

ACCIDENT DETECTION DEPENDING ON THE VEHICLE POSITION AND VEHICLE THEFT TRACKING, REPORTING SYSTEMS

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Abstract: World population has increased enormously in the recent times. Along with this, their luxuries and life styles are also modified in such a way to have their own vehicles etc. In the main part of paper is to concentrate on accident detection and alert by sending message to the Android Mobile. An android app that specifies the location name. Vehicle position on the road is important consideration for detecting accidents, So in this paper accident can be detected by using vehicle position on the road .

Keywords: Accident detection accelerometer, motor, GSM, GPS, Android, Keil C, Eclipse.

I. INTRODUCTION

Vehicles are to be secured from both on road and off the road where as in case of on road one have to know about the accident(s) and in case of off the road vehicle thefts are to be controlled.

The different systems at present are based on GPS receiver and CCTV based accident detection[1], pressure sensor based accident detectors, Radio Frequency based[2], video based detector[3], GPS and speed based accident detection[4] etc are prone to have false alarm and also not so effective.

Author in [1] suggested GPS and CCTV based accident alert system that encompasses GSM to send latitude to longitude values but the user may or may not understand GPS data which results no use. Author in [2] suggested "Radio Frequency" based accident detection which is confined to a particular region only where if it is out of range then it is not possible to detect the vehicle. Author in [3] suggested a video based accident detection which seems to be complex. Similarly in [4] author suggested a speed based algorithm which seems to have false alarm when sudden brakes are applied. Hence there is requirement to develop a system with less false alarm and location specifying system so that anyone can understand easily where the vehicle is located.

Covering these disadvantages, the paper introduces a new system with different algorithm that sense accidents with accelerometer sensor and on other hand it displays

location name with the help of android app [5]. In order to detect accident accelerometer sensor's tilt detection is considered which would decrease false alarm. This type of system would be more useful and effectively applicable for developed cities where security is highly sensitive. To perform all these embedded C programming in Keil and android app development in eclipse are used which are run on an ARM7 development board.

II. PROPOSED SYSTEM

ACCIDENT DETECTION:

Below fig 1 shows vehicles on the road in general case with the tilt angle is zero



Fig 1:On road vehicles

For detecting Tilt Angle this paper is going to use Accelerometer sensor "Accelerometer sensor" plays a major role. Fig 2 shows the sensor which is employed here. The sensor is a 3-axis accelerometer sensor (MMA7660FC) which is capable of finding different physical changes like "tilt", "tap", "shake" etc. Advantage of this sensor is it can sense the physical conditions in all the three directions (i.e., 3-Axis).

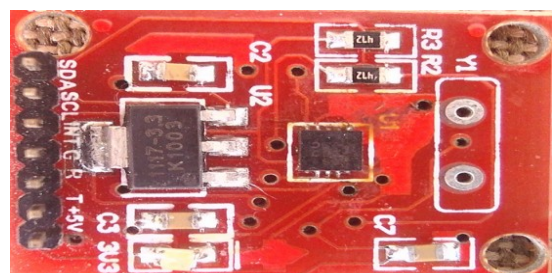


Figure 2: 3-Axis accelerometer



Fig 3: Different accident positions

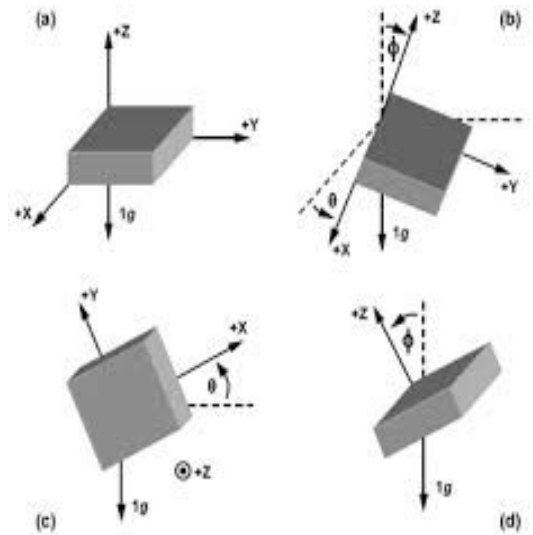


Fig 4: Accelerometer sensor at different tilt angles

Fig 3 shows the different accidents positions of the vehicles. To detect this way of accidents by measuring the Tilt angle to the road or surface is important. Fig 4 shows the how tilt angle of accelerometer sensor is work.

Fig 5 shows the block diagram of whole system that has all essential blocks like accelerometer sensor, GSM,

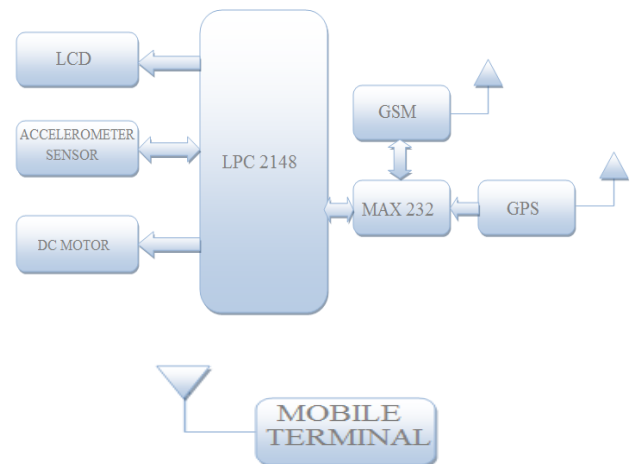


Figure 5: Block diagram of proposed system

GPS, LCD and DC motor to perform the objective of paper. All these are on one side of application and on other side a mobile terminal with developed android app is present.

The proposed system is to detect the vehicle in three different cases such as whenever user needs to find

vehicle location, secondly to detect an accident occurrence and finally to OFF the engine when it is theft.

Here DC motor is used to realize a vehicle which is controlled by transistor based switch. LCD is used to observe the status of execution. GSM module is used to send GPS data to mobile terminal and receive the control message from the remote terminal.

GPS module used to send location data i.e., GPS data to the mobile terminal.

ALGORITHM DEVELOPED

Algorithm for whole application is as follows,

1. Establish the exact connections.
2. Initialize GSM module.
3. Initialize GPS module.
4. Wait for threat conditions.
5. If any conditions arise then access GPS receiver.
6. Send accessed GPS data to the predefined number through GSM as SMS.
7. In the mobile terminal immediately receiving SMS open the android app.
8. In the app, it directly shows the position of the vehicle.
9. From this terminal, the position of vehicle is send to a predefined number.
10. While running the code related to this algorithm its every status is reflected on a LCD which is on development board.

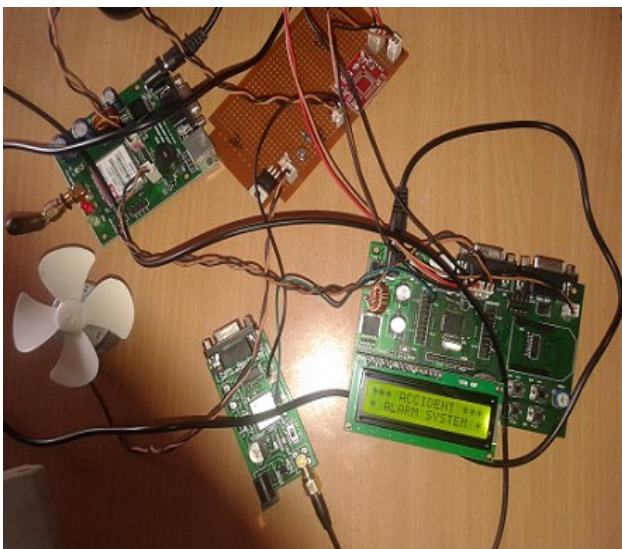


Figure 6: Total setup with all inter connected modules

Condition 1: Accident detection

Vehicle accident detection is determined using accelerometer sensor which detects “SHAKE”, “TAP” OR “TILT” to this sensor module. These conditions are actions of an accident. When sensor experiences these forces it avoids the supply to motor which HALTS/STOPS the vehicle immediately. After this the system sends GPS data to the mobile terminal. Fig 7 shows the result for this.

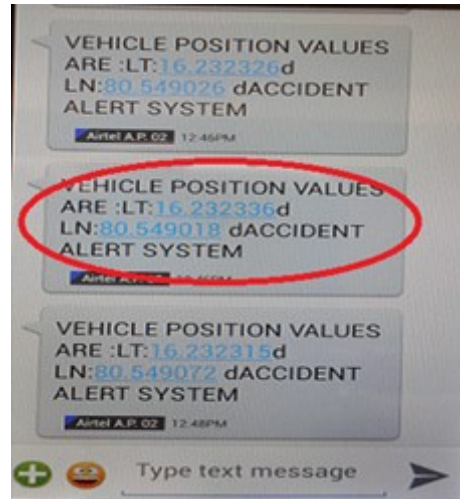


Fig 7: Figure showing received GPS data through SMS

Condition 2: Vehicle positioning

In order to determine the position of the vehicle a SMS with “SEND” as its body is sent to the number used GSM module. At this condition the system without STOPING vehicle it just sends the GPS data to the mobile terminal. Fig 8 shows this result of this.

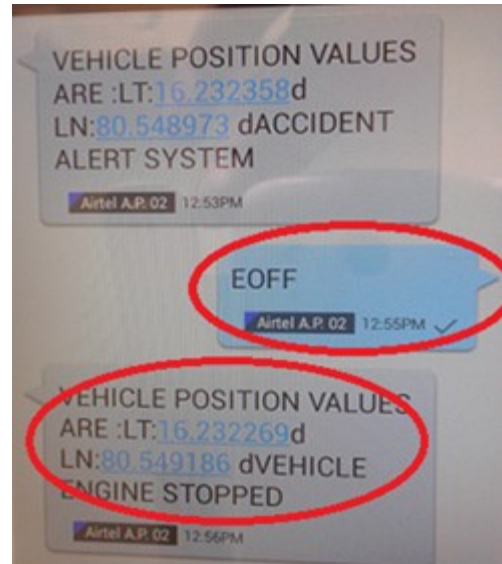


Fig 8: Figure showing SMS sent and received when the vehicle is theft by someone.

Condition 3: Vehicle theft detection

In a condition, where the vehicle is theft by someone then a SMS with body as “EOFF” is sent from

III. RESULTS OBTAINED

The result of the system is verified under 3 different conditions.

mobile terminal. At this condition the system STOPS the engine and sends the GPS data to the mobile terminal.

For all these three conditions, immediately after receiving GPS data one have to open the android application regarding this. This app automatically positions the location according to the received data. From this mobile terminal an SMS is again send to the other mobile regarding position.

IV. CONCLUSION

The system plays an important role in different ways thus it can be applicable in different areas like vehicle positioning, accident detection and theft detection. The SMS regarding the position of vehicle can be sent to any mobile terminal from android mobile. Even there is position to change the mobile terminal through settings in android application. The system is more accurate, highly applicable and less complex.

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