

# Intelligent vehicle control in embedded system using GPS and GSM

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**Abstract**— This paper presents the embedded system, used for tracking and positioning of any vehicle by using Global Positioning System (GPS) and Global system for mobile communication (GSM). This design will continuously watch a moving Vehicle and report the status of the Vehicle on demand. The hardware and software of the GPS and GSM network were developed. The proposed GPS and GSM based System has the two parts, first is a mobile unit and another is controlling station. The system processes, interfaces, connections, data transmission and reception of data among the mobile unit and control stations are working successfully. This also includes the Vehicle anti-theft system with vehicle ignition controlling technique. Whenever car owner removes key from the ignition lock at that system is turned on. We have provided vibration sensor with this project, which is similar to piezoelectric sensor. When vibrations are detected, SMS is sent to the owner of the car. When car owner sends back SMS to project then the engine is stopped. We have provided a Relay and a DC motor to show the demo of vehicle engine controlling system.

**Key words:** Global Positioning System (GPS), Global System Mobile Communication (GSM), vehicle tracking, ignition control (tracking and locking), vehicle safety

## I. INTRODUCTION

Currently almost all of the public having an own vehicle and having driving insecurities. The safety of vehicles is extremely essential for public vehicles. Vehicle accident prevention is more challenging. So in order to bring a solution for this problem system can be implemented. Vehicle tracking and accident prevention system can be developed through the application of ignition control (tracking and locking), accident detection and prevention, driver fatigue, and speed limiting with efficient vehicle management system. This technique helps to find out the exact location of the accident or car by using GPS module and with the help of server an emergency vehicle can be sent to the exact location to reduce the human life loss.

This vehicle tracking system is an electronic device, installed in a vehicle to enable the owner or a third party to track the location of the vehicle. This paper proposed to design a vehicle tracking system that works using embedded system, GPS and GSM technology.

The IR sensor is used as eye blink sensor which will detect the behavior of the driver through sensors whether he/she is drowsy or drunk, so that occurrence of accident can be prevented. This system describes a real time safety prototype that detects the driver condition and adjusts the speed of the vehicle. The place of the vehicle identified using global positioning system (GPS) and global system mobile communication (GSM). This is more secured, reliable and low cost. Currently GPS vehicle tracking ensures their safety. After switch off the engine, motor cannot restart without permission of password. This system installed for the four

wheelers. Vehicle tracking systems accepted in consumer vehicles.

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According to this project when a vehicle meets with an accident immediately Vibration sensor will detect the signal or if a car rolls over, and will detects the signal and sends it to ARM processor . ARM sends the alert message through the GSM modem including the location to police control room or a rescue team.

## II. PREVIOUS WORK

Prof. Chen H. Chiang, discussed about the GPS/GSM Based System is one of the most important systems, which integrate both GSM and GPS technologies. It is necessary due to the many of applications of GSM and GPS systems as well as the wide use of them by millions of people all over the world.

Prof. Albert Alexe discussed about the sensors are used to monitor the driver conditions and speed of the vehicle. All the data is transferred to GSM enabled device that is mobile phone. All the vehicles equipped with GPS antenna to locate the place of the vehicle. Sensor installed to monitor the driver's status. The proposed technology significantly avoids the accident at highways.

There are many efforts, application, approaches have been proposed to provide security and safety in case of accidents. A basic approach to increase the road travel safety using the concepts of wireless sensor networks. A good survey of using personal mobile phone, microcontroller has been provided.

## III. PROPOSED DESIGN

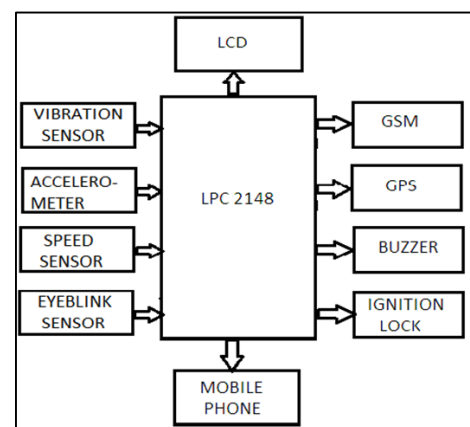


Fig. 1: Intelligent Vehicle Control System

The block diagram shown above is for intelligent vehicle control system. The diagram consists of various types of sensors, LPC 2148, GPS, GSM, buzzer, LCD, and Ignition lock, mobile phone.

Input from various sensors like accelerometer, vibration sensor, eye blink sensor, and speed sensor is given to the microcontroller and it gives the output to LCD display, it sends the exact location of the vehicle to the mobile phone via GSM with the help of GPS which will give the location of car or vehicle. Vibration sensor will detect the vibrations in case of accident as well as when a person other than the driver or owner tries to open the door lock of the car. When a third person tries to open the door lock of the car vibration sensor senses the vibrations, in that case also the car engine and the door automatically gets locked and owner or driver of the car will receive the SMS via GSM on the mobile phone.

Next sensor is the accelerometer which measures the acceleration of the car. The main purpose of measuring acceleration is to detect the rash driving which is dangerous and can cause human life loss. Accelerometer also acts as a vibration sensor in case of road rollovers or if in case a car meets with an accident. Accelerometer can also measure static (earth gravity) or dynamic acceleration in all three axis (X, Y, Z). Application of the sensor is in various fields and many applications can be developed using this sensor.

Accelerometer sensor measures level of acceleration where it is mounted this enable us to measure acceleration/deceleration of object like car or robot, or tilt of a platform with respect to earth axis, or vibration produced by machines. Sensor provides 0G output which detect linear free fall. Sensitivity can be adjusted in two ranges.

Speed sensor will measure the speed of the car and gives the required information of the speed to the driver as well as it will send the information via SMS also. If speed increases beyond limits the buzzer will ring and driver will decrease or adjust the speed according to the requirement.

The next sensor in this design is eye blink sensor, which is nothing but the IR sensor. IR sensor will work on the principle of infrared rays. It has IR transmitter and the IR receiver. IR transmitter will transmit the IR signals which will be received by the IR receiver. Input to the IR sensor is IR rays from eyes. If the eye is closed means the output of IR receiver is high otherwise the IR receiver output is low this to check the eye position. This output is given to logic circuit to indicate the buzzer. Vehicle accidents are most common on highways. This happens on most factors if the driver is drowsy or if he is alcoholic. If sensor detects that the driver is unconscious while driving in traffic or on highways or at the middle of the road, the vehicle is expected to detect the edge of the road and then stop. If it does so the vehicle may not disturb the other vehicles and can avoid an accident.

#### IV. RESULTS

Intelligent vehicle control system is mainly work for safety of the car driver and accident tracking as well as accident prevention by locating and speed limiting it. It also gives the anti-theft design for car. This system provides vehicle security based on embedded system by sending SMS to the authorized person on mobile phone and automatic ignition lock.

#### V. CONCLUSION

Intelligent vehicle control system is nothing but a well managed vehicle. This system gives us information regarding location of the vehicle, speed of the vehicle and if it exceeds the speed limit it letting driver know about it by ringing buzzer. It also provides security against the car getting stolen by sensing the vibrations and locking the engine.

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