

## Research Paper

# SMART CAR SYSTEM USING SENSOR, GPS AND GSM

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Through this our expectation is that the car should break automatics if any obstacle detection as per sensor input. It should also break if the car does not follow driving track and re-track car. If the above said condition it should generate alert message for immediate help and send that message to a predefined mobile number. In that SMS it should send current place latitude and longitude obtained from GPS so using that latitude and longitude, we can find its location on earth and we can provide fast help in case of emergency. The Microcontroller PIC18F26K22 is interfaced with a track sensor that continuously detect, track, vehicle is in motion if track sensor output detect off road path, then microcontroller immediately slow down vehicle speed and try to move the vehicle back on path depending on track sensor output. Also microcontroller interfaced with IR sensors to detect any obstacle is present in vehicle path, is in movement.

Keywords: Track sensing, Detecting obstacle, PIC microcontroller, Global Service for Mobile Application (GSM), Global Positioning System (GPS)

## INTRODUCTION

In addition to more security if the driver applies harsh break in emergency, this condition detects as accident porn situation in this case immediate SMS will send to owner via GSM along with GPS location of vehicle informing about accident porn situation alert in time. So it will help people in the car to get immediate help if needed (Syedul Amin Jalil *et al.*, 2012). SMS along with GPS location is also sent to the owner in

case of Dynamic Stability and track detection control occurs.

To improve overall system, Microcontroller featured with GSM and GPS interface. GPS device received valid GPS signals from satellite and send calculated longitude and latitude and speed of the vehicle to microcontroller at every one second. Microcontroller continuously monitor the speed received from GPS if there is a huge predefined difference between two consecutive readings of speed from the GPS

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is treated as accident condition. In such event microcontroller will send respective AT commands to GSM modem interfaced to take action for sending text SMS to predefined mobile number. This text message includes current latitude and longitude received from the GPS receiver (Sri Krishna Chaitanya Varma *et al.*, 2013).

On Dynamic Stability and track detection control makes driving on twisty and slippery road conditions safer, by using sensors to detect any of the wheels is losing path. It has the ability to slow down car speed, helping the car to regain its grip on the path. If in any case the car shows a tendency to skid the system Automatically slows down the wheel speed to help maintain control. In obstacle detection car will detect any object or other car in its driving path, as any obstacle detects in path it shall automatically reduce the car speed by applying smooth break.

## PROPOSED BLOCK DIAGRAM

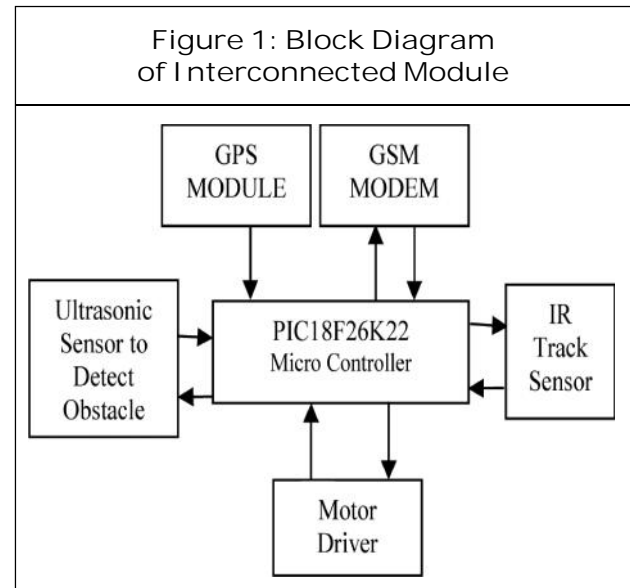
As soon as any obstacle detected through this sensor microcontroller shall immediately slow down vehicle speed and come to rest till obstacle is in the path. Once the sensor detects nothing is in path controller shall bypass control on breaks.

To detect obstacle in vehicle path the sensor is placed in such a way that each cover the maximum area in front of the vehicle chassis and to detect an obstacle either obstacle is small or big.

## EQUIPMENT AND PROPOSED METHODOLOGY

### Microcontroller Unit

The Microcontroller PIC18F26K22 is interfaced with a track sensor that continuously



detect, track, the vehicle is in motion if track sensor output detects off road path, then the microcontroller immediately slow down vehicle speed and try to move the vehicle back on path depending on track sensor output.

Also microcontroller interfaced with IR sensors to detect any obstacle is present in vehicle path, is in movement. In addition, to improve overall system, Microcontroller featured with GSM and GPS interface.

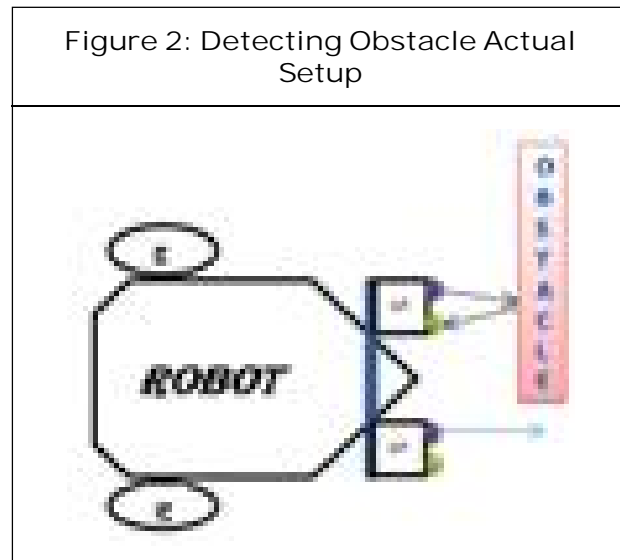
### The Track Sensing

The demonstration vehicle chassis uses IR sensors to sense the line, an array of 8 IR LEDs (TX) and sensors (Rx), facing the ground has been used in this setup. The output of the sensors is an analog signal that depends on the amount of light reflected back, this analog signal is given to the comparator to produce 0s and 1s that are then fed to the microcontroller.

The Motor Driver has four inputs to control the motion of the motors and to enable the inputs Which are used for switching the motors on and off.

### Detecting Obstacle

PIC generating Signal of 38 KHz frequency for better determination of the object. Detector TSOP1738, gives a high output signal IR detector circuit is a circuit which gives a low output in the absence of IR signal When some obstacle come in path IR signal reflected back and fall onto the IR detector. In such a way that obstacle is detected.



### GSM/GPS Modem

The modem can be controlled by a microcontroller through AT command set. The M12/M95 Quectel GSM Modem used in this system with Quad band 850/900/1800/1900 MHz. Compact “Plug And Play” Quad band GSM modems can be directly connected to the serial port of a desktop or notebook computer through the RS232 interface. A standard SIM card can be inserted in the integral card-holder within the metal enclosure.

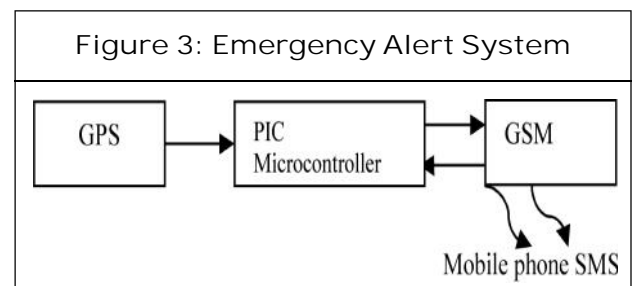
### GPS Module

The GPS module can receive the data by connecting to PIC Microcontroller UART1 through RS232. Quectel L50 ROM based GPS used in this system.L50 has fast tracked

and acquisition features. The output of GPS L50 has Recommended Minimum Specification, Global positioning system, GNSS DOP and Active satellite and GNSS Satellite in view Messages body format.

### Emergency Alert

In case harsh braking (Narendar Singh *et al.*, 2013) is detected microcontroller runs set of AT commands to send GPS location over SMS to predefined numbers. Microcontroller continuously receiving current valid location, i.e., latitude and longitude from GPS and monitor variation in speed in case of sudden variation it will announce as accident porn situation and text message sent to end user.



### Software

All components are built in Microchip MPLAB. In this code firmware. c. We have written embedded C codes for accident detection and avoidance. For that we have used microcontroller GPIO port, Uart1, Uart2, timer0, etc. Code uses the Peripheral support library available with MCC18 Compiler. Some commands are as follows:

#### **voidcall\_uart1\_receive\_data\_funcation(void):**

This function is will receive GPRMC latitude, longitude location string from GPS via Uart1 port of PIC18.

#### **voidSendGPS\_GPRM\_Setting\_to\_GPS(void):**

This function will send GPRMC setting string to GPS for disable other responses.

**void send\_gps\_loaction\_sms(void):** This function will send location message to GSM via uart2 port of PIC18.

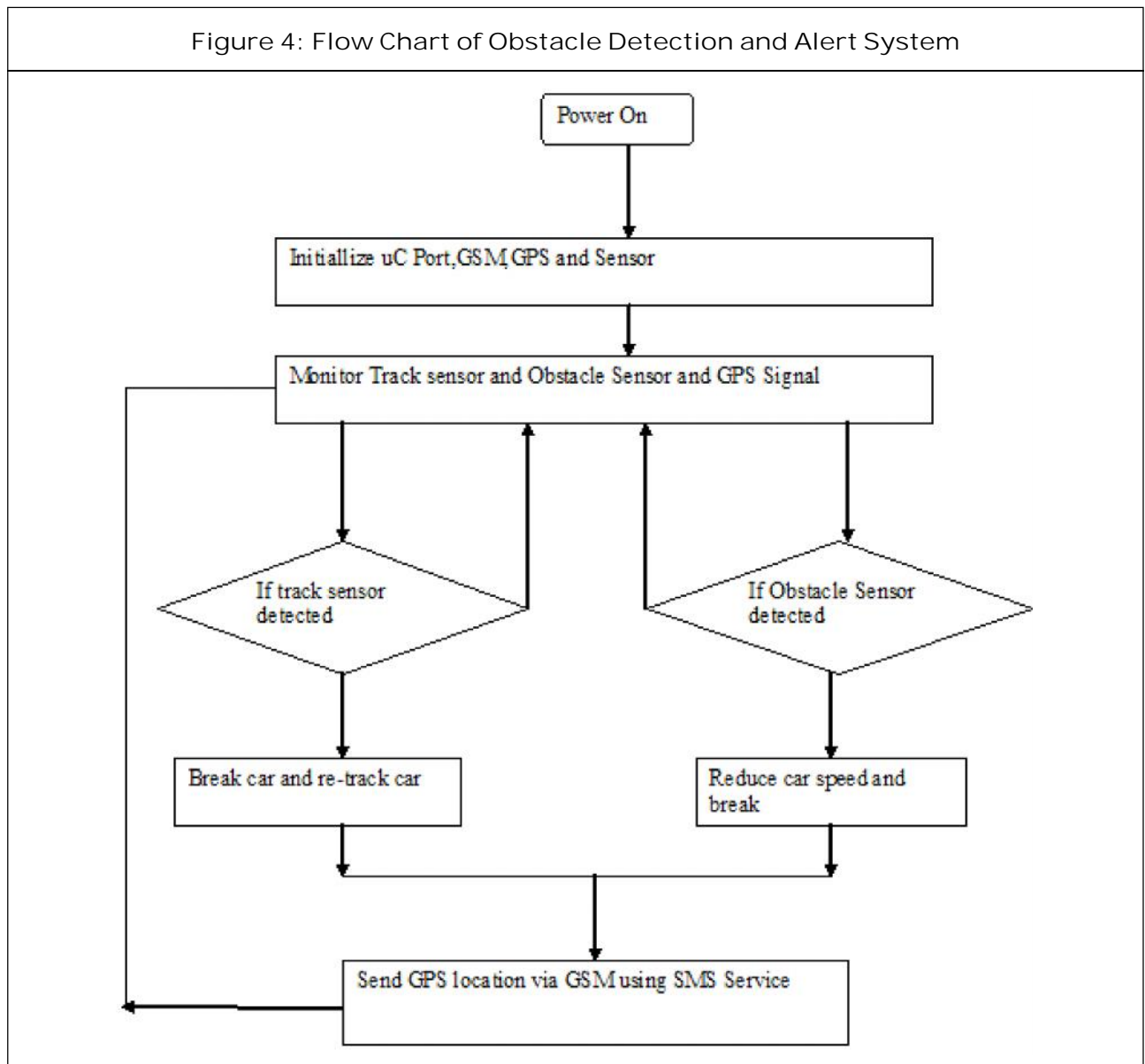
**InterruptVectorHigh(void):** This function is interrupt area for timer0,uart1,uart2, etc.

**void Inittialize\_System(void):** This function is used for initializing sensor uart1,uart2,timer0 peripheral, etc.

**void delay\_function(void):** This function is used for generating delay.

Initialize all input and output ports of the Microcontroller and power is supplied to GPS, GSM and sensor modules. IR Sensors are placed at the bottom of the car and are used to detect the road track. Due to some unexpected situation, if the car left the track, then system shall automatically break the car and retract the car on proper location. An alert SMS shall be sent to the predefined mobile number. If the car is on track, then system always monitors the road.

Figure 4: Flow Chart of Obstacle Detection and Alert System



An Ultrasonic sensor of five meter range is used to detect an obstacle in the front side. If an obstacle is detected then, system shall automatically break and reduce the car speed at the same time an alert SMS with longitude and latitude shall be sent to a predefined Mobile number. This operation is controlled and monitored by using the PIC Microcontroller.

## LITERATURE SURVEY

Syedul Amin Jalil *et al.* (2012) in this paper author built components using PIC 18F4550 Microcontroller. We have referred this paper in our project. GPS Play an important role in the vehicle system. GPS always monitors the speed of the vehicle. If accidental porn is occurring then, GPS sends the location of the accident with some predefined message body of the alert system or to the concern person. Microcontroller receives data from the GPS and encode that data. That means microcontroller compare the previous and current value. Some threshold values are defined as concerns with speed. If the vehicle speed is below the threshold value the we considered as something is happening to the vehicle. The location details sent via GSM module to concern authority on his/her mobile number.

Sri Krishna Catania Varma *et al.* (2013) authors demonstrates the accident detection and alert system using GPS and GSM system. In this project authors uses microcontroller AT89C52 as a core. He prepares a survey report that shows an porn occur because of the various things. Authors decides to nullify the accidental situation because it is difficult to track the accidental situation in the rural area.

The whole project assembly is placed inside the vehicle. GPS find the location of the vehicle. Data shall be sent to MAX232 via RS232 Cable. Different sensors are used to send intimation from GSM modem. Vibration and sound sensors are used efficient and the correct way of accident identification.

## ADVANTAGES

- Security and remote monitoring of vehicles, especially during military operations.
- Used in automotive and transport vehicles from lighter vehicles like cars, to heavier automotive like ships and airplanes.
- To monitor the road track detection.

## LIMITATIONS

One of the major disadvantage is that, this system is used only for front collision, the system needs GSM networking for SMS service, systems need GPS Signal for acquiring location from the satellite.

## APPLICATIONS

A growing world population and a rise in international prosperity have brought about a serious increased the accident on road maximum accident is done because of carelessness of drivers sometimes due to the road condition or harsh braking. This technology can help us in reducing such calamities using a sensor, GSM and GPS technology. This project also provides SMS alert in case of any emergency, so it can help in proving fast basic aids.

## CONCLUSION

If any obstacle detects the sensor sense the situation and car should break slowly and stop

automatically. If the car is on the wrong track then breaking car slowly and follows the right track automatically. In both the situation an alert SMS with predefined message body sent to the concert person. So that he/she can reach that place to save the human life. 🌐

## ACKNOWLEDGMENT

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