

A Survey on Vehicle Monitoring System

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Abstract- In today's scenario road accidents has become more common. Most of the accident occurs when the driver consumes alcohol, when the speed of the vehicle exceeds, or during night time when the driver felt drowsy. The proposed system may reduce the accidents occurring due to these factors. Various sensors are used in this system like alcohol sensor, speed detection sensor, seat belt sensor, eye blink sensor. The sensors are used to detect them and will be frequently updated in a webpage. When any of the accident causing factors are likely to occur an alert is given and the engine slows down and stops. Also the owner gets an alert and he will take the appropriate measures. A frequent update is being made. This site is protected against Cross Site Request forgery attack. This attack is being prevented by the SHA-1 and SALT algorithm. The SHA-1 is cryptographic hash function used to encrypt the data. This system is well suited for the private travel agencies who can keep track of their vehicle.

Keywords- vehicle monitoring, alcohol detection, seatbelt sensor, accident prevention, literature survey.

I. INTRODUCTION

To have a safe and secure traffic management in expressway, intelligent traffic monitoring systems (ITS) is essential. A design and development of low cost and reliable IoT framework that consists of RFID sensors for tracking of the vehicle on its motion from source to destination in a high speed in road is proposed. The real-time stamps are taken from the array of RFID sensor network and the velocity of the vehicle is calculated in the real-time environment using Euler's algorithms. Here an Arduino platform with an Ethernet connection is used as a core controller and the resultant data are viewed on the internet using cloud computing [1]. Also this can be implemented using two main components GPS and GSM. GPS is attached to the vehicle need to be monitored. Hence the security of the person travelling is ensured [2][8].

GPS is used to track the location of the vehicle. The system helps admin to find out the location of the driver driving the vehicle. Admin will know which driver is in which location. Admin will access the system using the unique ID and password to locate the driver location. He can also keep record of the driver's attendance that will help him to calculate salary of the driver very easily [3].

The system allows the user to track and check vehicle fuel entries, servicing data and even repair/ maintenance status. The vehicle that has been given on rent or leased can be monitored [4]. A mechanism to detect the rash driving on highways and to alert the traffic authorities in case of any violations is being proposed.. In past, lot of devices to detect rash driving on highways has been made. Most of the approaches require human concentration and involve a lot of effort, which is difficult to implement.

A system is designed for early detection and alert of dangerous vehicle driving patterns related to rash driving[10]. The entire implementation requires an IRtransmitter and receiver, a control circuit and a buzzer. The speed limit is set by the police depending upon the traffic at the very location. The time taken by the vehicle to travel from source to destination is calculated by control circuit. This is being displayed on seven segment displays. If the vehicle crosses the speed limit, the buzzer sounds alerting the police [5].

The system is aimed at making a safer vehicle driving than before. This is implemented using Arduino. The condition of the driver is checked during real time. The consumption of Alcohol is detected using an Alcohol detector connected to Arduino. When the level of alcohol crosses a permissible limit, the vehicle ignition system will turn off and the GPS module will capture the present location of the vehicle. A message is sent to police or family members using a GSM module automatically.

Most of the road accidents occur due to drunken driving. Hence this system is used to reduce accidents due to this. Alcohol presence is being detected and at the same time a SMS along with the location of the vehicle is send to three pre-selected contacts [6].

The purpose of is to design alternate method of seat belt safety mechanism without changing the available space. It also provides safety to occupants in the cars in which air bags could not be implemented. The actuating system design includes three point seat belt, sensors, and micro-controller and locking mechanisms [7].

II. INTELLIGENT VEHICLE MONITORING SYSTEM USING IOT FRAMEWORK

A. Techniques used

Vehicles are equipped with Passive RFID tags. An Antenna which is packed with a transceiver and decoder (The RFID reader), this emits a signal activating the RFID tag so it can read the ID stored in it to be used to identify that specific vehicle.

Each house on the road is a node which contains a RFID reader, nodes connect directly to the internet using WAN connection such as WIFI or Ethernet. When the car approaches to each RFID reader enabled node a timestamp is generated and is sent to the internet cloud.

When we get the real-time distance versus time plotting we can derive many kinematics parameters from the same for example velocity. Here we are finding the velocity from the distance versus time plotting and also approximating the same using modified Euler's algorithm to approximate the vehicles velocity in the next interrogation point.

By doing this the vehicles are monitored for high-speed expressway without using the high speed cameras and image processing algorithms.

When the speed crossed the limit the driver and the traffic authority is alerted using a web base application.

B. Advantages

- Low cost consuming.
- It is a better way compared to image processing.

C. Disadvantage

- It is an advanced system where every house need to have a RFID reader. It is impossible in current scenario.
- This system cannot be implemented in the highway where there is no RFID reader.

III. VEHICLE MONITORING AND SECURITY SYSTEM

A. Operation

The GPS module consist of the GPS antenna through which the information is received from the GPS satellite and thus it reveals the position information.

Using the GSM module, the received information from the GPS is sent to the Base station wherein it is decoded. Thus we have the complete data about the vehicle at the base station. Along with tracking the vehicle, this can also be used for security purpose.

Each employee will be given a unique ID and will be using a remote containing key for Entry, Exit and Panic. The Panic button is used by the driver/ passenger alerting the particular user in during emergency. If this button is pressed, an alarm will be activated which will help the passenger/employee in emergencies. The vehicle can be prevented from moving remotely. Figure 1 represents the block diagram. The GPS module sends the location information to the base station through GSM module. This information is stored for the future use and it is being monitored.

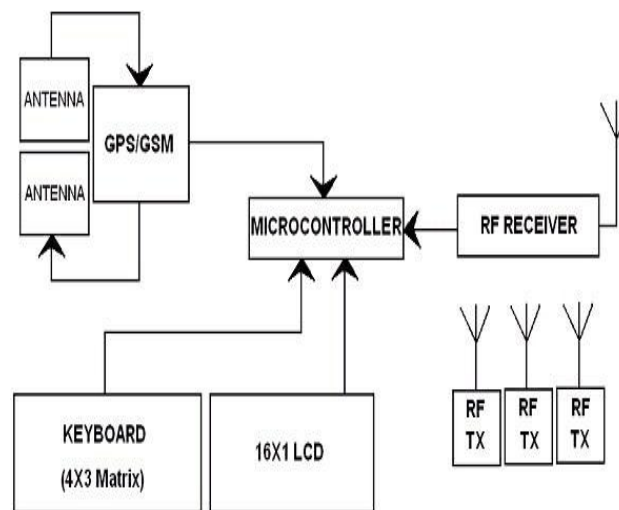


Fig 1. Block diagram for vehicle monitoring and security system.

Stage 1: Driver starts his trip from the transport office. VMSS transmits the Driver ID along with the Vehicle ID and the vehicles position to the base station is sent.

Stage 2: Taxi picks up the employee/passenger from their residence. Hence base station will be able to track the vehicle and thus the employee/passenger is also tracked.

Stage 3: Taxi will drop the employee/passenger to the workplace. VMSS transmits the Passenger ID along the Vehicle ID and the position of the vehicle is sent to the base station.

Stage 4: Taxi picks the employee/passenger from the workplace. VMSS transmits the Passenger ID along with the Vehicle ID and the position of the vehicle is sent to the base station. Hence this will enable the base station to estimate the time if required and also keep a track of the vehicle, passenger and the driver.

Stage 5: Taxi will drop the employee or the passenger to their residence. VMSS transmits the Passenger ID along with the vehicle ID and the position of the vehicle is sent to the base station and makes sure that the job is 100% completed.

B. Advantage

- Focuses on security of the employee/passenger which makes the company feel more secured.
- Constant monitoring of vehicle will reduce life risks, accidents, kidnaps etc
- Time interval is monitored consequently.
- Highly useful for Travel agencies or transport business.

C. Disadvantage

- Might not be used for private/personal vehicles as the location will be tracked continuously which may interrupt in privacy of the user.

IV. VEHICLE TRACKING USING DRIVER MOBILE GPS TRACKING

A. Mechanism:

User Login: User can login with user ID and password.

Admin Login: Admin will Login with his admin ID and password.

Registration: Admin will register the driver by entering driver details.

View Vehicle and Driver Location: - Admin can view vehicle and driver location.

Vehicle Tracking: System will track location of both vehicle and driver using GPS.

Send Location Details: System will send location details to admin.

B. Advantage

- This system helps admin to keep track of the driver so that driver cannot do any type of cheating.
- This system will help the admin to maintain the record of the driver's attendance which will be helpful in calculating salary of the driver.

C. Disadvantages

- If network failure occurs due to environment hazardous, system will fail to track location of the vehicle.

V. ANDROID VEHICLE TRACKING APPLICATION

A. Operation:

Admin Login: Admin will Login with his admin ID and password.

View Vehicle and Driver Location: - Admin can view vehicle location.

Registration: driver details will be registered by the admin.

User Login: User can login with user ID and password.

Vehicle Tracking: System will track location of both vehicle and driver using GPS.

Send Location Details: System will send location details to admin.

Fuel Entry: It provides a fuel entry form for each vehicle in that keeps track of its fuel entries for every month.

Repair & maintenance Entry: For each and every Vehicle allows us to track its monthly repair / maintenance status.

Vehicle Tracking: The vehicle tracking system used to track the vehicle of the driver.

Report: Fuel data, Servicing data, Repair and Maintenance

B. Advantages

- This system helps admin to keep track of the driver. The activities of the driver is being monitored.
- This system maintains the record of attendance of the driver which helps in calculating salary of the driver.

C. Disadvantages

- Environment hazardous may cause network failure which in turn causes the system failure in tracking the location.

VI. DETECTION OF OVER SPEEDING VEHICLES ON HIGHWAYS

A. Process

Step1: Apply the power supply by flipping the switch to ON

Step2: Reset the circuit so that display shows 0000

Step3: Select the speed limit to 80kmph

Step4: when the vehicle crosses the first IR diode light, PHOTO DIODE1 will trigger hence LED glows for some period.

Step5: The time taken to cross certain distance is also displayed on the 7 segment display.

B. Advantages

- Speed of the vehicle can be tracked and if the speed exceeds or the driver rash drives then the light will start to glow.
- The driver will be tracked periodically.

- Accidents due to over speed will be reduced.

C. Disadvantages

- Photo diode is an old technique and it is a failure model.
- This mechanism is not that effective.

VII. ALCOHOL DETECTION AND VEHICLE CONTROLLING

A. Operation

An Alcohol sensor is fitted to a system say vehicle. The system detects the traces of alcohol consumption in the vehicle and immediately locks the engine of the vehicle and an SMS along with the location of the vehicle is send to three pre-selected contacts.

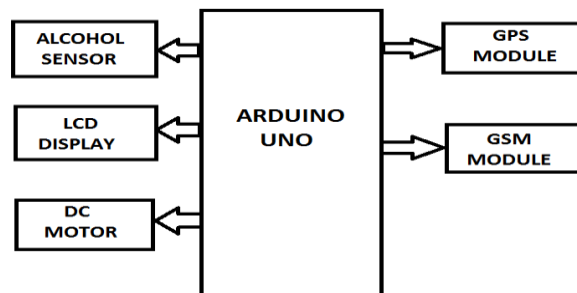


Fig 2. Block Diagram for alcohol detection system.

the alcohol sensor is connected to Arduino. The system is fed with the code about what operation should be performed with different data received from the sensor. Figure 2 represents the block diagram for this project.

When sensor sends the signal to arduino the DC motor of the vehicle must be seized. Arduino should be fed such that it performs these actions when the signal from the sensor is received. Since the vehicle is stopped the location of the vehicle is tracked using the GPS module and the message is sent to the owner and the information is sent to the nearest control room.

B. Advantage

Consumption of alcohol is detected and instant message is sent to the concerned authority using GSM module.

VIII. SEAT BELT SAFETY FEATURES USING SENSORS TO PROTECT OCCUPANT

A. Mechanism

Four touch sensors placed on each door edges. A load sensor is placed at the bottom of the seat to detect the occupancy. A variable reluctance sensor is placed near the roller of the seat belt webbing. A touch sensor is placed at the buckle of the seat belt. When all doors are locked, occupancy is detected, once the belt webbing is stretched and buckled the respective sensor provides signal to the micro controller which is placed under the seat this passes current to the wheel which helps in locking mechanism. Due to which wheel lock is removed, which activate of buckle lock and so the seat belt buckle gets locked. An electromagnetic phenomenon is used for locking mechanism.

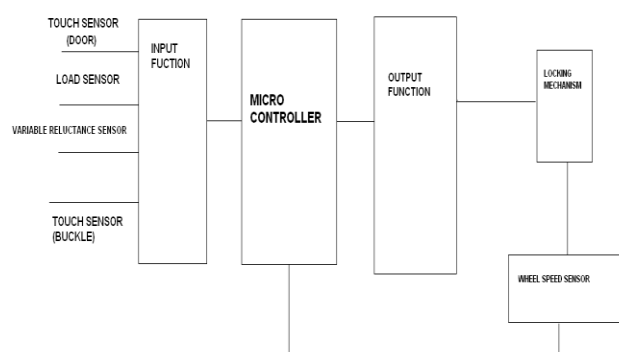


Fig 3 Block Diagram for seat belt detection.

A speed sensor is placed at the wheel, which will continuously provide feed back to micro controller regarding the speed of the vehicle. If speed exceeds zero and if the seat belt is locked than vehicle will move ahead. And if it is above zero and seat belt is unlocked then the wheel lock will be activated and vehicle will not move ahead.

Load sensor is placed at the front of rear bumpers and side skirt of the vehicle. These sensors will be activated during collision. As these sensors get activated current will be stopped and the seat belt lock will be removed. This results in wheel lock mechanism to be activated. This helps the injured people to come out without any difficulties. This mechanism is depicted in figure 3.

B. Advantage

- The system brings more safety to driver and the people travelling in the vehicle.
- 12v battery is the supply of the system which can be easily put inside any vehicle.
- The response time of the system is barely 2ms which makes it respond faster.
- This system makes seat belt wearing mandatory.

C. Disadvantage:

- Passive seat belt is costly and needs skilled person for installation purpose.
- Inferior occupant crash is offered by the automatic belt system.
- Seat Belt Safety Features Using Sensors to Protect Occupant 351
- If the vehicle door gets opened than automatic seat belt system leaves the occupant without belt protection causing greater injury or death
- Automatic seat belt systems also present several operational disadvantages.
- The sound from the warning system is so irritating to driver that it can cause serious accepted.

CONCLUSION

There are various existing models that are being implemented individually. All these models are implemented as a single unit. The data collected from these models are being updated frequently in the database, which can be viewed by the owner. Hence this system provides more information about the driver. The history of the driver can be verified during the payment times. Also the data security added in this project is more helpful to secure the system from the hacker using SHA-1 & SALT algorithm. The proposed system can be added with more features and can be used as an assist for the government transportation.

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