Design and Development of Secured Transportation System for Petroleum Products
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Abstract:
The project “Design and Development of Secured Transportation System for Petroleum Products” is designed to avoid the adulteration of fuel by implementing a security system on the fuel tanker which detects the theft and informs the concerned person about the theft by giving the details of the location of the tanker and also prohibiting the tanker from moving away from that position where theft is taking place. Now-a-days, it became very difficult to know that an accident has occurred and to locate the position where it has happened. It’s very difficult for the lives of victims until anyone noticed and informed it to the ambulance or to any hospital and if it occurs in remote areas there will be no hope to survive. The numbers of users have Android phone equipped with Global Positioning System, which can be used efficiently for security and protection purpose. This project is mainly developed for tracking of vehicles to make sure that it has reached the destination safely. This project is a multipurpose safety application, which will work on android platform.

Keywords: Global Positioning System, Android, Security, c#.net 2.0, .NET Framework Platform Architecture, Microsoft SQL 2000.

I. INTRODUCTION
As android operating System is used in mobile phones, tablets and laptops, it has covered more than 80% of the market. Now everyone is using android phone. As android is an open source operating system many developers are developing various applications every day. Millions of applications are available for use free of cost. These applications are helpful for Ticket booking, banking services, Online shopping, Tracking our family members etc. The “Design and Development of Secured Transportation System for Petroleum Products” project is to give assurance to the administrator that truck is reached destination safely without adulteration. There may be chances of stolen of vehicle and we will never understand that the Drivers are fake and we give responsibility of truck to drivers. So there is a need to overcome this problem and to communicate with administrator regarding Status of Vehicle. Now-a-days, it became very difficult to know that an accident has occurred and to locate the position where it has happened.

II. LITERATURE SURVEY
The purpose of literature review was to establish the potential topics and suggest ideas for another research, reporting published materials on existing conceptual framework, theories, techniques, processes, styles and instruments of other researchers related to the topic under investigation. It helped align our scope of study and in determining the various variables to be included. As for this research, the main purpose of literature review was to grasp comprehensive ideas on the extent of digital library initiatives and projects that had taken place worldwide and the factors and conditions that had influenced and contributed to their success.

Paper 1:
AUTHORS: Kantilal P. Rane, Dattatray A. Patil, Sumit S.Dukare. This paper contains the past work of vehicle monitoring, tracking and alerting system, to classify the different methodologies and identifies the new techniques. There are some challenges to face the vehicle tracking, monitoring and alerting because the lack of proper real time vehicle particular location and problem solving for the alerting system. GPS(Global Positioning System) is the most important technology used for vehicle tracking and it can monitoring the vehicle. The purpose of tracking system is to manage the transport using GPS and to control transportation to know about the current location of vehicle. The RFID (Radio Frequency Identification) is one of the technology and it is used for vehicle monitoring system. GSM (Global System for Mobile Communication) is mainly used for the vehicle to alert the system. In addition, this system is mostly essential for providing the information and location about vehicle to the user, passenger or owner.

Paper 2:
AUTHOR: R. Bala Krishnan, G. Jemilda. Linga Sangeeth, B. Johnson. This paper contains an Android mobile phone application and it gives information about trucks, and truck routes as well as truck numbers with both online and offline mode. The reason for Android platform is requires an open source development and it is probably the most feasible and user-friendly approach. In addition, it deals with Location Based Services, which are based on to track the exact location of the truck as well as it gives a particular remaining time for the tracked truck to reach its destination by using the different
technologies. It displays the required location in the maps with the help of GPS technology.

III. PROPOSED SYSTEM

“Design and Development of Secured Transportation System for Petroleum Products” project is developed in Android platform and database is created using SQLite which is the light version of SQL and works exactly same as SQL only difference is it takes very low space so best suitable for mobile apps. The centralized application helps admins to track the location of the vehicle in which Fuel is transferred. The admin has the authority to provide all the login credentials to drivers and bunk owners. The petrol bunk owners will also get alerts when the vehicle arrives near their respective stops and the admin can monitor the vehicle until they reach destination once they left from source using maps.

IV. METHODOLOGY

The project “Design and Development of Secured Transportation System for Petroleum Products” consists of three modules

1. Anti adulteration module.
2. Theft detection module.
3. Accident Recognition module.

4.1 Anti adulteration module:

As explained in the below flowchart (1) initially power supply is turned ON. Both the microcontrollers are reset and IR gets activated. We assume two conditions here i.e. whether the vehicle has reached the destination or not. If yes, the authorised person at the destination sends the password to the system mounted on the vehicle. If the sent password matches with the password stored in the system the IR sensor reading considered by the system and no message is sent and there is no power cut-off for the transmission in the vehicle. If no, the IR is checked for value ‘1’. If the value is 1, it continuously checks whether the vehicle has reached destination. If the IR value is ‘0’, the data is read from the GPS and a message is sent to the GSM (in this case mobile phone) along with the location of the tanker and simultaneously relay cuts-off the power required for the vehicle transmission.

4.2 Theft detection module:

As explained in the below flowchart (2) there is a hidden switch in the vehicle; once the vehicle gets started it checks the Condition that the switch is on or off. If the switch is on then there is a normal flow. If the switch is off then the theft is detected and the vehicle will stop automatically and message will be send to the vehicle’s owner’s mobile along with location.
4.3 Accident Recognition module:
As explained in the below flowchart (3) impact sensors are mounted in the vehicle. If there is no impact then no message will be send. If there is an impact then the SMS will be send to the mobile with location.

V. RESULTS AND DISCUSSIONS

Figure.1. Detecting unauthorized opening of lid.
As shown in figure 1, once the IR sensor detects the unauthorized opening of the lid, a message is sent to the administrative officer at the base station regarding this event along with the exact location (latitude & longitude values) of the tanker.

As shown in figure 2, when the tanker reaches the destination safely without malpractice, the Petrol bunk owner will send the password via GSM. The message is sent to the GSM device with sim card, mounted on the vehicle. This GSM modem will receive the SMS and send it to the microcontroller in the vehicle. The microcontroller will receive this SMS and compare the password and the command. If everything matches then it will deactivate the IR sensor.

As shown in figure 3, there is a hidden switch. If the driver is not turning that on, while driving the truck, the controller will receive signals from IR sensor on the wheel. On receiving this signal, the controller will send a SMS saying someone is stealing the truck and the truck will automatic shutdown. The impact sensors are connected in series in the vehicle, as the sensors are connected in series any side impact, the controller will detect it as accident and send the SMS to admin informing the accident occurs.

As shown in figure 4, the impact sensors are connected in series in the vehicle, as the sensors are connected in series any side impact, the controller will detect it as accident and send the SMS to admin informing the accident occurs.
As in Figure 5 the status will be displayed in the PC and in the android phone using WI-FI technology. The above figure is the condition where there is no theft detection & nor accident recognition.

As in figure 6 the status will be displayed in the PC and in the android phone using WI-FI technology. The above figure is the condition where there is theft detection and this status is displayed in android phone. By pressing stop button we can stop our vehicle.

As in Figure 7 the status will be displayed in the PC. The above figure is the condition where there is an accident.
As in figure 7 the status will be displayed in the PC and in the android phone using WI-FI technology. The above figure is the condition where the accident is recognised and this status is displayed in the android phone.

**Figure 8. Map showing location of GMIT college.**

Figure 8 shows the location of GMIT College in the map after giving the latitude and longitude values. The GPS system will send the longitude and latitude values corresponding to the position of vehicle to the mobile.

**VI. CONCLUSION**

The development of this system is based on android open source platform. This application is developed to bring convenience to the users. The applications is very flexible, versatile and user friendly. Admins can track the location of the vehicle in which fuel is transported. Once the driver starts the trip, bunk owners will alerted once the vehicles reaches their stop, and then the admins can monitor the location of vehicles until it reaches destination. The authority can add vehicles, drivers and bunk owners to use the application. In addition, the application is effective and accurate. It describes a method to track vehicles and provide interaction in more efficient and effective way resulting in greater reliability and security. We use simple and it makes easy to use. Since, we are making use of an android application; no additional hardware is required for implementation.

**VII. REFERENCES**


[6]. Software Engineering by Roger Pressman and David Lowe


