frequency of 433 MHz The transmission happens in the rate of 1Kbps - 10Kbps [2].The sent information is received by an RF

Volume 5 Issue 8, August 2016

www.ijsr.net

Licensed Under Creative Commons Attribution CC BY

receiver operating in the same frequency as those of the transmitter. This alcohol sensor is appropriate for discovering alcohol focus on your breath, much like your common breath analyzer. It features a high sensitivity and fast response time. Sensor offers an analog resistive output according to alcohol concentration. Relays are utilized where it's important to manage a circuit with a low-power signal (with complete electrical isolation between control and controlled circuits), or where several circuits should be controlled by one signal. A kind of relay that may handle our prime power needed to directly control an motor unit is known as a contactor. It's a POT (Oatch On The Top) Gps navigation. It possesses a solution in urban conditions and it has high-speed, sensitivity and precision in addition to high sensitivity and monitoring abilities in urban conditions. The Gps navigation Chipset inside was created by Media Tek Corporation. This GSM Modem can accept any GSM network operator Sim and act as being a cell phone using its own unique telephone number. Benefit of by using this modem is going to be which you can use its RS232 port to speak and develop embedded programs. Programs like SMS Control, bandwidth, handheld remote control and logging could be developed easily. GSM300 is an inexpensive solution for cellular/ handheld remote control projects. The modem includes RS-232 for interfacing with computer systems and also the Texas and RX pins are supplied for interfacing with SPDuino along with other microcontrollers. MAX232 is really a 16 pin IC. It converts signals from an RS-232 serial port to signals appropriate to be used in TTL compatible digital logic circuits. The MAX232 is really a dual driver/receiver and frequently converts the RX, Texas, CTS and RTS signals. Limit Switches can be used for charge of a piece of equipment, as safety interlocks, in order to count objects passing a place. A restriction switch is definitely an electromechanical device that includes an actuator that is robotically associated with some contacts. When an item makes connection with the actuator, the unit works the contacts to do or die the electrical contact. Thus, this product turns out to be very helpful for safety reasons. Bumper switch is an extremely effective sensor for collision recognition. Bumper switch functions as a pushbutton i.e. it will get triggered when pressed and also the microcontroller then performs the required action with this condition. This sensor is an extremely simple method to test collision recognition function in almost any locomotive. There are two modules - Transmitter and Receiver Section. Receiver module is going to be put on the vehicle and also the Transmitter module could be fitted on the sign board. Following would be the circuit diagrams: To deliver the data, RX Texas module is required. Within this circuit, 433 Mega Hertz frequency transmitter has been used. Parameters: ASK modulation and transmission range is 100-300 square ft. (10-15 ft.). You will find 4 pins: 1. Antenna: there's a built-in helical antenna 2. Data Pin-To get Data for transmission 3. Ground pin-linked to ground 4. VCC - 3 Volts Power HT 12 E Encoder can be used. You will find 4 data lines D0, D1, D2 and D3. On Data Lines, 4 switches are connected. This can create the data for that project and will also be decoded on vehicle side. On receiver side, each switch closure has a particular meaning. There's a TE pin that is active low, if this pin goes low, transmitter is enabled. The information out pin is linked to data pin of Texas. Here pulse stream is produced and provided to Texas. This pulse

stream will contain 8 bit address and 4 bit data. 89s51 Microcontroller has been used which IC includes a flash memory of 4KB. S means ISP (In System Programmable) technology meaning the IC 89s51 works and it is also designed in the same current of 5 V. This Microcontroller is really a 40 pin device. Pin 40 is linked to 5 V power and pin 20 is linked to Ground [3]. Pin 9 is reset pin. When microcontroller is started up, it's reset. You will find 4 ports-P0, P1, P2 and P3. Each one is 8 pin bidirectional ports. To get the information in the road side transmitter, RF Receiver is required. RX may have 4 pins just like those of Transmitter. HT 12 D decoder IC can be used. D0, D1, D2 and D3 would be the data lines, so whatever details are caused by the transmitter is given to those data lines which are linked to P3. The creation of RF RX is given towards the Data In pin from the Decoder. VCC is linked to 5 Volts. Valid Tone Pin goes at the top of receiving data. To point reception of information, Brought is linked to Valid Tone pin. Alcohol sensor MQ3 is linked to P1. It's 2 heater plates along with a sensor plate. Sensing plate is connected via a variable resistor towards the controller which controls the sensitivity [4]. Gas ions will fall around the sensing plate and can create the electron current flow that'll be given as current which current is going to be thought through the controller. So whenever alcohol is thought, it'll provide a high logic output that will steer clear of the vehicle and send SMS to RTO together with the position of the vehicle i.e. its latitude and longitude. The bumper switch is linked to P1 and it is employed for collision recognition. When collision is detected, SMS is distributed towards the Err combined with the Gps navigation location from the vehicle. To identify vehicle thievery, limit switch is attached to the doorways. If somebody tries to burglary the automobile, the lever from the limit switch is pressed thus getting in touch. This provides a logic high signal towards the microcontroller hence showing vehicle thievery. To exhibit the motive force the precise condition through which the automobile has been controlled, the Liquid crystal display is connected on port . Liquid crystal display is 16 figures by 2 rows. To manage the automobile, on port 2, three relay contactors are linked to control the motor from the vehicle. Relays have two teams of contacts- normally open and normally closed. The very first relay is connected so that when it's normally closed, motor works at 12 V as well as in normally open it up works in V. This relay halts the automobile just in case of collision recognition so when alcohol is thought through the MQ3 Sensor. The 2nd relay is connected so that when it's normally closed, motor works at 6 V as well as in normally open it up works in V. It's used when posted speed limit condition is receipted through the receiver circuit. The vehicle will move at half the current. The 3rd relay can be used for horn control. When horn prohibition condition is receipted, this relay's normally open contact is active therefore that the buzzer goes off. On port 3, GSM modem and Gps navigation are connected. GSM modem features its own antenna, 5V supply and Sim slot. The amount of the modem getting used is GSM-300. There's a 9 pin serial port for serial communication. It's a serial port and serial port creates RS232 protocol. To interface both of these, Max 232 IC is connected getting 5V power and ground. GSM can be used for delivering SMS towards the intended people just in case of collision, vehicle thievery and drunk driving. Gps navigation can be used to transmit

the place for the similar. It's Fundamental compiler for Intel's MSC-51 microcontroller family [5]. It's a user friendly compiler. It provides fast machine code rather than construed code. Express PCB is simple to lean and fast to make use of. It's a multi-functional free software by which schematic in addition to PCB layout can be created. It's accustomed to burn the .hex file produced through the compiler in to the IC. This is accomplished using the hardware package in which the IC is positioned. This will make it attached to the PC via its serial port for burning the code. AT instructions can be used to manage MODEMS. AT instructions having a GSM/GPRS MODEM or cell phone may be used to access following information and services: 1. Information and configuration relating to mobile phone or MODEM and Sim. 2. SMS services. 3. MMS services. 4. Fax services. 5. Data and Voice link over mobile network. When a heavy shower or squall has transpired, normal communications returns. However, during tropical storms or severe winter storms at northern latitudes, fadeouts can persist for hrs. at any given time. The machine is presently only focusing on collision recognition. Collision avoidance requires closeness sensors which haven't been implemented within the circuit.

- [3] <https://www.sparkfun.com/products/-8880> [Date of Access: July 19, 2013].
- [4] <http://www.engineersgarage.com/-tutorials/at-commands> [Date of Access: September 15, 2013].
- [5] http://www.rhydolabz.com/documents-/gpsgsm/GPS1269_UserManual.pdf [Date of Access: 17 March, 2014].

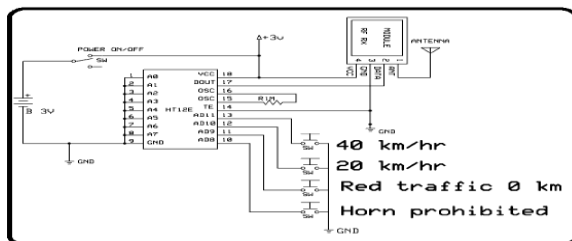


Figure 1: Block diagram of proposed system

3. Conclusion

With this particular prototype, an inexpensive embedded system continues to be effectively implemented which will help in curbing road accidents and flouting of traffic rules whilst supplying to safeguard the automobile. For that project Hayes AT can be used for programming the GSM Modem to ensure that on occurrence of accident, drunk driving or vehicle thievery, the GSM Modem transmits an SMS towards the pre designated figures. Rain fade refers mainly towards the absorption of the microwave rf (RF) signal by atmospheric rain, snow or ice, and deficits that are especially prevalent at wavelengths above 11 GHz. Additionally, it refers back to the degradation of the signal brought on by the electromagnetic interference from the innovative of the storm front. Rain fade usually doesn't last lengthy.

References

- [1] http://zeenews.india.com/news/nation-/indiano-1-in-road-accidentdeaths_704455-.html [Date of Access: June 26, 2013].
- [2] Sameer Ammoon, Fawzi Nashashibi, Claude Lurgeau, "Real-time crash avoidance system on crossroads based on 802.11 devices and GPS receivers; in proceedings of the IEEE ITSC 2006, IEEE Intelligent Transportation Systems Conference Toronto", Canada, September 2006.