

Smart Vehicle with Speed Lock System in Accident Prone Areas

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ABSTRACT

This paper represents a leading step to the idea in developing a vehicle safety system which would try to avoid a possible casualty by limiting the speed of the vehicle in accident-prone areas. In case of an accident, the engine temperature and location is sent through GSM to a present number for immediate rescue and treatment. Recorded data can also be used for legal, acknowledge the problem that caused the accident and give fabricator an idea for upgrading. So the goal is to build an embedded integrated system consisting of microcontroller, a power supply unit, sensor, memory, a motor driver unit and GPS/GSM modem

Keywords— GPS, Proxy sensor, Collision Avoidance, GSM

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I. INTRODUCTION

Nowadays road facilities are a major concern in the developed world. Nowadays the road accidents in modern urban areas are increased to uncertain level. The loss of human life due to accident is to be avoided. The vehicle accident is a major public problem in many countries, particularly India. Recent studies show that one third of the number of fatal or serious accidents are associated with excessive or inappropriate speed, as well as changes in the roadway (like the presence of road-work or unexpected obstacles). Reduction of the number of accidents and mitigation of their consequences are a big concern for traffic authorities, the automotive industry and transport research groups. The aim of this research is to maintain the speed control over restricted area like (schools, hospitals, colleges etc..) by using GPS technology.

Now a day's people are driving very fast; accidents are occurring frequently, we lost our valuable life by making small mistake while driving. So in order to avoid such kind of accidents and to alert the drivers and to control their vehicle speed in such kind of places the highway department have placed the signboards. But sometimes it may be possible to view that kind of signboards and there is a

chance for accident. So to intimate the driver about the zones and the speed limit automatically, is done by means of using RF technology. The main objective is to design a Smart Display controller meant for vehicle's speed control and monitors the zones, which can run on an embedded system.

II. PROPOSED SYSTEM

In proposed system if a vehicle has met accidents, immediately an alert message with the location coordinates is sent to preset mobile number using GSM module which is fitted in the vehicle. Due to this if any major accident happens then help will be provided for that location. For tracking the location GPS module is used. Other future of this project is if vehicle entered in any accident prone area or in any hospital zone, school zone where there is speedlimiting signboard are present but normally everyone ignore that so in our project when vehicle entered in this zone then speed of vehicle is reduced to half or more than it. So probability of accident taking place will be reduced. For

detecting any accident zone, we use proximity sensor and metal strip for it.

III. LITERATURE SURVEY

Tracking systems were first developed for the shipping industry because for tracking vehicles.

SawantSupriya described the system in October 2012 "An intelligent vehicle control and monitoring using arm" published in International Journal of Engineering and Innovative Technology (IJET) Volume 2, Issue 4, in which they perform operation on alcohol sensor, LPG gas sensor, Obstacle detection, eye blink sensor and GPS-GSM unit to sending location co-ordinates. RamchandraPatil perform project in August 2014 is "Design and implementation of car black box with collision avoidance system ARM" published by International Journal of Innovative Technology and Exploring Engineering (IJITEE) ISSN: 2278-3075, Volume-4, Issue-3. In this system they perform different sensors operation and GSM module for sending message. In project vehicle is control in particular zone using RF transceiver section.

IV. SYSTEM DESCRIPTION

The Block diagram of system hardware is shown in the figure 1.

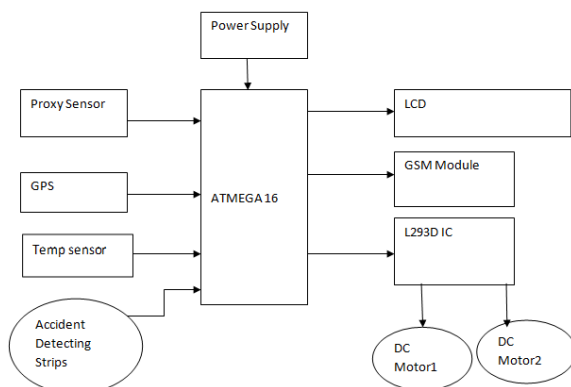


Fig -1: Design of System Hardware

As shown in above block diagram Atmega 16 processor is use for interfacing the devices which is a heart of the project. Power supply is use to give constant dc voltage to circuit. GPS module is been used in the project which receive coordinates of actual location and that co-ordinate are send to processor. GSM module which is interface with processor which sends these coordinates of location of vehicle if any accident takes place, to specified mobile number. Accident detecting strip which is rounded around the vehicle, If any accident condition is detected using copper strips then it will generate pulse and that pulse is send to processor and that location of accident is send through GSM module to predefined mobile number. A proximity sensor which use in the project it detect any school zone, hospital zone or any accident prone area then speed of vehicle is slow downer lock to avoid the accident. LCD display is use to display location of vehicle in Latitude and longitude and temperature of vehicle if increase beyond certain preset

limit. Temperature of engine also send through GSM module. Two DC motor are used for vehicle to control speed of it.

HARDWARE COMPONENTS AND DESIGN

A. ATmega16 AVR MICROCONTROLLER

The system uses ATmega16 AVR MICROCONTROLLER as a master controller.

Features: Low power AVR 8 bit microcontroller.

- Low power AVR 8 bit microcontroller.
- Advanced RISC architecture.
- 131 power-full instruction most single clock.
- 512k byte of EEPROM
- 1k internal of SRAM.
- Two 8 bit timer/counter.
- 8 channel 10 bit ADC.
- Operating voltage: 2.7 to 5.5v

Proximity sensor

A proximity sensor is used to detect the lanes in which the vehicle is travelling. A proximity sensor is sensor able to detect the presence of nearby objects without any physical contact. A proximity sensor often emits an electromagnetic or electrostatic field.

Features of Proximity Sensor: -

1. Detection range adjustable up to 7 cm
2. Operation range varies according to size of the metallic object.
3. Power Supply: 5V DC Power Consumption: 50mA max.
4. Detection Indicator LED and Buzzer
5. Digital output.
6. Dimensions: 52x71 mm
7. Full SMD design

L293D Motor Driving Controller IC

The Device is a monolithic integrated high volt- age, high current four channel driver designed to accept standard DTL or TTL logic levels and drive inductive loads (such as relays solenoids, DC and stepping motors) and switching power transistors. To simplify use as Two H Bridges each pair of channels is equipped with an enable input. A separate supply input is provided for the logic, allowing operation at a lower voltage and internal clamp diodes are included. This device is suitable for use in switching applications at frequencies up to 5 kHz.

Features of L293D Motor Driving Controller IC:

1. 600mA output current capability per channel
2. 1.2A peak output current (non repetitive) per channel
3. Enable facility

4. over temperature protection
5. Logical "0" input voltage up to 1.5 V (high noise immunity)
5. Internal clamp diodes.

DC motor unit:

We are designing our own vehicle unit which consists of 2 DC motor based wheels. These wheels are operated using 12V DC motor. The microcontroller works at 5V and the DC motors operate at 12V, so to match the voltages we are interfacing a DC motor driver circuit L293D which will in turn drive the DC motors.

GPS unit:

The GPS unit sends the co-ordinates to the microcontroller which stores these co-ordinates in its ram location. Also various other parameters are also stored in microcontroller. Then after a specific time microcontroller sends this data to the base unit (surveillance unit) with the help of on board GSM modem with help of AT commands.

Features of GPS unit: -

1. Ultra high sensitivity
2. Low power consumption: Typical 45mA@3.3V
3. Operating voltage: 3.0V to 4.2V
4. Operating temperature range: -40 to 85°C
5. Small form factor: 15x13x2.7mm.

Temperature Sensor:

Engine temperature is important in engine control unit, if this value goes to abnormal, some unwanted gases exhaust from vehicles due to improper combustion. In this project, in order to obtain the vehicle engine temperature, we have used LM35 temperature sensor. This temperature sensor continuously reads the engine temperature and fed to the microcontroller. The output of LM35 is given to pin P0.28 of LPC2148. It converts temperature value into electrical signals. Its temperature sensing range is -55 to +150°C.

Result:

This Smart vehicle with speed locks System Classified into two main sections. This classification can be done by the System working functionality. These two sections are

1. Vehicle section
2. Controlling section

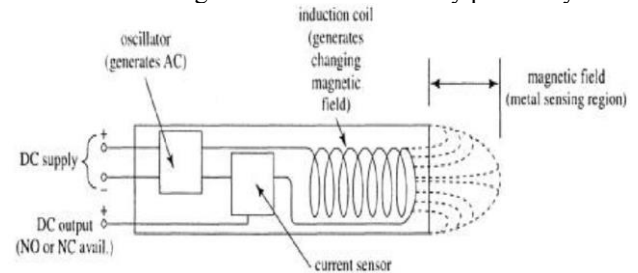
A. Vehicle Section

The vehicle section consists of an ATmega 16 Micro-Controller, proximity sensor, and various sensors like Temperature sensor (LM35), GSM modem, Power supply and LCD. The sensors are used to record values at the time of the accident. The values are very useful in the post-accident investigations. LCD is used to display all the recorded values. The GSMXM1510S module is used to send the message to the relative person,

hospital or police station when an accident is occurred to the vehicle.

B. Controlling Section

The controlling section consists of only proximity sensor.



V. FUTURE SCOPE

1. A Front Camera can be used for Lane Tracking purpose or for recording so if there will be an accident then video recording can be used in Police Investigation purpose.
2. Long range IR sensors can be used in front to avoid vehicle collision. They detect objects in front of the vehicle and give indication to the driver and can also automatically apply break.
3. Vehicle location tracking in real-time can be implemented so that owner of that car know location of the vehicle in real-time.

APPLICATION

1. Military Vehicles: Military vehicle carry ammunition from one place to other for e.g. in Kashmir military vehicles can be fitted with this system so if militants had attacked or damaged the vehicle immediate SMS is send to military based station and this ammunitions can be made save from wrong hands.
2. Private Vehicle: In private vehicle if the speed not controlled by driver in accidental prone areas then this system work excellent to retard the speed and control the vehicle without any hazardous situation.
3. Location Tracking: If accident happens then location is sent to the mobile number in it. So this will save time and also many valuable lives.

VI. CONCLUSION

This paper has presented a new vision for the vehicles industry, which is the Smart vehicle with speed lock system and Collision Avoidance System used for vehicles. A full and detailed description was made for every part of this system. This paper has also offered a user friendly embedded program to analyze the data of the accident. This system built can be implemented in any vehicle. As soon as the driver runs the motor, this system will begin to collect the data from all the sensors and stores in EEPROM. The data saved can be retrieved after the accident for privacy purposes.

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