GLOBAL POSITIONING SYSTEM (GPS) BASED VEHICLE TRACKING AND SECURITY SYSTEM

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ABSTRACT

An efficient vehicle tracking system is designed and implemented for tracking the movement of any equipped vehicle from any location at any time. The proposed system made good use of a popular technology that combines a Smartphone application with a GPS/GLONASS and GSM connectivity. The designed in-vehicle device works using Global Positioning System (GPS) and Global system for mobile communication / General Packet Radio Service (GSM/GPRS) technology that is one of the most common ways for vehicle tracking. The device is embedded inside a vehicle whose position is to be determined and tracked in real-time. A Teltonika FM 1120 is used to control the GPS and GSM/GPRS modules.The GSM/GPRS module is used to transmit and update the vehicle location to a database. There is a separate interface for the police station, and through that authorized person is able to provide information of lost vehicle. This information forward to the toll service for further processing. our system is going to track the position of that vehicle using vehicle speed, vehicle movement through GPS. Finally all information will be send to the Cloud server for the further action. In this Proposed Novel System we are mainly target For the Functionality of Fleet management as well as off Track Vehicle detection using Geo fencing Concept. As we have Facility in portal for generating all the Different Reports Like KM, Speed and Generating Review of past History

ARTICLE INFO

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I. INTRODUCTION

GPS modules are popularly used for navigation, positioning, time capturing and other purposes. GPS antenna receives the location values from the satellites. GPS gives information about: 1) Message transmission time 2) Position at that time. The number plate's recognition system has a wide range of purposes: Highway mechanised tolling, Monitoring administration, Centre of population automated parking management, urban road monitoring and illegal-incidents management, Test outing vehicles, Traffic gauges and Safety management.

The GPS technology being enhanced day by day, companies are coming up with devices that are compatible with phones and other modern gadgets. Some vehicle tracking systems integrate several security systems, for example by sending an automatic alert to a phone or email if an alarm is triggered or the vehicle is moved without authorization, or when it leaves or enters a geofence (a hypothetical circular area). In this proposed system, user is able to detect many things related to vehicle; alerts should be sent after any problem happens with vehicle such as: Door Open/Close, Engine ON/OFF, Over Speeding, Location Changed alert, Stolen Vehicle details to Police station, Kilo meter traveled, Battery Notifications, Longitude and Latitude etc

II. RELATED WORK

Phone-based transit tracking: Our work is mostly related to recent works on the transit tracking systems, Easy Tracker ,presents an automatic system for low-cost, real-time transit tracking, mapping and arrival time prediction using GPS traces collected by in vehicle smart phones. Thiagarajanetal present a grass roots solution for transit tracking utilizing accelerometer and GPS modules on participating mobile phones. EEMSS presents a sensor management framework which uses minimum number of sensors on mobile devices to monitor user states. VTrack estimates road travel time based on a sequence of WiFi based positioning samples using an HMM-based algorithm for map matching. C Track presents trajectory mapping using cell tower fingerprints and utilizes various sensors on mobile phones to improve the mapping accuracy. Our work

differs from them in that it predicts the bus arrival time based on cell tower sequence information shared by participatory users. To encourage more participants, no explicit location services (e.g., GPS-based localization) are invoked so as to reduce the overhead of using such special hardware for localization.

Cell tower sequence matching: Star Track provides a comprehensive set of APIs for mobile application development. Applying new data structures, enhances Star Track in efficiency, robustness, scalability, and ease of use. CAPS determines a highly mobile user's position using a cell-ID sequences matching technique which reduces GPS usages and saves energy on mobile phones. Unlike those proposals, our work does not aim to position the mobile users though similar in spirit to these existing works in utilizing the cell tower sequences. [6]

This paper proposes a real-time vehicle tracking system using a global positioning system (GPS) technology module to receive the location of the vehicle, to forward into microcontroller and to connect internet by a general packet radio service (GPRS) technology for displaying a real time on the website map developed by Google Map which allows inspection of vehicles at all times.[1]

The major challenges in the public transport system and discuses various approaches to intelligently manage it. Current position of the bus is acquired by integrating GPS device on the bus and coordinates of the bus are sent by either GPRS service provided by GSM networks[5] or SMS or RFID. GPS device is enabled on the tracking device and this information is sent to centralized control unit or directly at the bus stops using RF receivers. This system is further integrated with the historical average speeds of each segment. [2]

Cloud computing has evolved over the last decade from a simple storage service for more complex ones, offering software as a service (SaaS), platforms as a service [3]

III. Problem Statement

Proposed System objectives are to ensure that, Showing the current status of vehicle, Reduction of Management Costs, Convenient and Quick Service to the Vehicle Owners, Tracing the Complete.

Goal and Objectives:

- Vehicle tracking is important in many applications traffic information collection, intelligent transportation systems

Statement of scope:

The GPS technology being enhanced day by day, companies are coming up with devices that are compatible with phones and other modern gadgets. Some vehicle tracking systems integrate several security systems, for example by sending an automatic alert to a phone or email if an alarm is triggered or the vehicle is moved without authorization, or when it leaves or enters a geofence (a hypothetical circular area). In this proposed system, user is able to detect many things related to vehicle; alerts should be sent after any problem happens with vehicle such as: Door Open/Close, Engine ON/OFF, Over Speeding, Location Changed alert, Stolen Vehicle details to Police station, Kilo meter traveled, Battery Notifications, Longitude and Latitude etc

IV. MODULE DESCRIPTION

GPS: GPS technology became a reality through the efforts of the American military, which established a satellite-based navigation system consisting of a network of 24 satellites orbiting the earth. GPS is also known as the NAVSTAR (Navigation System for Timing and Ranging). GPS works all across the world and in all weather conditions, thus helping users track locations, objects, and even individuals! GPS technology can be used by any person if they have a GPS receiver.

AVL-Advanced Bike Locator: AVL systems generally include a network of vehicles that are equipped with a mobile radio receiver, a GPS receiver, a GPS modem, and a GPS antenna. This network connects with a base radio consisting of a PC computer station as well as a GPS receiver and interface. GPS uses interactive maps rather than static map images on the Web. This means users can perform conventional GPS functions such as zoom, pan, identify and queries. This Proposed system uses TELTONIKA FMXXXX device. It is a terminal with GPS and GSM connectivity .

Live Tracking Module: Live tracking vehicle display on map. Displaying vehicle details on live tracking page carrier, last seen, IGN, Door, Battery, Temp, GPS, Speed, Latitude, Longitude, Address etc. Selection for registered vehicle.

Replay Track Module: Showing animation of how vehicle traveled using date range. Playing, Pausing, Stopping animation on map. Increasing/Decreasing speed of animation on map. Displaying details with animation like Time. Address, Speed, KM Traveled, Ignition.

Report Module Km Travelled. Idle Time Stopped time with engine on. Working Time vehicle engine is on without stopping time Speed Report As per entered speed it will display report Over-speed Report Speed is more than defined regular speed. Geo-fencing If Traveled through some circular area. Bold Stop on which vehicle stopped for more than some interval. Export report into Excel file.

V. ALGORITHM STEPS

The haversine formula is an equation important in navigation, giving great-circle distances between two points on a sphere from their longitudes and latitudes.

```
public class Haversine {
    public static final double R = 6372.8; // In kilometers
    public static double haversine(double lat1, double lon1,
double lat2, double lon2) {
        double dLat = Math.toRadians(lat2 - lat1);
        double dLon = Math.toRadians(lon2 - lon1);
        lat1 = Math.toRadians(lat1);
        lat2 = Math.toRadians(lat2);

    double a = Math.pow(Math.sin(dLat / 2),2) +
Math.pow(Math.sin(dLon / 2),2) * Math.cos(lat1) *
Math.cos(lat2);
        double c = 2 * Math.asin(Math.sqrt(a));
        return R * c;
```

```
    }
    public static void main(String[] args) {
        System.out.println(haversine(36.12, -86.67, 33.94, -118.40));
    }
}
```

VI. RESULT

Following are the result of our implemented system:

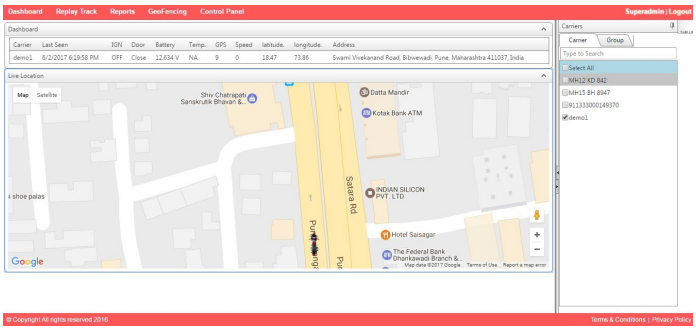

Fig.1 Live Vehicle

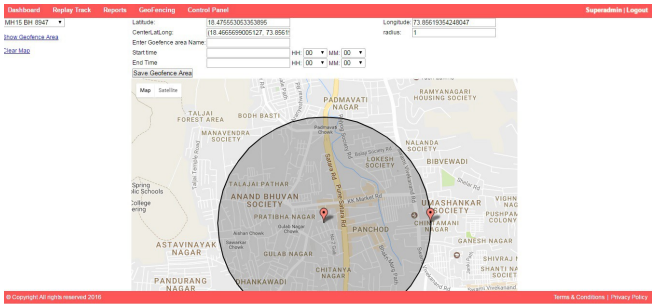

Fig.2 Geofence Marking Area.

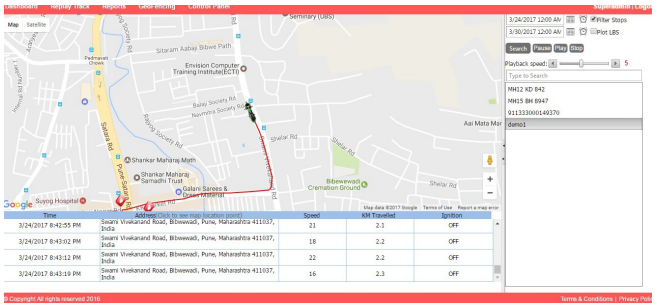

Fig.3 Live and Reply Tracking

VI.FUTURE WORK

The use of this project for bus navigation, on a large scale, can be implemented using many GPS placed on the buses whose locations are to be traced and the information can be fed to the server from through the GSM modules. And the querying users can get the desired bus location from the database of the server.

VII. CONCLUSION

A conclusion of the GPS technology being enhanced day by day, companies are coming up with devices that are compatible with phones and other modern gadgets. Some vehicle tracking systems integrate several security systems, for example by sending an automatic alert to a phone or email if an alarm is triggered or the vehicle is moved without authorization, or when it leaves or enters a geofence (a hypothetical circular area). As our system works with offline data system based on the some reference data which we will improve further for multiple application.

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