

# Traffic Sensing and Accident Detection Using GPS and GSM

S.Geethanjali Reddy<sup>[1]</sup>, Y.Bhaskar Rao<sup>[2]</sup>

Student, Department of Electronics and Communication Engineering, Saveetha School of Engineering<sup>[1]</sup>

Assistant professor, Department of Electronics and Communication Engineering, Saveetha School of Engineering<sup>[2]</sup>

sgeethanjalireddy@gmail.com<sup>[1]</sup>, ybhaskarrao86@gmail.com<sup>[2]</sup>

**Abstract:-**With the advances in wireless communication and mobile computing, a future infrastructure less self-organizing traffic information system, where vehicles can form a network for exchanging traffic information among themselves, will soon be realized. In an infrastructure less traffic information system, vehicles will act as mobile sensors and collect the traffic data as they travel. Smart phones are a great choice for traffic sensing devices as they are now equipped with a variety of sensors such as global positioning system (GPS) receiver, accelerometer, gyroscope, camera, and microphone. Automatic accident detection notification methods and also sense the traffic of a location. These various sensors sense when an accident is about to occur and immediately notifies emergency situation. Among all sensors, GPS receiver was given prominence for traffic sensing though it consumes large amount of power and shortens the battery life. In this project, we explore a possibility of using other sensors used in smart phones along with GPS. This helps to provide information about the traffic as well as the accident occurred if any. Distribution of the work among various sensors may help this situation. so, we introduce a tilt sensor which is normally used in airlines to detect the accident and to sense the traffic

**Keywords:** GPS (Global Positioning System), GSM (Global System for Mobile Communications), Tilt Sensor, PIC Microcontroller, Traffic Information System.

## I. INTRODUCTION

Constant traffic data, for example, normal speed of vehicles, vehicle thickness, flow rate, and travel time can enable drivers to pick a course. The 3 axis tilt sensor depends on the guideline of capacitive detecting. The sensor is made of spring stacked, smaller scale machined structure, mounted on silicon base. Constrain on the structure changes the position of seismic mass joined on the spring. The adjustment in speeding up unbalances the tilt sensor pivot, saw by balance/demodulation circuits and in this way, brought about yield relative to increasing speed. The detecting can be static (gravity) or dynamic (constrained increasing speed). The confirmation got from the GPS radio wire must be sent to the Base station wherein it is decoded. We utilize GSM module

Which has a radio wire. We have at the Base station; the entire information about the vehicle. At the point when car collision happens all of a sudden, the response of the crisis benefits now progresses toward becoming race amongst life and passing. In this we are attempting to program a GPS and GSM module joining a tilt sensor to report events of emergency by means of GSM correspondence stage to the closest organizations, for example, healing facilities, police headquarters, and fire administrations etc, giving the correct position of the point where crash has happened.

## II. IMPLEMENTATION

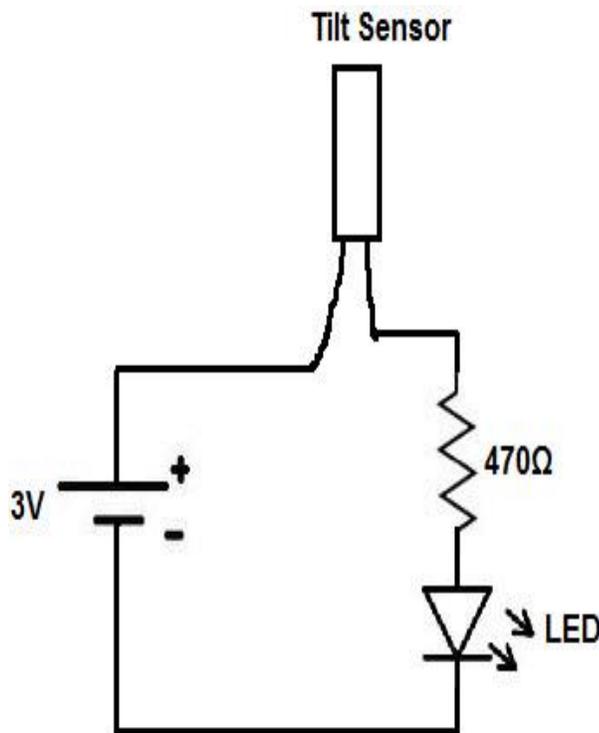
- If the accident occurs, the vehicle gets disturbed, so the tilt sensor sends signals to PIC to activate the buzzer.
- If it is intermediate accident, the buzzer should be stopped. Message is not sent.
- If it is a severe accident, buzzer runs for total delay time and an emergency message is sent

## III. TILT SENSOR

A tilt sensor can quantify the tilting in frequently two tomahawks of a reference plane in two tomahawks. Conversely, a full movement would use no less than three tomahawks and frequently extra sensors. One approach to quantify tilt edge with reference to the world's ground plane, is to utilize an accelerometer. At most applications can be found in the business and in amusement controllers (computer games, graphical amusements). It is currently being utilized as a part of a wide range of perspectives, rather than just diversions like Moto crossing and pilot test programs. It can be utilized for brandish gaming, first-individual shooter, and other odd uses, for example, in Wario Ware: Smooth Moves .

Measuring and arrangement of 2-dimensional plane tilt edges with double hub tilt sensors 2-axis tilt sensors/inclinometers using MEMS tilt sensors are fit for concurrent 2-pivot high precision (normally  $0.001^\circ$ ) and wide edge measuring range (e.g.,  $\pm 30.000^\circ$ ). The 2-hub tilt sensor innovation empowers concurrent 2D (X-Y plane) tilt edges estimation which customary single-pivot tilt sensors can't offer. Frequently, accuracy industry applications specifically, leveling, point

estimation/arrangement and surface evenness profiling undertakings basically include 2-dimensional planes instead of single-axis.



#### IV. GPS

L80 GPS module with an implanted radio wire (15mmx15mmx4mm) and LNA brings elite of MTK situating motor to the mechanical applications. It can accomplish the business' most elevated amount of affectability, exactness and TTFF with the least power utilization in a little impression sans lead bundle. With 66 look stations and 22 concurrent following stations, it secures and tracks satellites in the most limited time even at indoor flag level. The implanted glimmer memory gives ability to clients to store some valuable route information and considers future updates.

L80 module joins with many propelled highlights including EASY, AIC, LOCUS, Always Locate TM and Antenna Supervisor. These components are helpful to quicken TTFF, enhance affectability, spare utilization and recognize radio wire status for GPS framework. The module bolsters different area, route and modern applications including self-governing GPS, SBAS (counting WAAS, EGNOS, MSAS, and GAGAN), QZSS, and AGPS. L80 disentangles the gadget's plan and cost in view of inserted Patch Antenna and LNA. Besides, L80 not just backings programmed reception apparatus exchanging capacity, which can accomplish exchanging between outer dynamic receiving wire and inner

fixed radio wire additionally underpins outside dynamic receiving wire recognition and short insurance. The identification and notice of various outside dynamic receiving wire status will be appeared in the NMEA message including outer dynamic radio wire association, open circuit for reception apparatus and receiving wire lack. So host can inquiry the outer dynamic receiving wire status auspicious and advantageously.

#### V. GSM

A GSM module is a chip or circuit that will be utilized to set up correspondence between a cell phone or a processing machine and a GSM framework. The modem (modulator-demodulator) is a basic part here. These modules comprises of a GSM module or GPRS modem fueled by a power supply circuit and correspondence interfaces (like RS-232, USB 2.0, and others) for PC. A GSM modem can be a devoted modem gadget with a serial, USB or Bluetooth association, or it can be a cell phone that gives GSM modem abilities. A GSM module or GPRS modules are like modems, however there's one distinction: A GSM/GPRS Modem is an outer gear, though the GSM/GPRS module is a module that can be coordinated inside a hardware. It is an implanted bit of equipment. A GSM is a versatile component, then again, is a total framework in itself with inserted processors that are committed to give an interface between the client and the portable system.

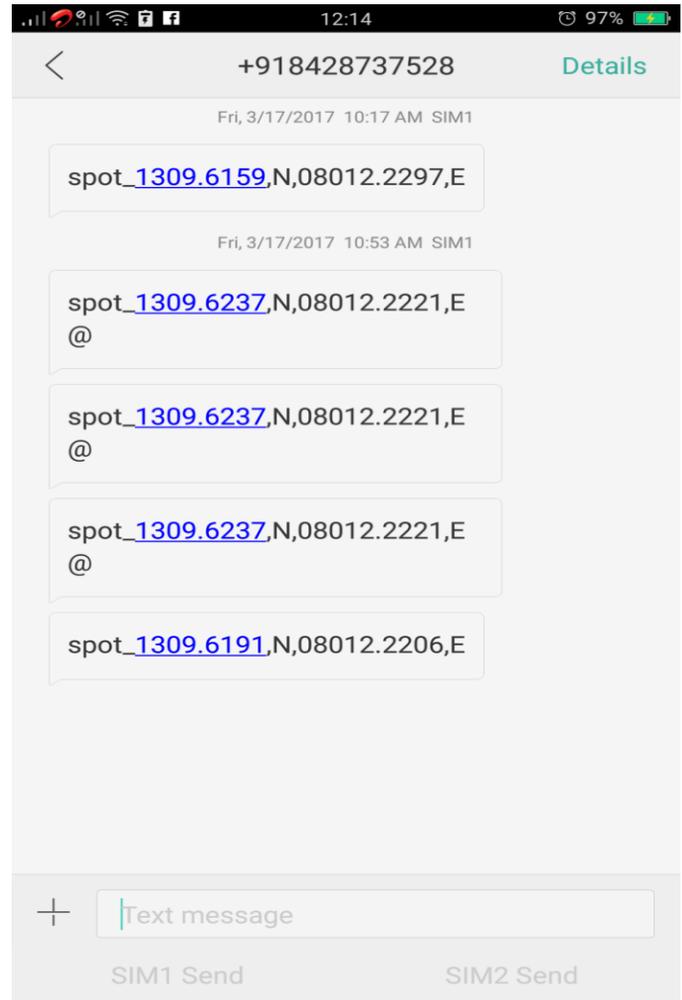
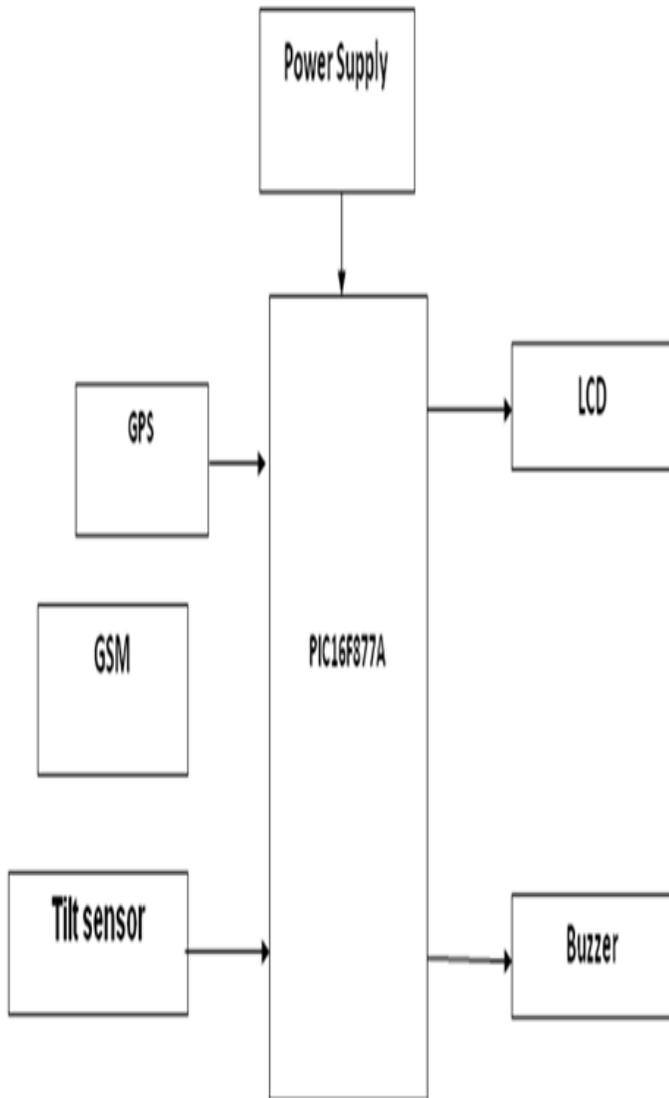
#### VI. PIC MICRO CONTROLLER

The PIC microcontroller PIC16F877A is a standout amongst the most famous microcontrollers in the business. This controller is extremely advantageous to utilize, the coding or programming of this controller is additionally less demanding. One of the fundamental points of interest is that it can be compose delete whatever number circumstances as could reasonably be expected on the grounds that it utilize FLASH memory innovation. It has an aggregate number of 40 pins and there are 33 pins for information and yield. PIC16F877A is utilized as a part of numerous pic microcontroller ventures. PIC16F877A additionally have numerous application in advanced gadgets circuits.

PIC16f877a discovers its applications in countless. It is utilized as a part of remote sensors, security and wellbeing gadgets, home mechanization and in numerous modern instruments. An EEPROM is likewise included in it which makes it conceivable to store a portion of the data for all time like transmitter codes and collector frequencies and some other related information. The cost of this controller is low and its taking care of is likewise simple. Its adaptable and can be utilized as a part of territories where microcontrollers have never been utilized as in coprocessor applications and clock capacities and so on.

**VII. BLOCK DIAGRAM**

*A. Output*



**VIII. RESULT AND ANALYSIS**

The output is shown in the mobile receiver when the accident scenario is very severe and the help is out of reach. When an accident occur, the tilt sensor sends signal to pic microcontroller to activate the buzzer. If the accident is not fatal, then the buzzer is turned off. When the buzzer is not turned off even after the delay, then the message is sent to the mobile phone through GSM. The message consists of the location showing latitude and longitude coordinates tracked by GPS

**IX. CONCLUSION**

In this system effective solution is provided to develop the traffic sensing and accident detection which will monitor various parameters of vehicle in-between constant time period and will send this data to the base unit. We have used hardware like PIC microcontroller, GPS, GSM and Sensor modules. Designed system will perform the function of communicating with the ambulance and mobile receiver via GSM. The entire control system provides advantages like minute volume and high reliability. Finally the load on GPS alone is decreased so that the overall power consumption decreases as the GPS consumes more power than any other mobile phone sensor. The delay is reduced between the occurrence of accident and the time the help is reached .

## REFERENCES

- [1]. Traffic Sensing Through Accelerometers ;Sooksan Panichpapiboon, Member, IEEE, and Puttipong Leakkaw.
- [2]. Monitoring and detecting vehicles accelerometer and MEMS using GSM and GPS technologies B.Sulochana, B.A.Sarath Manohar Babu.
- [3]. Energy-Efficient Rate-Adaptive Passive Traffic Sensing using Smartphones; Raphael Frank, Foued Melakessou, German Castignani, Thomas Engel.
- [4]. Intelligent Automatic Vehicle Accident Detection System Using Wireless Communication A.Rajkiran, M.Anusha.
- [5]. Development of MEMS Based 3-Axis Accelerometer for Hand Movement Monitoring; Zohra Aziz Ali Manjiyani, Renju Thomas Jacob, Keerthan Kumar R, Babu Varghese.
- [6]. Car Accident Detection and Notification System Using Smartphone; Hamid M. Ali, Zainab S. Alwan.
- [7]. Accelerometer-Based Event Detector for Low-Power Applications; Jozsef Smidla and Gyula Simon.
- [8]. Safe Driving Using Mobile Phones; Mohamed Fazeen, Brandon Gozick, Ram Dantu, Moiz Bhukhiya and Marta C. González.
- [9]. Design and Development of accelerometer based System for driver safety; V.Sagar Reddy, Dr.L.Padma Sree, V. Naveen Kumar.
- [10]. [www.mecs-press.org/ijisa/ijisa-v5-n9/IJISA-V5-N9-0.pdf](http://www.mecs-press.org/ijisa/ijisa-v5-n9/IJISA-V5-N9-0.pdf).
- [11]. [www.ijettjournal.org/volume-3/issue-2/IJETT-V3I2P219.pdf](http://www.ijettjournal.org/volume-3/issue-2/IJETT-V3I2P219.pdf)
- [12]. [en.wikipedia.org/wiki/Vehicle\\_tracking\\_system](http://en.wikipedia.org/wiki/Vehicle_tracking_system).
- [13]. Bhaskar.R, Vankadhara.V, Raman.B, Kulkarni.P, “Wolverine: Traffic and road condition estimation using smartphone sensors”, Ieee Conference Publications .
- [14]. N. Jinaporn, S. Wisadsud, P. Nakonrat, A. Suriya, "Security system against asset theft by using radio frequency identification technology," Ieee Conference Publications, Vol.2, Pp.761-764, May 2008.
- [15]. Murugandhan and P.R.Mukesh (2010) “Real Time Web Based Vehicle Tracking Using GPS ” world Academy of Science ,Engineering and Techology.
- [16]. F. A. Author is with the National Institute of Standards and Technology, Boulder, CO 80305 USA (corresponding author to provide phone: 303-555-5555; fax: 303-555-5555; e-mail: author@ boulder.nist.gov).
- [17]. Y. Zhang, W. Lin, and Y.-K. Chin, “A pattern-recognition approach for driving skill characterization,” IEEE Trans. Intell. Transp. Syst., vol. 11, no. 4, pp. 905–916, Dec. 2010.
- [18]. BOSCH, Bmi150—Digital, Triaxial Acceleration Sensor-Data Sheet, Oct. 2011. [Online]. Available: <http://catalog.gaw.ru/project/download.php?id=20526>.
- [19]. S. Reddy, M. Mun, J. Burke, D. Estrin, M. Hansen, and M. Srivastava, “Using mobile phones to determine transportation modes,” ACM Trans. Sensor Netw., vol. 6, no. 2, pp. 13-1–13-27, Feb. 2010. [20] J. Kwapisz, G.
- [20]. Weiss, and S. Moore, “Cell phone-based biometric identity- caption,” in Proc. 4th IEEE Int. Conf. BTAS, Sep. 2010, pp. 1–7.