Intelligent Vehicle Monitoring Using ARM Microcontroller System Based on GSM And GPS Technology

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Abstract- *Currently almost of the public having an own vehicle, theft is happening on parking and sometimes driving insecurity places. The safe of vehicles is extremely essential for public vehicles.*

Vehicle security and accident prevention is more challenging. So in order to bring a solution for this problem this system can be implemented. Vehicle security enhancement and accident prevention system can be developed through the application of ignition control (tracking and locking) system. Fuel theft, accident detection and prevention, driver fatigue, pollution control and speed limiting with efficient vehicle management system.

I. INTRODUCTION

Vehicle tracking system main aim is to give Security to all vehicles. Accident alert system main aim is to rescuing people in accidents. This is improved security systems for vehicles. The latest like GPS are highly useful now a days, this system enables the owner to observe and track his vehicle and find out vehicle movement and its past activities of vehicle. This new technology, popularly called vehicle Tracking Systems which created many wonders in the security of the vehicle. This hardware is fitted on to the vehicle in such a manner that it is not visible to anyone who is inside or outside of the vehicle. Thus it is used as a covert unit which continuously or by any interrupt to the system, sends the location data to the monitoring unit. When the vehicle is stolen, the location data from tracking system can be used to find the location and can be informed to police for further action. Some Vehicle tracking System can even detect unauthorized movements of the vehicle and then alert the owner. This gives an edge over other pieces of technology for the same purpose.

This accident alert system in it detects the accident and the location of the accident occurred and sends GPS coordinates to the specified mobile, computer etc. The fire detector circuit in it is used to detect fire in the vehicle, if the temperature inside the vehicle goes above a certain limit then a warning will be automatically send to the intend receiver. The infrared sensor which is additionally interfaced to the microcontroller is used to detect the obstacles and accidents, in any case if any mishap occurs then its warning will be directly send to the intended receiver.

When a request by user is sent to the number at the modem, the system automatically sends a return reply to that particular mobile indicating the position of the vehicle in terms of latitude and longitude. A Program has been developed which is used to locate the exact position of the vehicle and also to navigated track of the moving vehicle on Google Map.

The self-balancing robot, concept of two-wheel inverted pendulum has gained momentum in research over the last few years. Inherently self-balancing robot is unstable and it would roll around the wheels' rotation axis without external control and eventually fall. The robot returns to right position if motor driving occurs in right direction. The robot is naturally unstable although, it has many favors over the statically stable multi wheeled robots. A special electromechanical system in which the robot has to be based on balances itself onto a pair of wheels while standing tall. If the base on which the robot stand is not stable or the platform is not balanced, the robot tend to falling off from the vertical axis. This time a gyro chip is needed to provide the PID controller about the angular position of the base of the self-balancing robot [1].A self-balancing algorithm is programmed into the controller and the controller drives the motors either clockwise or anticlockwise to balance the basement by a pulse width modulation (PWM) control signal. The robot has to be work upon any type of surface based on two motors constructed with wheel one for each [2].

II. LITERATURE SURVEY

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vehicles. The latest like GPS are highly useful now a days, this system enables the owner to observe and track his vehicle and find out vehicle movement and its past activities of vehicle. This new technology, popularly called vehicle Tracking Systems which created many wonders in the security of the vehicle. This hardware is fitted on to the vehicle in such a manner that it is not visible to anyone who is inside or outside of the vehicle. Thus it is used as a covert unit which continuously or by any interrupt to the system, sends the location data to the monitoring unit. When the vehicle is stolen, the location data from tracking system can be used to find the location and can be informed to police for further action. Some Vehicle tracking System can even detect unauthorized movements of the vehicle and then alert the owner. This gives an edge over other pieces of technology for the same purpose.

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The project consists of GPS receiver and GSM modem with a micro controller. The whole system is attached to the vehicle. In the other end (main vehicle station) one GSM mobile phone is attached to the computer with VB application. So the GPS system will send the longitudinal and altitude values corresponding to the position of vehicle to GSM Modem. The main concept in this project is introducing the mobile communications into the embedded system. The vehicle thief takes only a few minutes to deactivate the security system. Furthermore, nobody will pay an attention when the car alarm goes off. Based on these reasons, it is proposed that a GSM-based vehicle anti-theft system development is designed and developed to improve the performance of the current vehicle security system. Somehow if there is another way of transmitting the alarm to the vehicle owner that is not limited to the audible and line of sight, the system can be upgraded. SMS is a good choice of the communication to replace the conventional alarm, because it can be done and does not require much cost. Although most of people know GPS can provide more security for the vehicle but the main reason people does not apply it because the cost. Advance vehicle security system is too expensive. Cost for the gadget is too high. In this project Raspberry pi is used for interfacing to various hardware peripherals. The current design is an embedded application, which will continuously monitor a moving Vehicle and report the status of the Vehicle on demand.

The GPS modem gives many parameters as the output, but only the NMEA data coming out is sent using GSM. The same data is sent to the mobile at the other end from where the position of the vehicle is demanded. The hardware interfaces to microcontroller are GSM modem and GPS Receiver. In order to interface GSM modem and GPS Receiver to the controller, a MUX is used. The design uses RS-232 protocol for serial communication between the modems and the microcontroller. A serial driver IC is used for converting TTL voltage levels to RS-232 voltage levels.

Different types or sensors such as infrared sensors and fire detector are used for detecting different types of problem encountered in the vehicle such as theft, accident, fire warning etc. In any of these cases messages will be

automatically send to the intended receiver. When a request by user is sent to the number at the modem, the system automatically sends a return reply to that particular mobile indicating the position of the vehicle in terms of latitude and longitude. A Program has been developed which is used to locate the exact position of the vehicle and also to navigated track of the moving vehicle on Google Map.

Block Diagram

This is avoiding accidents due to collision of vehicles with any static obstacles.

Working-
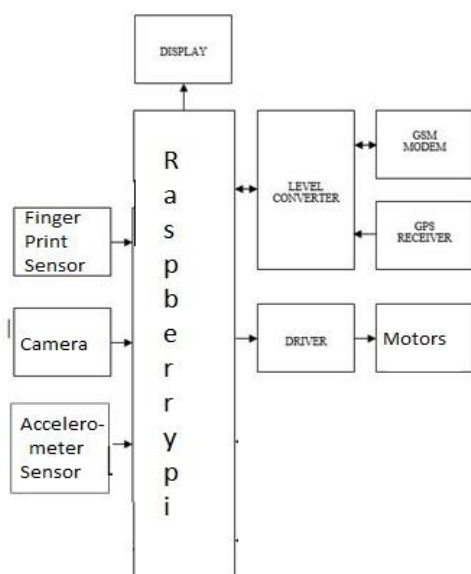
In this system describes a real time safety prototype that detects the driver condition and adjusts the speed of the vehicle. Sensors are used to detect the driver condition. It uses Psychological signals. When the driver is in abnormal condition first a warning signal is issued to alert the driver and braking will be applied if he continues driving.

In this system provided vehicle cabin safety, security based on embedded system by modifying the existing modules. This method monitors the level of the toxic gases such as CO, LPG and alcohol within the vehicle provided alert information as alarm during the dangerous situations. The SMS sends to the authorized person through the GSM.

In this method, the IR Sensor used to detect the static obstacle in front of the vehicle and the vehicle stopped if any obstacle Detection System compared the obtained images with

In a vehicle tracking system is an electronic device, installed in a vehicle to enable the owner or a third party to track the vehicle's place. This paper proposed to design a vehicle tracking system that works using GPS and GSM technology. This system built based on 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 In Face Detection System used to detect the face of the driver, and compare with the predefined face. The car owner is sleeping during the night time and someone theft the car. Then Face Detection System obtains images by one tiny web the stored images. If the images don't match, then the information sends to the owner through MMS. The owners get the images of the thief in mobile phone and trace the place through GPS. The place of the car and its speed displayed to the owner through SMS. The owner can recognize the thief images as well as the place of the car and can easily find out the hijackers image. This system applied in our day-to-day life.

IMPLEMENTATION

Figure 1Interfacing of IR sensor and servo motor

- The IR sensor detects the obstacle.
- When a obstacle is detected, the motor stops.
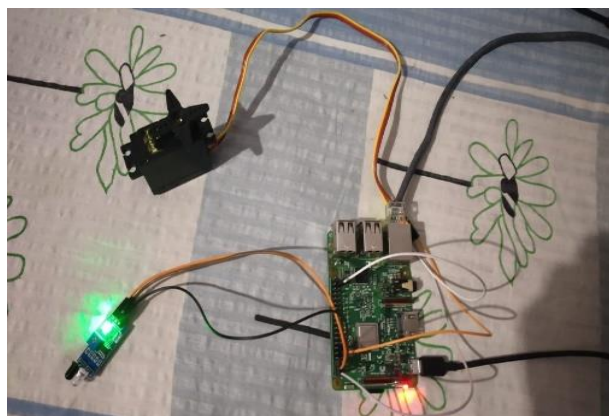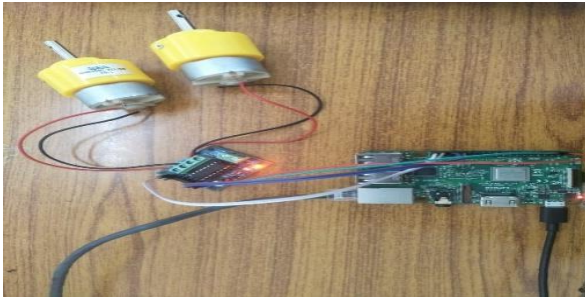- If obstacle is not detected, the motor continues to rotate.

Figure 3.4 Interfacing of DC motor

- DC motor is used for the movement of the wheel.
- The movements can be forward, backward, right and left. Movement for motor is given either left or right based on obstacle

Expected output

In this paper, we have proposed a novel method of vehicle tracking and locking systems used to track the theft vehicle by using GPS and GSM technology. This system puts into the sleeping mode vehicle handled by the owner or authorized persons; otherwise goes to active mode. The mode of operations changed by persons or remotely. When the theft identified, the responsible people send SMS to the micro controller, then issue the control signals to stop the engine motor. After that all the doors locked. To open the doors or to restart the engine authorized person needs to enter the passwords. In this method, easily track the vehicle place and doors locked.

- Thus in this project we have provided the means of accident prevention using eye blink sensor, accident sensor wherein the vehicle is stopped immediately And intimated wherever needed.
- It involves automated security system that provides high security to driver through the use of GPS and GSM technologies.
- It involves obstacle detection with lane detection for efficient vehicle parking management at emergency situation.
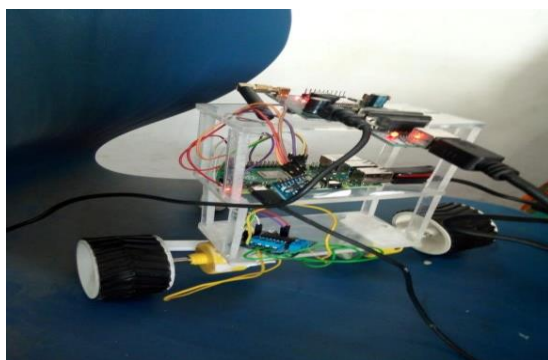
III. RESULTS & CONCLUSION

Fig 1: Self balance Robot

A self-balancing robot was designed and established as desired with limited resources possible. It was able to balance smoothly with a maximum tilt error of 5 degrees. The robot is capable of taking payloads around 0.3 Kg. Maximum angle of tilt for balancing was also determined through various experiments. However there are some limitations. The robot is unable to balance itself at upright position without significant movement. It means the robot has to move forward and backward continuously within a range of -3 cm and +3cm around the balancing spot in order to balance itself on the flat surfaces. Compared with the smooth flat surfaces, the stability of the robot is better when balancing on the rough flat surfaces like carpet. This can be explained by the relatively small moment of inertia of the wheels compared to the moment of inertia of the robot's body and the extra damping effect produced by the carpet. Besides, the height of the robot in this project is limited by the torque of the DC motor.

From the experimental result, we can draw conclusions as follows:

1. This system that consists of ultrasonic sensors, Raspberry pi, GSM/GPRS/GPS Shield modules and Bluetooth module can monitor the liquid volume inside tank and detect the leakage via web based application continuously.
2. The road condition (flat or tilt) is affecting the accuracy rate of the sensor. In the normal road the accuracy rate is 99.33% while in tilted road the accuracy rate drop until 84%. This system can be implemented in any road condition
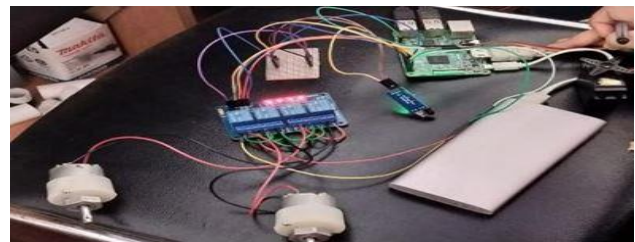

Figure 4 Hardware component

VI. CONCULSION AND FUTURE WORK

The foremost objective of this paper is to assist and ensure the safety and security of the vehicle. To investigate the performance of the whole strategy, several trials have been conducted on the different locations in order to get the GPS coordinates. The assistive device in this work will inform the owner if someone tries to steal the vehicle. In the distant future, it can be extended to a system to suit outdoor environments and can be made compact for usage and future works may be carried on for developing android application to avoid message throwback. A self balancing robot was designed and established as desired with limited resources

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