Bus Tracking System and Ticket Generation using QR Technology

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Abstract

In order to facilitate flexibility of planning the travel by public transport, Bus tracking system is an application which gives the real time location of the bus along with the distance and route. The system uses GPS (Global Positioning System) of user's mobile device to track the vehicle's location. The data is simultaneously updated and stored in the database. The system works in admin and user category separately. The admin has the access to the backend data repository that includes user information and the encrypted unique QR code of the user. The users on the other hand has the knowledge of the real time location, route and QR scanner for payment. Along with this, e-ticket generation and senior citizen seat reservation are additional features.

Keywords: Application, GPS, QR Code, Android..

I. INTRODUCTION

Means of Transport is one of the important facilities of any country. The main problem about the transportation is the uncertainty of waiting time due to traffic jams and any other issue live abnormal conditioning. Real time tracking system was required that can transmit the collected information about the vehicle after regular intervals or at least could transmit the information when required by monitoring station. In order to transmit vehicle's data in real time active systems were developed using cellular or satellite networks to a remote admin.

The application allows the users to interact with the system from anywhere as long as they are connected to the internet. The interaction is between the user and the bus conductor for ticket scanning and payments. This system is built such that user can book bus seat in advance by paying money from e-wallet, means user just have to scan the QR code from bus conductor. It also eliminates the payment issue (cash or issue of change). The plan is to replace the old booking system with new system which will be online. Public Transport was made for the ease of general public, to make their transportation cheap and yet efficient. After so much of development, people find travelling via public transport mainly city buses very hectic. So, to overcome these issues we implement system which will generate ticket online using QR technology hence, there are fewer chances of losing tickets. Along with it, people used to wait for a long time on bus stops for appropriate bus arrival. The live location of the bus will be shown to the user so that it can get a visual aspect of the application. The map will show all the routes and display the source and destination points. As the main feature of the application is to provide real time location and distance between the user and the selected bus, it provides it within no time and thus is very efficient for the people who are in a hurry. The time calculations will be performed using certain algorithms. System will also manage buses for specific routes or reduce the frequency of buses if necessary. Some buses have multiple routes, and thus the user will have the option to select the route to go to its destination. The application will show the routes with all the stops that come in between and the shortest path to go to the destination. All the appropriate research and surveys have been performed to check the efficiency level of the application. Thus, providing timely results with most accurate distance and paths will be done.

II. LITREATURE SURVEY

The capacity to track vehicles is valuable in numerous applications including security of individual vehicles, public transportation system, fleet management and others. Moreover, the quantity of vehicles out and about all-inclusive is too

expected to increment quickly. Consequently, the advancement of vehicle following framework utilizing the Global Positioning System (GPS) and Global System for Mobile Communications (GSM) modem is attempted with the point of empowering clients to find their vehicles easily and in a helpful way. The system will give clients the ability to follow vehicle remotely through the versatile system. This paper exhibits the advancement of the vehicle tracking system's equipment model. In particular, the system will use GPS to acquire a vehicle arrange and transmit it utilizing GSM modem to the client's telephone through the versatile system. The main hardware components of the system are u-blox NEO-6Q GPS recipient module, u-blox LEON-G100 GSM module and Arduino Uno small scale controller. The created vehicle tracking system shows the possibility of close constant following of vehicles and enhanced adaptability, worldwide operability and cost when contrasted with existing arrangements.[1]

In this unique life where everybody is in a rush to achieve their goals, waiting for transport is boisterous and even a significant number of us are uninformed of the transport timing. To overcome this trouble, a simple system is proposed in this paper to help following ongoing transport area. The proposed arrangement takes favorable circumstances of the two primary highlights in portable stage these days which are area administrations, for the most part GPS based, and fundamental communication administrations, for the most part SMS based. The system comprises of opposite sides, server side and customer side. The server gadget's fundamental duty is to give the correct area of the transport to the server, or to the client if there should arise an occurrence of SMS based question from customer's gadget. Then again, customer's gadget can discover transport area either utilizing SMS administration or utilizing network access. On the off chance that customers' gadget is an android based smartphone, he can install our application to track transport area utilizing web benefit. The server's gadget will be put on the vehicle of enthusiasm with android application introduced on it. Trials were made with this system furthermore, found that it performs preferable from various perspectives over other comparative vehicle tracking system.[2]

The proposed system assumes a vital job continuously following and checking of vehicle and furthermore provides safety and secure solution for the traveler utilizing sensors. At whatever point there is vehicle robbery circumstance or vehicles mishap circumstance happens, the proposed system gives the vehicle's current area, speed to the vehicle owners mobile number. Henceforth this advantages to track the vehicle as early as possible. In specific circumstances according to student's safety concern the proposed framework given a provision of alert massage on student parents mobile which additionally assumes an essential job.[3]

Vehicle Tracking System perceives the accident location with the assistance of GPS module and offer alarm to the rescue vehicle framework in healing facility. Declined death rate in accident cases and time management is increased.[4]

As of now there are many research cantered around using smartphone as an data collection gadget. Many have demonstrated its sensors capacity to supplant a lab test bed. These inertial sensors can be used to portion and arrange driving occasions decently precisely. In this exploration we investigate the likelihood of utilizing the vehicles inertial sensors from the CAN transport to manufacture a profile of the driver to at last give appropriate criticism to lessen the quantity of hazardous vehicle move. Braking and turning events are better at portraying an individual looked at to increasing speed events. Histogramming the time-arrangement esteems of the sensor information does not encourage execution. Besides, joining turning and braking occasions enables better to separate between two similar drivers when utilizing regulated learning procedures contrasted with separate occasions alone, but with frail performance.[5]

This paper examines the way toward building up a Vehicle Tracking Device (VTD). VTD is a tracking device focusing on vehicles that utilization Short Message Service (SMS). VTD will give data of area facilitate to smartphone at whatever point there is a demand for it through the SMS. The integrated Global Positioning System and Global System for mobile communication (GPS-GSM) is utilized to track vehicle using application, for example, Waze or then again Google Maps. VTD is a reconciliation of both equipment and programming. The hardware components incorporate a smaller scale controller, Arduino Uno board, sim-card slot, voice-caution module, flag receiving wire, battery and cell phone as well as a program controller interface. The model of VTD has been effectively created to track vehicle using GPS through SMS.[6]

Drunk driving, or officially Driving Under the Influence (DUI) of liquor, is a noteworthy reason for car crashes all through the world. In this paper, we propose a very effective framework went for early discovery and alarm of unsafe vehicle moves normally identified with alcoholic driving. The whole arrangement requires just a cell phone put in vehicle also, with accelerometer and orientation sensor. A program installed on the cell phone registers increasing velocities based on sensor readings, and contrasts them and average alcoholic driving examples extricated from genuine driving tests. When any proof of alcoholic driving is available, the cell phone will automatically alert the driver or call the police for help well before mishap really occurs. We execute the discovery framework on Android G 1 phone and have it tried with various sorts of driving practices. The outcomes demonstrate that the framework accomplishes high precision and vitality efficiency.[7]

This paper thinks about a far reaching and community oriented venture to gather a lot of driving information out and about for use in a wide scope of territories of vehicle related research focused on driving conduct. In contrast to past information gathering endeavours, the corpora gathered here contain both human what's more, vehicle sensor information, together with rich and nonstop translations. While most endeavours on in-vehicle look into are by and large engaged inside individual nations, this exertion joins a collective group from three differing areas (i.e., Asia, American, and Europe). Subtleties identifying with the information gathering worldview, for example, sensors, driver data, courses, and interpretation conventions, are talked about, and a fundamental examination of the information over the three information gathering destinations from the U.S. (Dallas), Japan (Nagoya), and Turkey (Istanbul) is given. The ease of use of the

corpora has been tentatively confirmed with a Cohens kappa coefficient of 0.74 for interpretation unwavering quality, just as being effectively misused for a few in-vehicle applications. Above all, the corpora are freely accessible for research use and speak to one of the first multination endeavours to share assets and comprehend driver qualities. Future work on appropriating the corpora to the more extensive research network is likewise examined.[8]

III. PROPOSED SYSTEM

The system provides online tracking of public buses, seat reservation and generation of e-ticket using QR codes. System being user friendly and accurate, is available for 24 hours. The system is equipped with basic security measures such as authentication and authorization. The application is available for admin side as well as user side.

A. *Methodology*

The system follows a methodology that relies on algorithms for performing operations. There are two algorithms implemented on an android platform.

• Haversines algorithm haversines algorithm is used to find out missing sides on a spherical triangle or used to find out distances on the great circle structures. The values are represented in the form of haversine function as follows:

$$haversine(\theta) = sine^2 \ (\theta/2)$$

here, θ represents the central angle subtended on the sphere.

$$\theta = D/r$$

D is the spherical distance R is the radius of the sphere. In the proposed system haversines is used because the distance needed to be calculated is spherical. The device fetches the latitude and longitudinal values and pass to the algorithm module. The algorithm will process using following formula:

$$D = 2rarcsin(hav(A-A') +cos(A)cos(A') \ hav(B-B'))$$

A, A'- latitude of point 1 and 2
B, B'- longitude of point 1 and 2
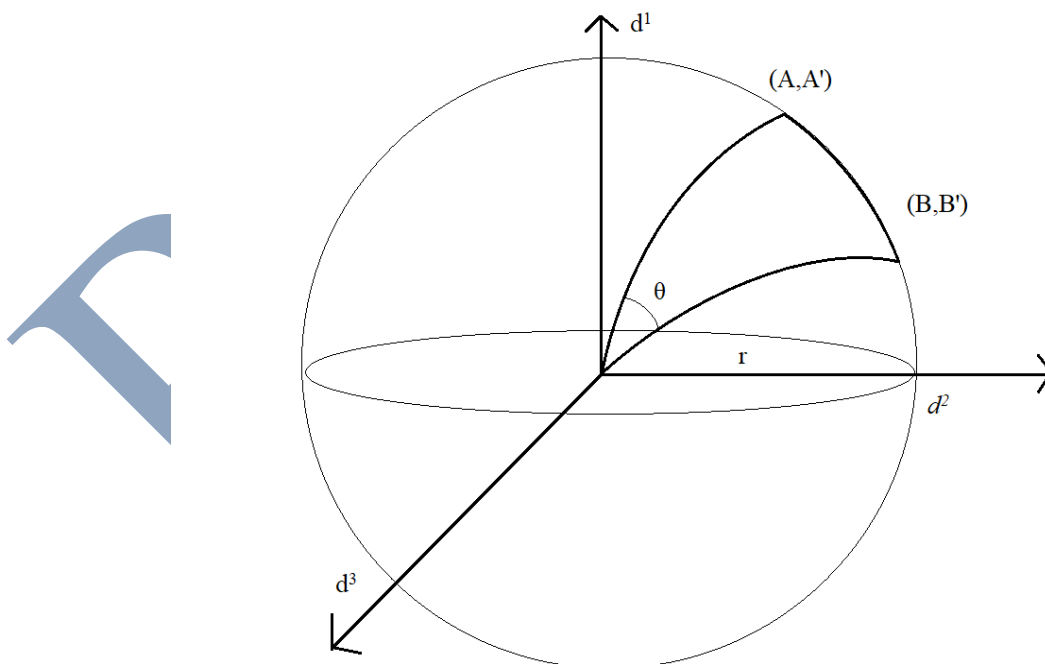D is the requires distance as output.

Figure 1 : Haversine Co-ordinates

• AES algorithm it is a symmetric key algorithm basically used for encryption and decryption purposes. It uses a substitution and permutation concept to build a Jason format string that is the QR code. In this system this algorithm is used to scan and verify QR codes. First use: the first use of the algorithm is when the user QR is generated (Encryption)

Second use: the second use of the algorithm is when the conductors QR is scanned. These two algorithms provide the main paradigm for operations. The structural appearance of the application follows the methodology as per the android framework support.

B. Architecture of the System

The devices used in the system are mobile phones with android support and an admin system. The architecture shows different components and operations in the online ticket booking module of the system. The system initializes by user registration. The registered user is assigned a unique QR code generated by the system using AES algorithm. Another operation the system does for the registered user is calculation of amount per travelling charges. On the conductor side, the system generates the QR using the characters or numbers from the amount and user detail. The conductor QR code is scanned to the user QR code, once approved the money is either deduced from the wallet or paid manually. The next component of the architecture is the TC that scans the conductor QR code. This part of the architecture is for maintaining the overall record of the ticket generations and amount gathered from collective buses. In the location tracking module, the user has to request for the live location of the desired bus from the system, then the system will retrieve the live data from the database and will finally send the live location of the bus to the user.
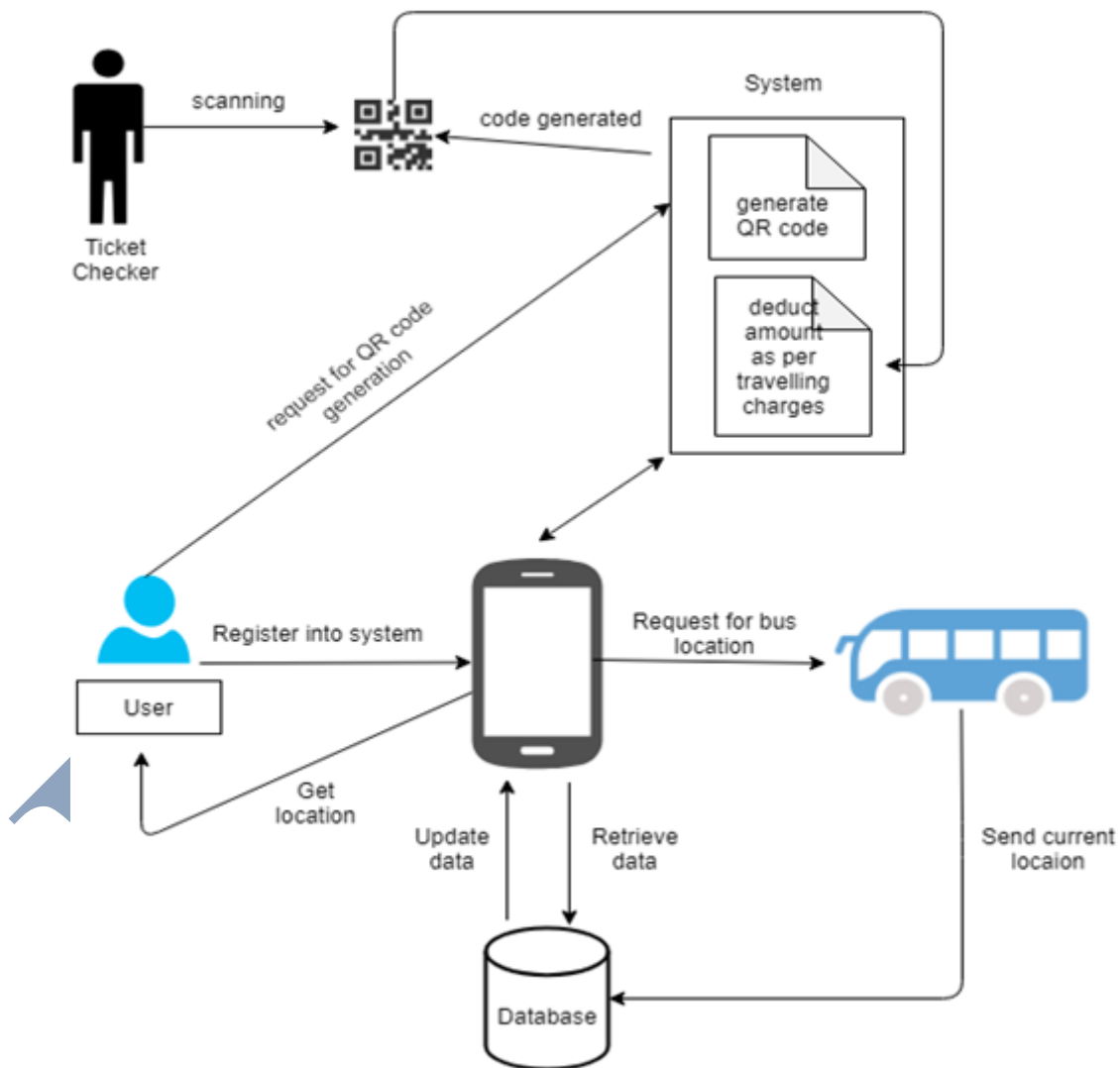

Figure 2 : System Architecture

IV. CONCLUSION

The main objective of this thesis was to design and construct a cost-effective system to track position or movements of public buses using a GPS based positioning system. In conclusion of this thesis, it can be assured that the main objective of this project is enhancing the ease for public travelling, with the use of this application. This survey basically concludes that there is need of a system that provides a user-friendly GUI so that passengers from all the age groups can have an easy access to boarding a public bus. The proposed solution in the paper possess a great scope in the result phase as the relevant technologies are used for reservation, e-ticket generation etc.

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