ISSN: 2278 – 7798
International Journal of Science, Engineering and Technology Research (IJSETR)
Volume 5, Issue 8, August 2016

GPS-GSM Based Intelligent Vehicle Tracking System Using ARM7

T.Narasimha[1], Dr. D. Vishnuvardhan[2]

Student, E.C.E Department, J.N.T.U.A College of Engineering, Pulivendula, India[1]

Assistant Professor, E.C.E Department, J.N.T.U.A College of Engineering Kalikiri, India[2]

***Abstract*--- Number of vehicles is increasing rapidly day by day. Thefts and Accidents of vehicles are happening frequently. Auto collisions/accidents are the leading cause of injury and deaths. About 1.25 million road traffic deaths are estimated globally in 2013. This paper presents a technique for designing and development of GSM-GPS based intelligent vehicle tracking system using ARM7 processor. The proposed system uses MEMS sensor, MQ3 Alcohol sensor, Magnetic Switch sensor, GPS and GSM modems to prevent vehicles from collisions and alert the collision of vehicles to owners. Improvements in automobile secure systems have steadily reduced the injuries and deaths from accidents. Basic advantage of this system is low power consumption because of ARM7 processor is used as an embedded microcontroller and it is low cost to implement.**

***Key words*--- ARM7, MEMS, MQ3, GSM and GPS.**

I. INDTRODUCTION

According to world's research, global registrations jumped from 980 million units in 2009 to 1.015 billion in 2010. The figures mirror the rough number of autos, light, medium and substantial obligation trucks and transports enlisted around the world, yet that does exclude rough terrain, overwhelming obligation vehicles. The 3.6% ascent in populace was the biggest rate increment since 2000, while the 35.6 million year-to-year unit increment was the second-greatest expansion in general volume ever.

India's vehicle populace experienced the second-biggest development rate, up 8.9% to 20.8% million units, compared with 19.1 million in 2010. Vehicle thefts and accidents are the major problems in the World. Mostly vehicles are theft while they are parked. Today vehicle security systems are developed to alert the owners of vehicles. Few accidents are occurring out of cities or at a place where no one is there. It is very hard to find exact location of accident where it was happened. In this case, an intelligent vehicle tracking system is required to find the location. The proposed system automatically intimates to the owner about the location of accident. Whenever vehicles are theft, the current location of vehicles can be easily tracked by this system. Majorly accidents are happening due to not wearing of seat belt and alcohol consumption by driver. These types of accidents can also be controlled by the sensors used in the proposed system.

This proposed system records various parameters and transfers the information to the owner. This system records various parameters like seat belt status, occurrence of accidents, alcohol consumption rate, vehicle speed and temperature of vehicle engine.

II. PROPOSED METHOD

The proposed low power and low cost embedded system continuously monitors the speed of vehicle, location of vehicle, temperature of vehicle engine, accident occurrence, alcohol consumption rate and seat belt status. With the help of GPS system user can easily find the current location of vehicles by sending SMS through their mobile. The latitude and longitude of vehicle location can be found out through by GSM system. Using Google map, the exact location of vehicle can be found and can be controlled the speed of vehicle.

Here embedded microcontroller is ARM7. ARM7 is advanced RISC machine. Different sensors like alcohol sensor, speed sensor, accident sensor, seat belt sensor and temperature sensor are used in this system. Additionally GPS and GSM modems, DC motor and LCD display are used in the system.

Block diagram of proposed method is shown in figure1

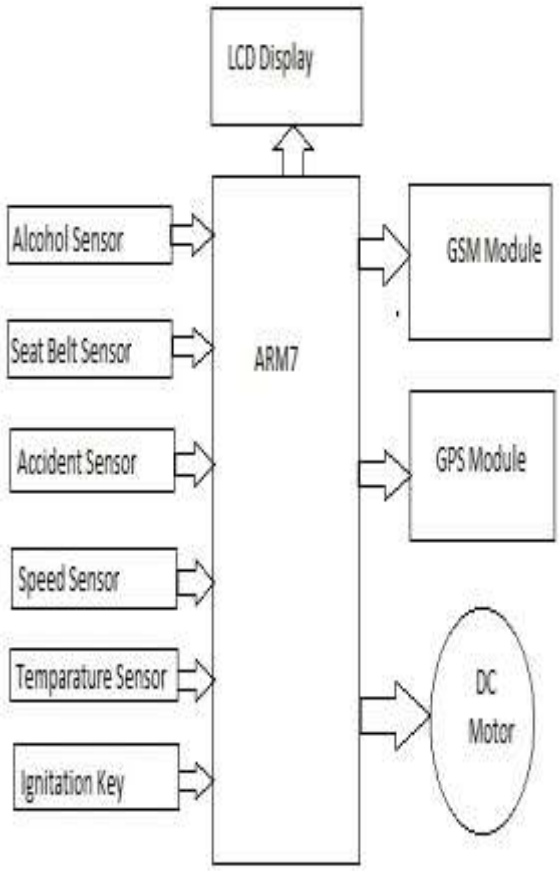

Figure1. Block diagram of proposed system

III. COMPNENTS USED IN PROPOSED METHOD

i. MQ3 ALCOHOL SENSOR

The grove gas sensor (MQ3) module is used to detect the leakage gas detection in home or in industry. It is also used to detect the alcohol, methane (CH4), LPG, Benzie, Hexane etc. It is high sensitive and fast response sensor.

FEATURES

1. High sensitive to alcohol
2. Low sensitive to benzene
3. Long life, stable and low cost
4. Simple drive circuit

Alcohol sensor which used in the proposed method is shown in figure 2.

Figure 2. Alcohol sensor

ii. SEAT BELT SENSOR

Seat belt sensor acts as switch connectors. It is a reed switch, mounted in a plastic shell. Basically reed is ‘’open’’ when no connection between two wires. Another part is magnet. When reed is kept at less than 14 mm distance, the reed switch is closed. Seat belt sensor which used in the system is shown in figure 3.

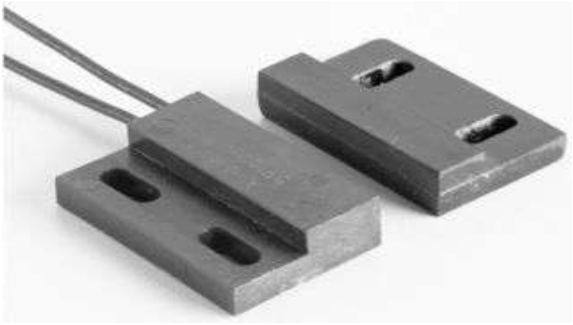

Fig3. Seat belt sensor

iii. ACCIDENT SENSOR

Figure 4 shows the accident sensor used in the system. Accident sensor used in this method is ADXL330. It is small in size and low power consumption sensor. This sensor has three axis accelerometer which has signal conditioned voltage outputs. It can measure the static acceleration of motion body as well as dynamic acceleration of motion body, thus it can find the occurrence of

accident. The capacitors $C_{X,}$ C_Y and C_Z at the X_{out}, Y_{out} and Z_{out} pins are used to select the bandwidth of accelerometer. The bandwidth varies from 0.5 Hz to 1,600 Hz for X and Y axes and for the Z axis, it ranges from 0.5Hz to 550 Hz.

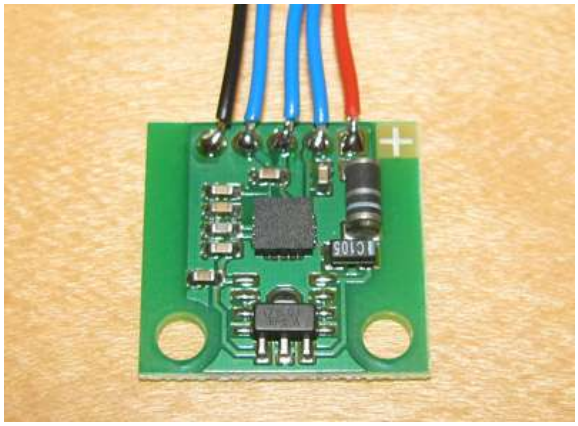

Figure4. Accident sensor

GSM modem is used to transmit the vehicle information to owner. A GPS device can track location in all weather conditions. The experimental setup is shown in figure 5.

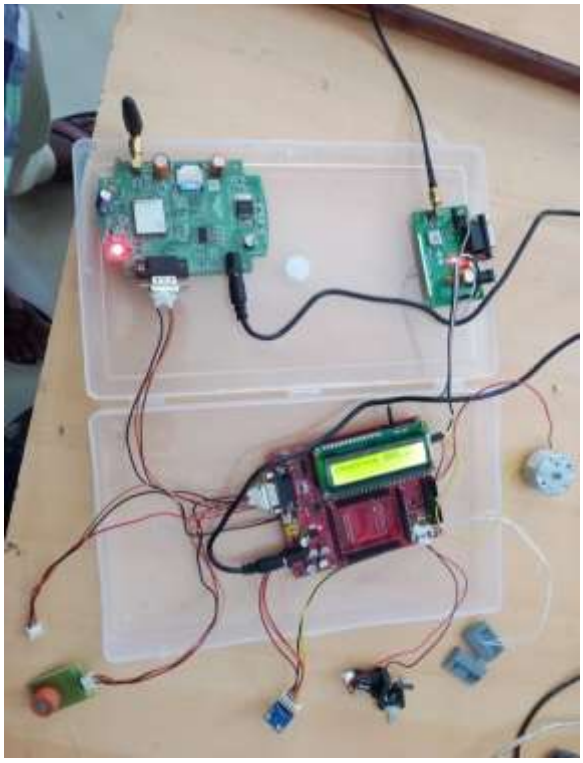

Figure5. Experimental setup

The system is implemented with all sensors and modems. Here ignition key is used to start the DC motor. Once the system is on, all the sensor values are set to zero and then the values from various sensors are obtained according to their inputs. GPS receives current latitude and longitude of vehicle. LCD display is used to display various values like speed of vehicle, status of vehicle, alcohol consumption rate, seat belt status, accident occurrence and longitude and latitude values which are obtained from various sensors. Thus accidents are reduced and thefts can be controlled.

IV. SYSTEM SIMULATION AND REALIZATION

FLOWCHART OF SYSTEM OPERATION

Flowchart of system operation is shown in figure 6.

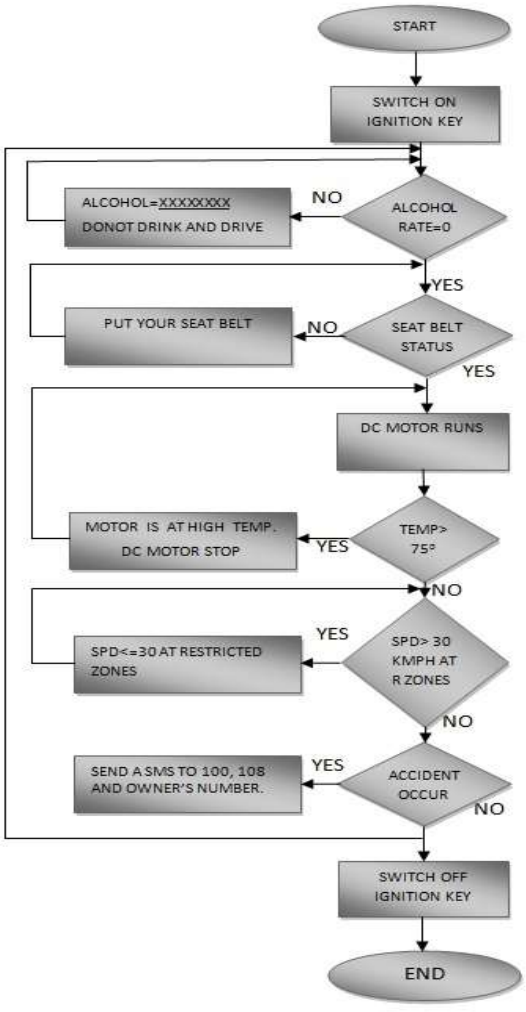

Figure 6. Flowchart of system operation.

SYSTEM OPREATON

STEP-1

Switch on the ignition key. It checks the Alcohol consumption rate. If there is no alcohol consumption by the vehicle driver, the status of LCD display is as shown in figure 7. Figure 8 shows the alcohol consumption by the vehicle driver.

Figure 7. Alcohol consumption is not present

Figure 8. Alcohol consumption is present

STEP-2

Next step is, it checks the status of seat belt. DC motor starts functioning, only if the driver wears seat belt. The status of seat belt can be obtained through LCD display which is shown in figure 9.

Figure 9. Seat belt status

STEP-3

Whenever temperature of engine or DC motor is greater than 75^0 centigrade, engine or DC motor is stopped automatically.

STEP-4

Speed of vehicle should be less than 30 Kmph at restricted zones like schools, colleges, temples etc., so vehicle speed should be controlled at these places. These restricted places can be located by Google map with help of GPS modem. Thus proposed solution can control rash driving and can make speed control operation in restricted zones.

STEP-5

Whenever accidents occur at any places, it can be located with help of GPS modem in this proposed method and it can be seen in LCD display as shown in figure10.

Figure 10. 1 Location of accident on LCD Display.

Figure 10.2 Accident alert on Owner's Mobile.

Thus the operation is continuously carried out until the ignition key is switched off and DC motor stops.

The latitude and longitude of current location is easily find simply by sending SMS and these values are displayed as shown in figures 11 and 12.

Figure 11. SMS from owner's mobile device

Figure 12.Latitude. Longitude values of current location

If vehicle is theft, the ignition system can be switched off by sending SMS as shown in figures 13 and 14.

Figure 13. SMS to Lock vehicle functioning

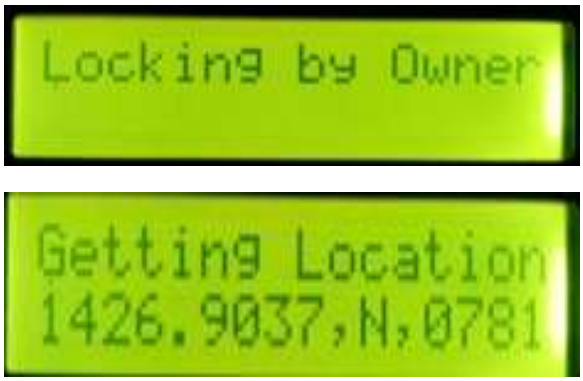

Figure 14. Locking the vehicle functioning

V. FUTURE WORK

The proposed system can measure and monitor various parameters like alcohol consumption, seat belt status, temperature of engine, speed of vehicle and accident occurrence. The other parameters like measuring of fuel level in the fuel tank of vehicle, destination distance can further be implemented.

VI. CONCLUSION

The proposed low power and low cost system measures and monitors the various parameters like alcohol consumption, seat belt status, temperature, speed of vehicle, accident of occurrence and theft of vehicle continuously with the help of various sensors and devices used, thereby reduces the road accidents and vehicle thefts. This system can be implemented to any type of vehicle.

VIII. REFERENCES

[1] C.Pamuleti et al, (2012) "Design and implementation of black box alert system for crash recovery of automobiles and prediction using mem accelerometer " *International Journal of Computer Science and Management Research.*, Volume 1 Issue 4, pp.56-57.

[2] Mamata Bhamare et al., (2013) " GSM Based LAN Monitoring and Controlling " *International Journal of Modern Engineering Research* (IJMER) Volume2, issue.2, pp.387-389.

[3] Prashant Kumar et al., (2012) " GSM Based Operating of Embedded System Cloud Computing, Mobile Application Development and Artificial Intelligence Based System " *global Journal of Computer Science and Technology Network, Web & Security*, Volume 12, Issue 15 ,pp.352-365.

[4] Pankaj Verma et al., (2013) "Design and Development of GPS-GSM Based Tracking System with Google Map Based Monitoring ", *International Journal of Computer Science Engineering and Applications (IJCSEA)*, Volume3, No.3, pp.56-98.

[5] Stephen Teang Soo Thong, Chua Tien Han and Tharek abdul Rahman "Inteligent Fleet System with Concurrent GPS & GSM Real Time Positioning Technology", IEEE, Wireless Communication Center (WCC), University Teknologi Malasiya (UTM), malasiya in 2007.

IX. AUTHORS PROFILE

Dr. D. Vishnu Vardhan, working as Assistant Professor in the Department of ECE, JNTU college of Engineering Kalikiri. He has fifteen years of research and teaching experience in various domains.

T. Narasimha, M.Tech in Digital Electronics and Communications Systems. He is a research scholar in JNTU college of Engineering Pulivendula. He is interested in Digital Electronics and Embedded Systems.