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Vehicle Tracking and Mapping In Solid Waste Management

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Abstract

The collection and transportation of the large amount of waste is a concerning matter for urban local bodies. A large number of municipal and private vehicles are used for the collection of waste. The disposal process is usually through a landfill, program, burning place, or waste treatment plant. All these vehicle trips require route planning and real-time monitoring to ensure that the whole operation is done in an efficient manner. We will help to track the number of trips and actual visits. Our Solution will help the authorities to structure the entire process, manage and monitor their fleet. Moreover, installing these devices will provide valuable insight into how fleets are being used and help Municipal Corporation to effectively utilize their assets.The vehicle tracking application will be a web-based application and will help in the tracking of the vehicles. It will be integrated with accurate, comprehensive, and detail-rich digital maps.

Keywords—Solid Waste,Vehicle tracking,mapping,GPS

Introduction

The collection and transportation of the large amount of waste is a concerning matter for urban local bodies. A large number of municipal and private vehicles are used for the collection of waste. The disposal process is usually through a landfill, program, burning place, or waste treatment plant. All these vehicle trips require route planning and real-time monitoring to ensure that the whole operation is done in an efficient manner. We will help to track the number of trips and actual visits. Our Solution will help the authorities to structure the entire process, manage and monitor their fleet. Moreover, installing these devices will provide valuable insight into how fleets are being used and help Municipal Corporation to effectively utilize their assets. The vehicle tracking application will be a web-based application and will help in the tracking of the vehicles. It will be integrated with accurate, comprehensive, and detail-rich digital maps. Waste management include all the activities and actions required to manage waste from its inception to its final disposal . This includes collection, transportation, treatment and disposal of waste together with monitoring and control. Waste collection approaches vary widely among different countries and regions. Domestic waste collection services are provided by local government authorities. Curbside collection is the most common method of disposal, in which waste is collected at regular intervals by specialized trucks. Waste collected is then transported to an allocated disposal area.

Nowadays, cities having developing economies experience exhausted waste collection services,inadequately managed and uncontrolled dumpsites and the problems are more serious. Waste collection methods in such places are an ongoing challenge and many struggle due to weak institutions and rapid urbanization. An unavoidable consequence of development and industrial progress is generation of waste. Therefore, efficient and economic waste management is a matter of international concern and countries have set up robust regulatory waste management regimes for balancing the objectives of development and environment sustainability.

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Objectives:

The proposed system is a garbage vehicle tracking system which tracks the vehicle and provides the live location information.The system's database stores all the essential details of who is being tracked and about the admins using the application. Dashboards increase the overall efficiency of business analytics by allowing users to easily visualize and review data at a glance.

○ With our custom tracking system for waste management we can know where the garbage trucks are in real time, how fast they are going, and what traffic delays they may face.

○ We can eliminate inefficient trends,with a historical record of garbage truck activities.

○ Easy to use system designed for garbage truck fleets in municipalities of all sizes.

○ From simple route planning to real-time and historical location information, these systems waste management fleet managers with all of the information they need to provide timely service .

System Requirements & Technologies Used:

For the project we are using different technologies for truck location and mapping and mostly it is done using a device with a GPS module (smartphone) or by implementing a custom device attached to the truck with a working GPS module.

HARDWARE

- SMARTPHONE WITH GPS
- OS - Android 8.0 or more
- Ram Capacity : 4GB
- Memory - 120 MB

SOFTWARE

- Language : PHP
- Databases used : MySQL
- Design used : HTML JavaScript,Bootstrap
- Browser used : Google Chrome
- Software used: XAMPP/ LAMP

Software Working

1. A Web application is made where the admin can login and monitor or manage the fleet from the website dashboard.
2. The location of the garbage truck when active is sent to the web application via the API.
3. This is received as coordinates with a timestamp.
4. This detail is then used for live tracking.
5. The coordinates are used by Google maps API to pinpoint the truck location and are shown with time of update.

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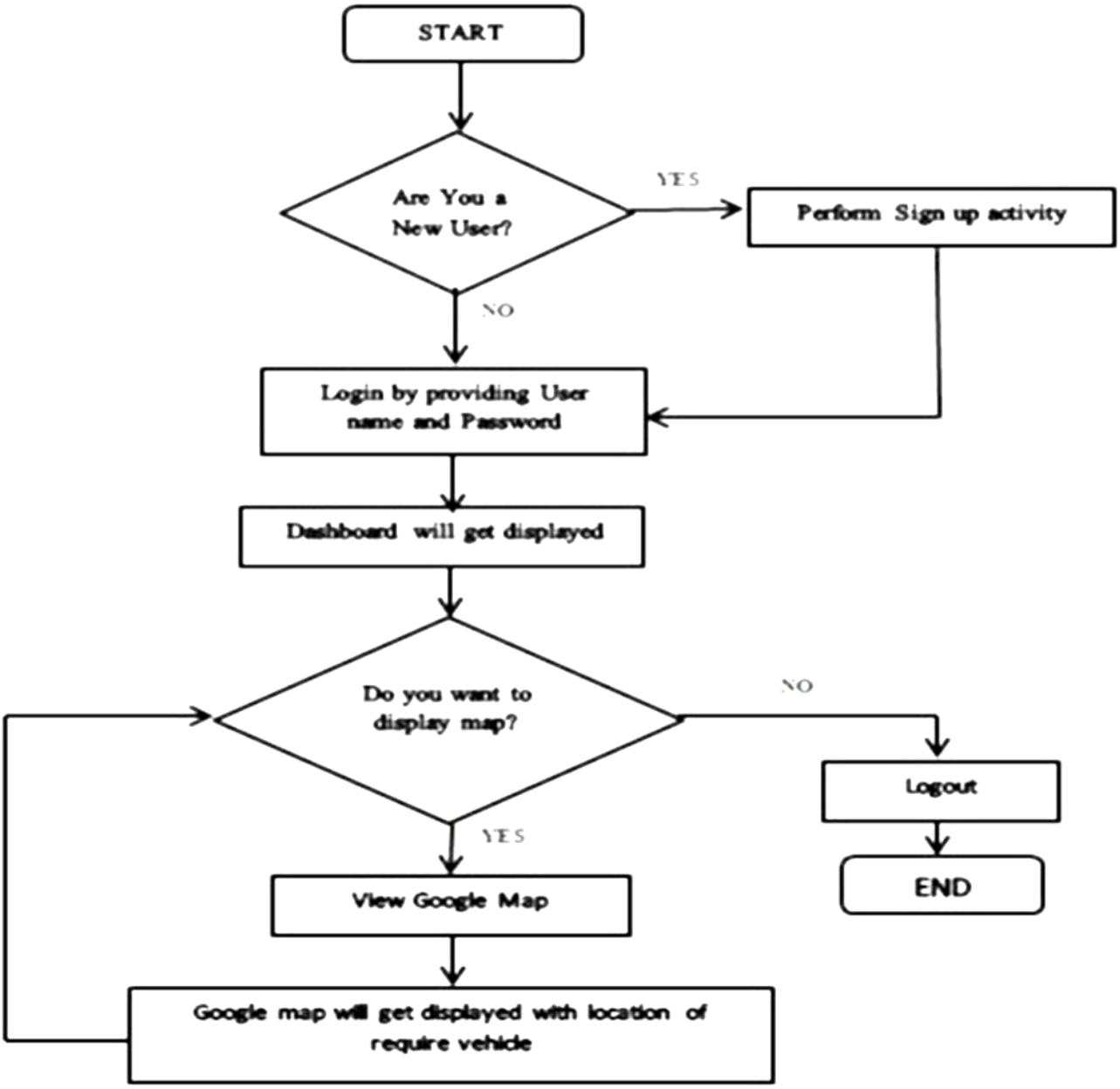

Module Description

In this section we would be describing module details of the project. The system after careful analysis has been identified with following modules:

Dashboard

Dashboard is the one page that the users see first in the web application. The analysis of the application's data, trends, summaries etc can be shown in this page. In some cases it dynamically reports important pieces of data from the web application.

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Vehicle

Vehicle functionality is the most integral part of this web application. From adding a vehicle to allocating and tracking it, all the details should be very well tracked and analyzed.

Driver

This is another integral part as for all vehicles registered a driver should be allocated. So this feature is subdivided into Add Driver and Driver List

Tracking

Tracking functionality is used to track and locate each vehicle's current location directly with the help of a map and GPS module installed in the vehicle.

Reminder

Reminders provide timely alerts or information to the vehicle drivers. There may be situations where some routes are blocked or they need to divert their route with immediate effect. In such cases this functionality plays its role. This functionality is only for admin.

Geofencing

A geofence is a virtual perimeter for a real-world geographic area. A geo-fence can be dynamically generated or match a predefined set of boundaries (such as school zones or neighborhood boundaries).

Users. Here users means admin accounts. Most powerful type of user accounts are admins. They have the power to do just about anything on a device.

5. **Results And Discussions**

Application Interface

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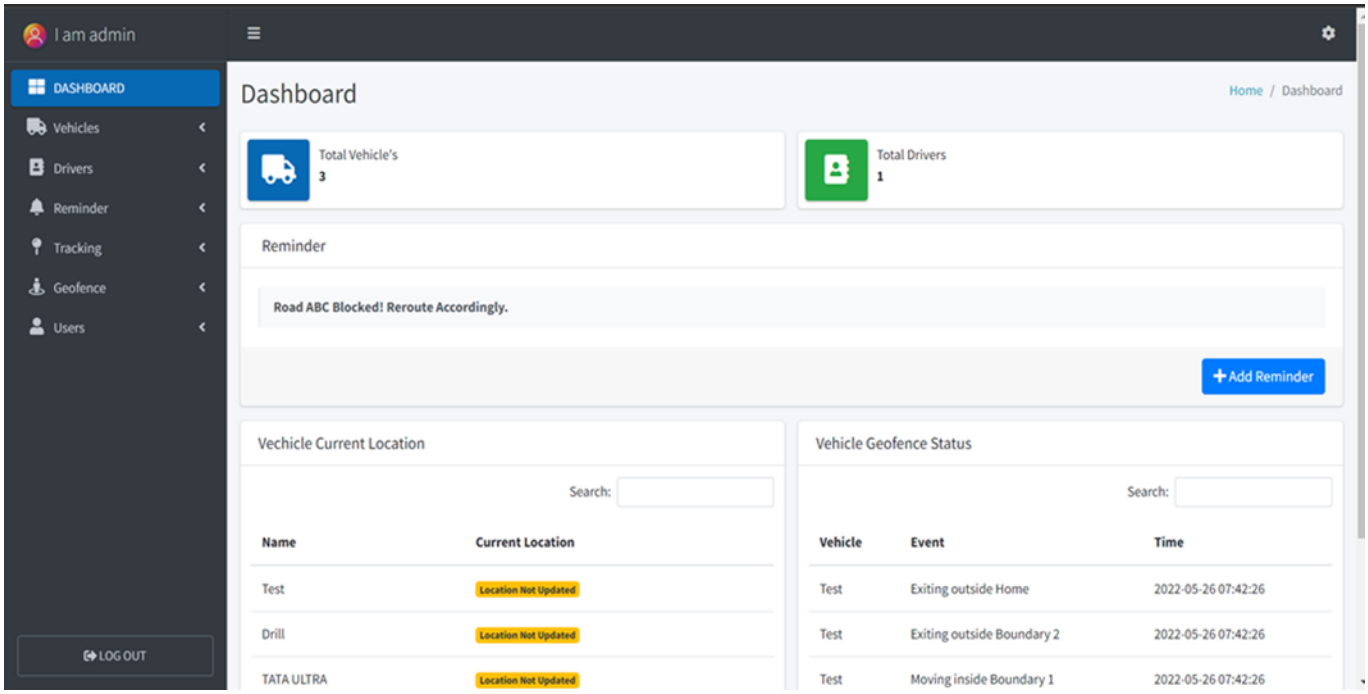
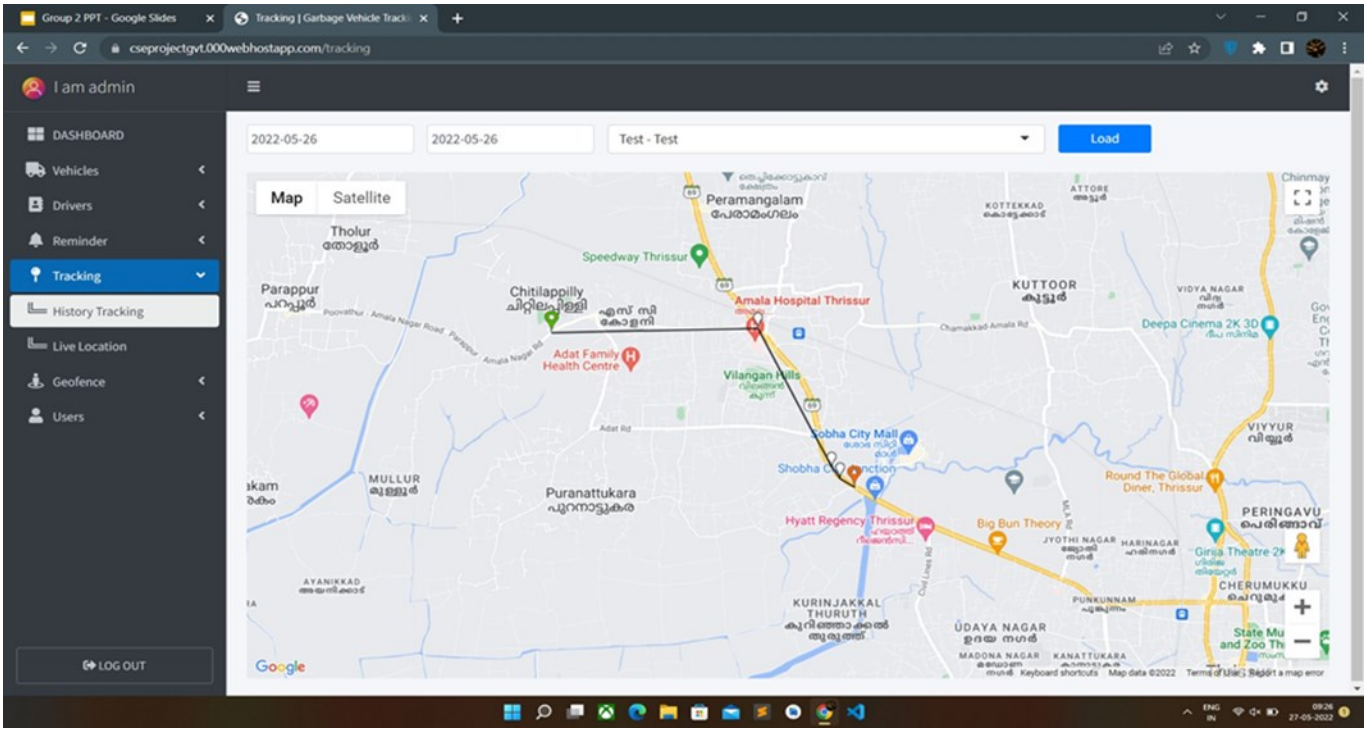


Web Interface



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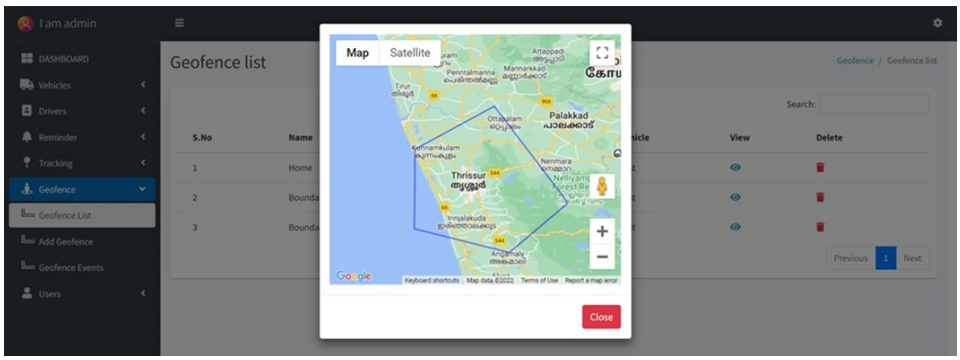

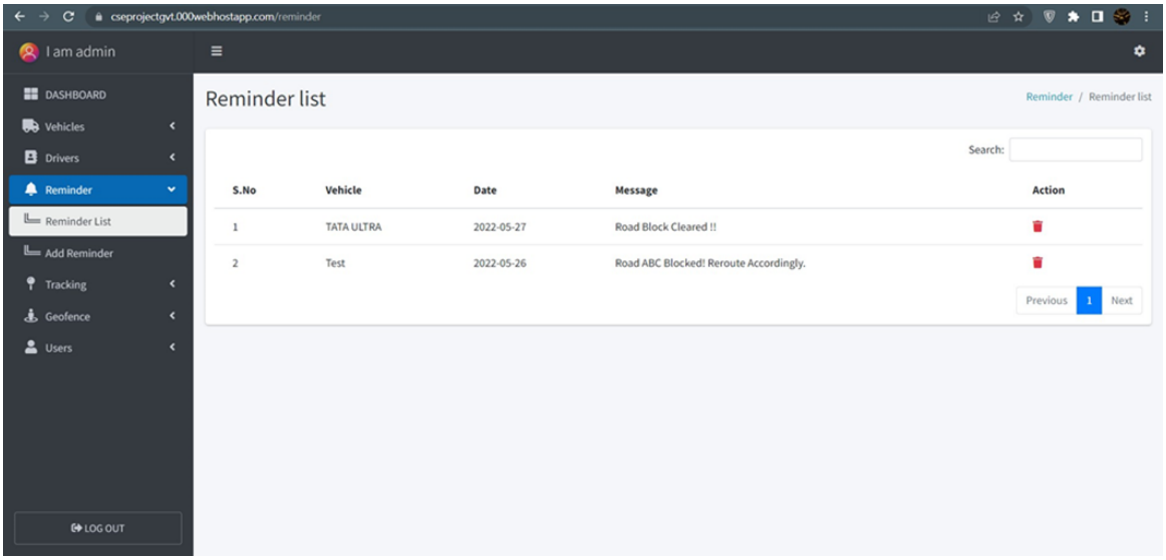

6.Conclusion

The Location Based Tracking System is a real time problem solving application. The Vehicle tracking system makes efficient fleet management and which in turn brings large profits. Efficient scheduling or route planning can enable you to handle larger job loads within limitted time. Vehicle tracking improves safety and security, communication medium, performance monitoring and increases productivity. A vehicle tracking system offers a lot of benefits for companies and individuals that deploy vehicles on a day to day basis. On the business front, a GPS Vehicle Tracking System helps organizations in streamlining their fleet operations in the most effective and efficient manner, along with serving as an anti-theft facility by means of asset tracking. The cost of this device is reasonable and the return on investment is significant.Without the need to invest in expensive equipment or hire additional employees, a telematics based vehicle tracking device is a very attractive option. Being a fleet owner, you can have full control over your vehicle's movements, operational cost, fuel expenditure and many more useful features with just a click.

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