SMART CAR SYSTEM USING SENSOR, GPS AND GSM

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Abstract

A New generation of cars is improved in such a way that the number of accidents decreases. Innovative ideas have implemented and emerged in order to reduce the risk of accident. During the recent past years, some alarm system and intelligent controlled apparatus have been designed and developed in order to increase the safety of automobiles. Security in travel is a primary concern for everyone Security system nowadays become a need for vehicles and available with many modern features. This car security system comes with extra secure access and message on GSM network and GPS. The system can monitor by owner using GSM module communication via mobile phone. With the growth of vehicles in large number and with the same Narrow size road it is very difficult for the driver to drive a vehicle safely without a crash on the road

Keywords: Safety, Gps, Gsm, Smart Cars.

I. INTRODUCTION

Smart car history, all started back in 1995, when Swatch and Mercedes Benz decided to build a very small car for Europe, long before we even think about the need to drive such a small car. The name "Smart "comes from a partnership between Swatch & Mercedes (S+M) and the fact that wanted to design an "artful" little car so, S+M+ART=SMART! Figure 1.1.1shows Junior, a robotic Volkswagen Passat, at Stanford University in October 2009 An autonomous car, also known as a Smart car,[2] self driving car or robot car, is an autonomous vehicle capable of fulfilling the human transportation capabilities of a traditional car. As an autonomous vehicle, it is capable of sensing its environment and navigating without human input. Robotic cars exist mainly as prototypes and demonstration systems. Currently, the only self driving vehicles that are commercially available are open-air shuttles for pedestrian zones that operate at 20.1km/h.

Figure1.1.1: A Robotic Volkswagen Passat

The Google driverless car is a project by Google that involves developing technology for autonomous cars. The software powering Google's cars are called Google Chauffeur.[2] Lettering on the side of each car identifies it as a "self-driving car". The U.S. state of Nevada passed a law on June 29, 2011 permitting the operation of autonomous cars in Nevada. Google had been lobbying for robotic car laws. The Nevada law went into effect on March 1, 2012, and the Nevada Department of Motor Vehicles issued the first license for an autonomous car in May 2012.

The license was issued to a Toyota Prius modified with Google's experimental driverless technology.Google's robotic cars have about $150,000 in equipment including a $70,000 LIDAR (laser radar) system. The range finder mounted on the top is a Velodyne 64-beam laser. This laser allows the vehicle to generate a detailed 3D map of its environment. The car then takes these generated maps and combines them with high resolution maps of the world, producing different types of data models that allow it to drive itself.

Figure1.1.2: Toyota Prius, Google driverless car

The purpose of the project is to find the vehicle where it is and locate the vehicle by means of sending a message using a system which is placed inside of vehicle system Most of the times we may not be able to find accident location because we don't know where accident will happen. In order to give treatment for injured people, first we need to know where the accident happened through location tracking and sending a message to your related one or to the emergency services. So in this work we are using the PIC Microcontroller 18F26K22 for cost effective and also for easy understanding. Here we used Embedded C programming for better accuracy and GPS and GSM modules which helps to trace the vehicle anywhere on the globe. The exact location of the vehicle is sent to mobile phones using GSM. GPS is the most popular system to find the location and the position of the objects[2].The obstacle detection is carried out using ultrasonic sensor. If any obstacles are detected, the information is sent to the vehicle through Global System for Mobile communication (GSM). On the whole, the system suits well for industrial goods transportation. The wireless technology plays the vital role in this automated system.

1.2 MOTIVATION

In today's world safety and security plays an important role, hence we tend to provide a good safety and security system while travelling. Vehicles are important in today's fast-paced society. Hence, acquiring a vehicle nowadays is considered a necessity, compared to the past where it was considered a luxury. In this thriving society, more and more vehicles are produced to meet the increasing demands of people and businesses from all corners of the world. Here comes the necessity to provide more and more safety and security features to them. Hence this project aims to design an embedded system for vehicle safety and security by modifying and integrating the existing modules.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. The

obstacle detection is carried out using ultrasonic sensor[1][7]

The main purpose is to provide security to the vehicle at very reasonable cost. So by using the basic microcontroller AT89C52 for cost effective and also for easy understanding.[5] Here assembly programming is used for better accuracy and GPS and GSM modules which helps to trace the vehicle anywhere on the globe. The exact location of the vehicle is sent to mobile phones using a GSM modem.[2][3] Passive Infrared sensor is a reliable solution for detecting human or animals and this technique certainly can save lots of life.[4] Autonomous vehicle which can be started automatically and the drive automatically without changing lanes and avoid forward collisions. The car will be replaced by a microcontroller ARM 7 TDMI S LPC2129 which will drive the car automatically.[6]

Whenever an accident takes place the accident interrupt block gives interrupt to the ARM-7 microcontroller.Through serial communication block the system is interfaced the PC.[8] In order to avoid accidents and alert the drivers about the speed limits for safe travelling. When they enter into the speed limit zones, using GSM technology if driver neglect the speed limit in the zone, the details of the zone and vehicle will be sent through the message to the traffic police system such that Challan can be sent to the drivers address. Even if the accident occurred using GPS receiver location is found out and the message is sent through the GSM technology.

1.3 Project Objective

Through this Project our expectation is that the car should start when authorized persons send predefined message as Start on the External SIM. Otherwise the car is locked ,after sending Stop on same number. Smart vehicle sends current locations on the different predefined mobile numbers. In this situation owner calls on External SIM for the first time, then the car should stop & when the user calls second time, then the vehicle will start automatically. Also, When the car is in motion and suddenly Obstacle occurring in front of the vehicle, then the sensor should detect barrier, (may be small or big) car should break automatic. And try to search alternate path in case of an accident. For immediate help and send that message to an owner and care center.

1.4 Problem Statement

Types of car accidents include lane departure crashes, collisions with cyclists and pedestrians, collisions with animals, and collisions at road junctions. An unauthorized person try to hack car. So to overcome these scenario ,I have decided to construct such car which satisfy the below conditions. Authorized owners will Send text SMS on External SIM card to Unlock the Car. The Car will detect any object or other car in its driving path, as any obstacle detects in path it will automatically reduce the car speed by applying smooth breaks. If huge accident occur in front of smart car then car will search alternate lane automatically. That means it bypass the accidental or obstacle & ready to travel using another free lane.

The car should also break if the car does not follow driving track and re-track car on the original track automatically.In a harsh break SMS will send to owners via GSM along with GPS location of vehicle informing about accident situation. When vehicle is in unknown or known place it will send an Alert containing location address in every two minutes, on the predefined numbers. now if any owner calls first time on External SIM then car will automatically stop .so that we can reach that place easily. If owner calls second time then car will start automatically and follows track & detect obstacle.

1.5 Project Overview

This Project we will achieve through two major parts like Dynamic Stability and track detection, control and obstacle detection system. In Dynamic Stability and track detection control makes driving on twisty and slippery road conditions safer, by using sensors to detect whether any of the wheels is losing path. Dynamic Stability and track detection control 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 wheels 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 will automatically reduce the car speed by applying smooth breaks.

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. SMS along with GPS location is also sent to the owner in case of Dynamic Stability and track detection control and obstacle detection condition occurs. [11[21[3][4]

II. ADVANTAGES,LIMITATIONS AND APPLICATIONS

2.1 ADVANTAGES

1. Security and remote monitoring of vehicles.
2. The road track detection is easy and Low Cost of implementation.
3. Theft is unable to hack vehicle as Vehicles sends the current location to all predefined numbers in every two 2 minutes automatically.
4. The Processor is independent of the compiler.
5. Vehicle search alternate path in case of accident in front side.
6. The Owner can stop the car at any speed.

2.2 LIMITATIONS

1. One of the major disadvantages is that, this system is used only for front barrier detection.
2. Neat & proper arrangement of track is required.
3. The system needs GSM networking for SMS service.
4. Systems need GPS Signal for acquiring location from the satellite.

2.3 APPLICATIONS

1. Security and remote monitoring of vehicles, especially during military operations.
2. Used in automotive and transport vehicles- from lighter vehicles like cars, to heavier Automotives like ships and airplanes.
3. Track Follower or line follower.

III. RESULTS AND DISCUSSION

3.1 TEST RESULTS

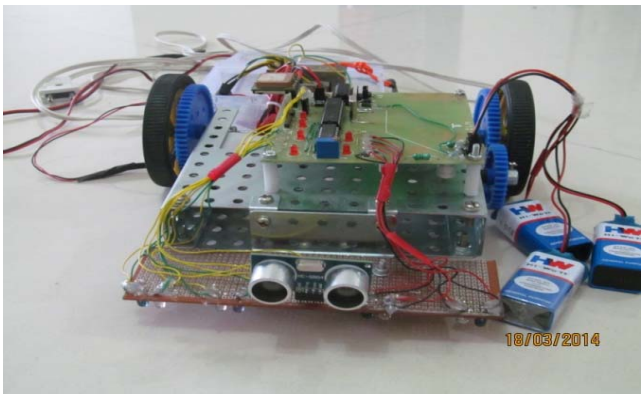

Figure.3.1.1 Actual Setup of Obstacle & Track detection [I][II]

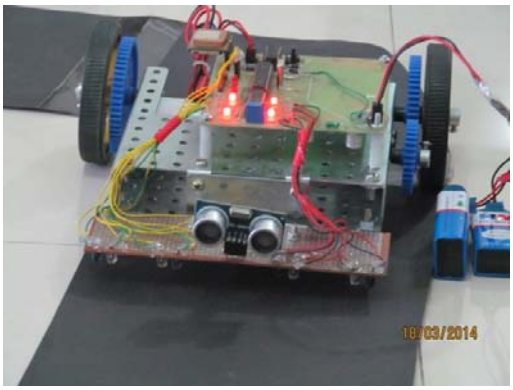

Figure 3.1.2 Signal Indication [I][II]

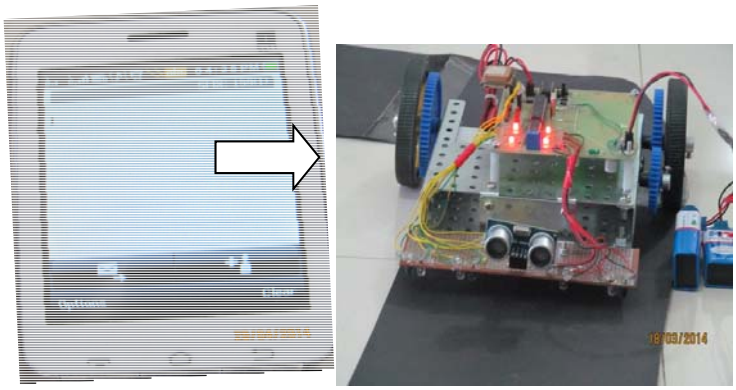

Figure 3.1.3 To Unlock Vehicle[II]

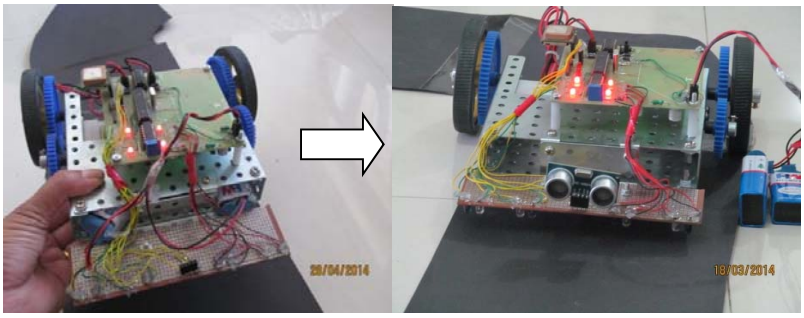

Figure 3.1.4 Track Detection [I]

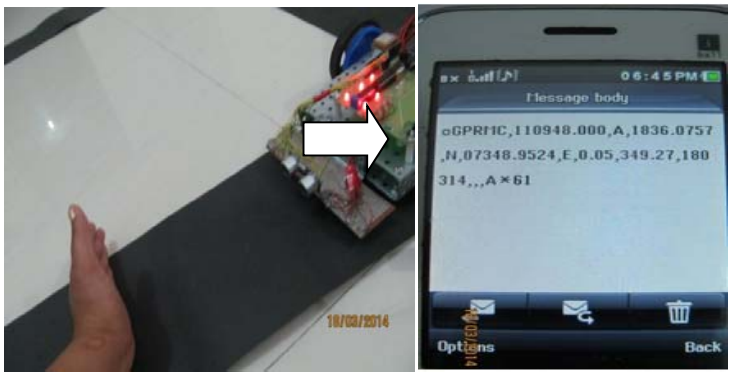

Figure-.3.1.5.Obstacle detection (Hand)[II]

Figure-.3.1.6 Obstacle detection (Plastic Material)[II]

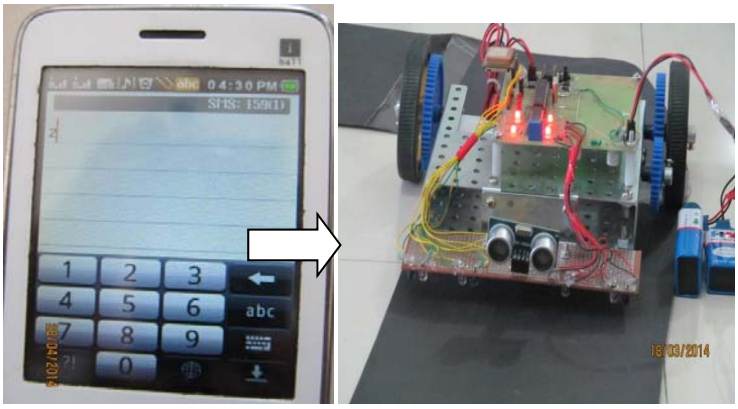

Figure.3.1.7 To Lock Vehicle[I]

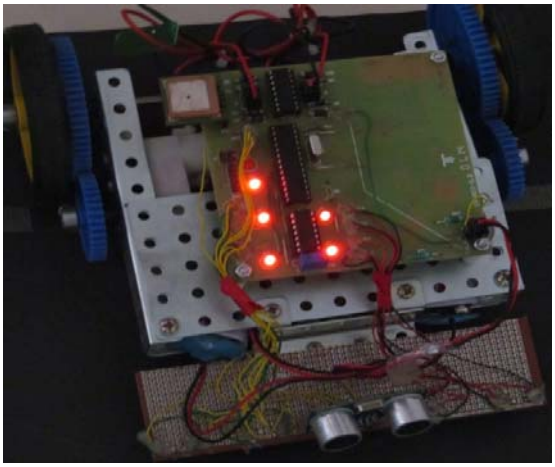

Figure-3.1.8 Vehicle search alternate path [I]

Figure 3.1.9.Reactangular Track[I][II]

Figure- 3.1.10 Straight Track[I][II]

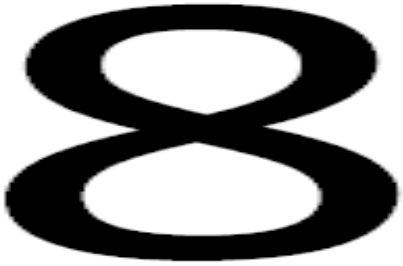

Figure- 8.1.11 Eight Shaped Track[I][II]

IV. CONCLUSION

If the authorized person sends Message on SIM, then only the car starts otherwise lock the car. That means theft unable to hack the car.[I]

1= Start

2=Stop

Any obstacle detects the sensor senses the situation & car should break slowly & stop automatically. If the car is on the wrong track then breaking car slowly & follows the right track automatically. An alert SMS with predefined message body sent to the concert person. Also we have tested this system for different types of obstacles such as other vehicle, human, small stones or any barriers. Track sensor is like a line follower robot. As a part of testing, we have considered all possible scenarios to track. Track arrangement for a vehicle may a straight line track, winding track, number eight like track, triangular track, etc.

V. SCOPE FOR FUTURE WORK

The System may be implemented in back side as well as rear side This can be interfaced with a vehicle air bag system. That prevents vehicle occupants from a striking interior object such as the steering wheel or window.when the sensors Detect the accident, the air bags get opened. The system will then send the accident location acquired from the GPS along with the time and the speed by utilizing the GSM network .Also, this accumulates camera to capture images inside the vehicle, the camera shall come into action as soon as accident detection triggered and captured images send to predefine email ID's as an attachment with location detail as text in the mail using GPRS service.

Two alerts one with text message with accident location and another one is Email with photo images along with accident location will give proper information of incident site. This will help to reach the rescue service with proper aid in time and save the valuable human life.

An airbag is a vehicle safety device. Its purpose is to cushion occupants during a crash and provide protection to their bodies when they strike interior objects such as the steering wheel or a window. Airbags are directly linked to the life of the driver and passengers, as they are used as the last resort in a collision.[25] Hence the proper functioning of the system is an important issue. Hence, to ensure the precision and reliability of airbag operation, it is necessary to design a robust system. Though many companies are working on the optimal deployment time for airbags, several problems still occurs. For example, when a vehicle operates off road or when the sensor inside the airbag control unit (ACU) receives a powerful shock, the vehicle's airbags may inadvertently deploy, although no collision has occurred, because a crash like signal is delivered to the ACU. Also, when there is actual situation which requires airbag deployment, the software designed make faulty judgments and miss the time frame for airbag deployment. To resolve these problems, we can design a system which can generate information about the crash scenarios before collision takes place.The system uses what are called second generation integrated ultrasonic sensors that both transmit and receive a 40 kHz ultrasound signal. Thus the sensing modules are smaller and less obtrusive than the first generation devices. One sensor is located in the top center console, another in the A pillar above the door hinge, and two above the passenger in the headliner.

VI. REFERENCES

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