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Master Wagon: Alcohol Detection and Anti-theft Protection with GPS tracking via GSM/GPRS

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Abstract

In India, there are many numbers of accidents those are taking place in one single day. A minimum of 400 people are killed due to the road accidents, most of these include drunk and drive only. Yearly the death rate is increasing, To overcome this issue a gas sensor is installed in the vehicle so that if the driver was drunk the vehicle fails to start. Another issue that people are facing in our country is the theft of Vehicles. Daily about 120 vehicles are being theft only in Delhi, and about 1.65 lakh vehicles are being theft across India. To minimize` this issue the implementation of GPS/GSM in vehicles is done, this helps to track the vehicle when it has been theft.

Keywords—Alcohol Detection, GPS tracking, GSM, Fingerprint Scanner.

1. Introduction

Master Wagon is generally an automobile ensuring the safe driving by checking the alcohol detection and providing anti-theft to the vehicle by the GPS tracking system. Alcohol detection is the technique in which the breath of the person who is driving the vehicle will be sensed using a gas detection sensor. This is done in-order to avoid the road accidents and ensure the security of the driver. Anti-theft of a vehicle is done by using the real-time GPS tracking system that is being prominently used by many of the vehicles to ensure the safety of the vehicle and has become very common these days is carried out by usingthe GPS tracker in the vehicle this helps in tracking the vehicle with the help of GSM/GPRS technique. As this, the process is made a bit more adequate by using the biometric fingerprint scanner as it helps in unlocking the vehicle which is also the part of the GSM/GPRS technique.

2. Methodology

- The system is actually a combination of multiple systems consisting of an admal microcontroller (ATMEGA32) with the help of AURDINO and location finder device (GPS) along with the communicator (GSM).
- The GPS (NEO6M) module helps in tracking the vehicle and sends the location to the GSM.
- The GSM (SIM800C) module with an antenna which helps in sending the messages to the registered mobile number.
- The fingerprint module consists a display with a 4 pin enroll id to store and alter the fingerprints and also consists of a reset pin along with a microcontroller.
- The gas sensor module is connected to a microcontroller which helps in detecting the content of alcohol and sends the signal to DC motor.
- The step-down transformer (12V-230V) is connected to a rectifier which helps to convert the ac power to dc power and also to boost the power (14V–15V).
- The parallel connection of capacitors to filter the circuit in the bridge rectifier diode and there are voltage regulators to maintain a constant power supply.

3. Literature Survey

Vehicle tracking systems used to track the vehicle by using GPS and GSM which is one of the finest and better achievement to track the location of the vehicle. The system can be used in cases of

personal (to track once own vehicle in finding the routes) and business purpose (to find the stolen vehicle). This can also be used for the business purpose to improve safety and security.

- The paper entitled " Vehicle Location finder using global position system and global system for mobile "by M. F. Saiid, M.S.A. Megat Ali is referred to know how GPS and GSM are combined with Microcontroller(Arduino) in order to get the accuracy of the location when the vehicle is in motion.[3]
- Also, the paper entitled **"**Anti-theft Protection of Vehicle by GSM and GPS by fingerprint verification." By Mrinmoy Dey, Md. Akteruzzaman Arif states that along with GSM and GPS Fingerprint verification is done to make sure that the correct person is driving the vehicle and if the fingerprint does not match than a link of google map will be sent to mobile of the owner of the vehicle.[4]
- "Routing and Tracking system for mobile Vehicles in a large area" by Thuong Le Tien proposed the usage of GPS module-eMD3620 and GSM modem-GM862 which are controlled by 32bits microcontroller LM3S2965 in order to get the location of the vehicle in the larger area.[5]
- "Design and implementation of remote Monitoring system Based on GSM" by Chen Peijiang, Jiang Xuehua is referred where GSM, an MSP430F149 MCU has been used and the result of this paper shows that the system can control and monitor the remote communication between the remote monitoring station and the monitoring center.[2]
- GPS.gov: "How GPS Works" Poster. (n.d.). retrieved from http://www.gps.gov/multimedia/poster states to understand the working of Global Positioning System.[9]
- The SIMCOM website "www.simcom.ee" stated in order to get information about different GPRS, GSM, and GPS modules.[6]

3.1 Challenges

- If the signal is lost to an assisting system the coordinates cannot be received. It is not much accurate as compared to a GPS system.
- Monitoring the drunk and drive cases regularly with the instruments will be a difficult task to be carried out.

4. Proposed Method

The main objective of this paper is to prevent Vehicle theft in various places and sometimes driving in unsecured places and also saving the lives from most of the accidents due to the drunk and drive issue. This proposed system will monitor the breathe of the driver continuously as it would be placed on steering wheel or Somewhere around the driver cabin to sense his breathe so as to find the alcohol content and his breathe and ensure the safety of the driving so as to avoid the accidents because of the drunk and drive issues and also a fingerprint verification sensor to unlock the car, when finger is placed on sensor it will capture the image of the finger and stores the image. If the image of finger matches then the green light blinks otherwise it will send a signal to GSM(SIM800C) and it connects GPS(NEO6M) and through that GSM(SIM800C) will send a link to the registered mobile number which will give the correct location of the vehicle.

4.1 Architecture of the proposed system

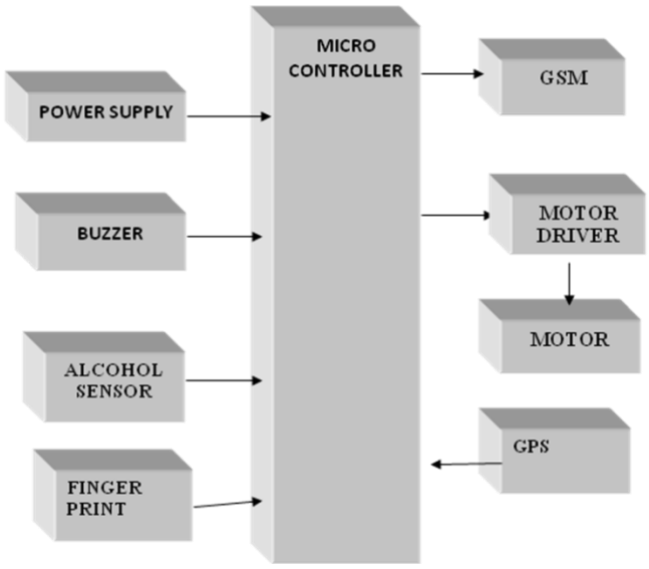

Figure 1: Architecture of Proposed System

The microcontroller is the main central part of the system which collects the information from the data pin of the arduino. The alcohol sensor sends the output to the microcontroller which is passed to the motor driver and it sends the signal to the motor which is connected to the motor driver to start the vehicle. Once the motor starts using the power supply the gas sensor comes into the act detecting the presence of alcohol inside the vehicle up to a particular threshold value.

Before running the process the biometric system of the vehicle unlocks the system using a fingerprint scanner which is connected to the central part of the

microcontroller which takes in the images to unlock the vehicle. Once the image is captured by the fingerprint sensor it stores and rechecks the image whenever a finger is placed on the fingerprint sensor. If the image matches it is nullified and in case if the image mismatches it will blink a red light.

Once the red light starts blinking it is an indication that the fingerprint is not matching and the GSM gets the input through the microcontroller consisting a small chip of sim slot which acts as a carrier in sending the message using the network to the registered mobile number. When the message is sent to the registered mobile number a link is generated in that message using the GPS tracking system, measuring the latitude and longitudinal coordinates of the location ensuring the presence of the vehicle.

This whole system acts on the power supply unit and voltage rectifier that is controlled by a step-down transformer receiving the DC current. Once the DC current is passed into the transformer it alters the current and converts it into AC current and passes it into the rectifier bridge consisting of rectifying diodes along with capacitors and voltage regulators. The power of the step-down transformer used in building the section of a prototype can be varied from 12V-230V.

Coming to the work of the capacitors, the power coming from the step-down transformer will be 12V and after passing through these capacitors it increases the voltage of the power supply from 12V to !4V-!5V and this increased voltage is regulated to the voltage regulators to maintain the fluctuations of the voltage. This rectifier bridge is connected to an admal arduino system with a microcontroller consisting of transmitter and receiver pins.

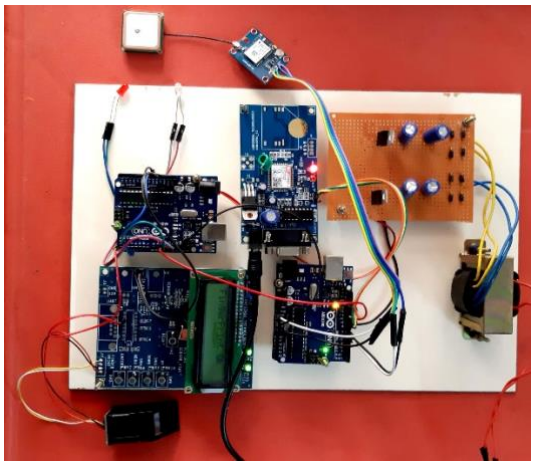

Figure 2: Fingerprint, GSM/GPS Connections

4.2 Result

- If the gas sensor detects alcohol in the breath who is driving the vehicle, it sends signal to the microcontroller and it stops sending power to the DC motor. The output of the gas sensor is the input to the microcontroller which is connected to Port 5. Based on the result of the gas sensor the microcontroller sends the signal to the motor driver whether to start or stop the vehicle. If the input from the gas sensor is negative then microcontroller doesn't send the signal to the motor driver and if the input is positive microcontroller sends the power to the motor driver.

Figure 3: Alcohol Detection Module

In the fingerprint verification module, the fingerprint of the person is stored with a specific id and is verified. If the fingerprint mismatches from the fingerprint stored in the verification id then it displays the information on the LCD screen and the red light blinks and if the fingerprint matches the same as stored in the id then the green light blinks. When the red light blinks the signal is sent to the GSM, where it sends the alert message to the registered number with the coordinates of the vehicle.

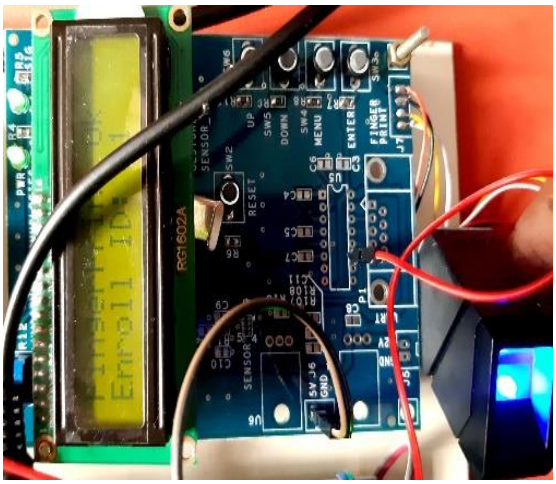

Figure 4: Fingerprint Detector

- When the link is sent to the registered mobile number the user can enhance the location of the vehicle and how far it is located from him/her. We will get the location of the vehicle frequently when the coordinates keep changing.

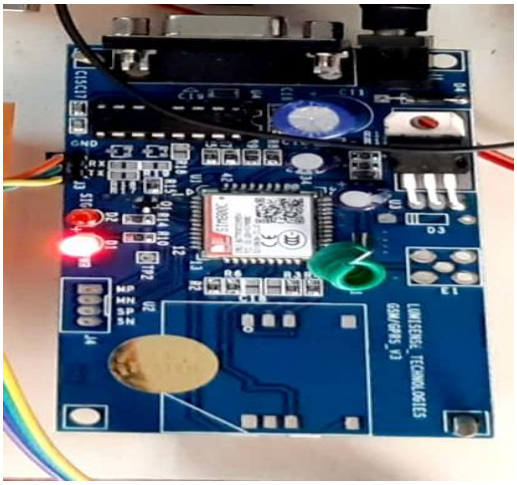

Figure 5: GSM

- The antenna sends and receives the signal for the location tracking depending on the GPS. The GSM receives the latitude and longitude of the vehicle from the GPS and sends this location through a link to the registered mobile number. So that the owner could find the location of the vehicle where it is exactly present and in which direction it is moving.

Figure 6: GPS with Antenna

- The GPS keeps changing the latitude and longitude values as the vehicle keeps changing its position. It frequently detects the location as the vehicle moves to and fro from a point.

5. Conclusion

- The proposed method ensures the safety of the vehicle which is a very common problem and it reduces the accidents due to the driver's irresponsibility. Vehicles can be modified to provide safety to the vehicle as well as the driver.

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