An Android Application to Track College Bus

Hari Bharath R, Aman Kothari, Chintan M. Jain

Abstract: College Students finds it difficult to catch college bus on a regular basis. This is a common problem among Students. Efforts have been made to simplify this process by introducing GPS tracking. But as none of them have a proper algorithm to take into consideration the bus stops as well, the whole point of a student intercepting a bus's route is lost. The idea of catching a bus then results in the student chasing the bus. This project is an attempt to solve this problem by introducing an Algorithm which uses Google Maps API ,to find the best way to intercept a bus's route to catch the bus without asking the bus to wait for the student ,neither for the student to chase the bus. The algorithm would show the Student, the nearest bus stop from his location, and the exact location of the upcoming buses, approaching that particular bus stop. Also this allows student to know locations of other nearby buses to help him decide manually if other buses are a better option for him.

Index Terms: Android Application, Google Maps API, GPS Technology and Shortest Path Algorithm.

I. INTRODUCTION

College Students finds it difficult to catch college bus on a regular basis. This is a common problem among Students. Efforts have been made to simplify this process by introducing GPS tracking. But as none of them have a proper algorithm to take into consideration the bus stops as well, the whole point of a student intercepting a bus's route is lost. The idea of catching a bus then results in the student chasing the bus. This project is an attempt to solve this problem by introducing an Algorithm which uses Google Maps API ,to find the best way to intercept a bus's route to catch the bus without asking the bus to wait for the student ,neither for the student to chase the bus. The algorithm would show the Student, the nearest bus stop from his location, and the exact location of the upcoming buses, approaching that particular bus stop. Also this allows student to know locations of other nearby buses to help him decide manually if other buses are a better.

II. LITERATURE SURVEY

1. Algorithms to find shortest and alternative paths in free flow and congested traffic regimes by Alberto Faro, Daniela Giordano, Journal / 2016.

A* is a heuristic algorithm used to have “forward looking” component to estimate the length to complete paths to the destination. Even though this paper uses A* as a heuristic algorithm it has quite a few disadvantages. A* are not the best algorithms to find 'one to one' fastest path or 'one to all' shortest path.

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This would allow to inform the drivers not only about the current shortest paths to destination but also about alternative, timely computed paths to avoid being trapped in the traffic jams signaled by cyber-physical-social systems. To this aim, the paper proposes a set of algorithms that solve very fast the All Pair Shortest Paths problem in both the free flow and congested traffic regimes, for road networks of medium-large size, thus enabling location-based systems to deal with emergencies and critical traffic conditions in city and metropolitan areas, whose transport networks typically range from some hundreds to many thousands of nodes, respectively.

2. A Method for Real-time trajectory Monitoring to Improve Taxi Service Using GPS Big Data by Zuojian Zhou ,Wanchun Dou ,Guochao Jia ,Chunhua Hu, Xiaolong Xu, Xiaotong Wu, Jingui Pan , Journal / 2015.

Taxi service is supervised by certain electronic equipment (e.g., GPS equipment) and network technique(e.g., cab reservation through Uber in USA or DIDI in China), taxi business is a typical electronic commerce mode. For a long time, taxi service is facing a typical challenge, i.e., passengers may be detours overcharged by some unethical taxi drivers, especially when traveling in unfamiliar cities. As a result, it is important to detect taxi drivers' misbehaviour through taxi's GPS big data analysis in a real-tome manner for enhancing the quality of taxi services. In view of this challenge, an online anomalous trajectory detection method, named OnATrade (pronounçed 'on a trade' , which means activities in a taxi trade on the fly), is investigated in this paper for improving taxi service using GPS big data. The Method mainly consists of two steps: route recommendation and online detection. In the first step, route candidates are generated by using a route recommendation algorithm. In the second step , an online anomalous trajectory detection approach is presented to find taxis that have driving anomalies. Experiments evaluate the validity of our method on large-scale, real world taxi GPS trajectories. Finally, several value-added applications benefiting from big data analysis over taxi's GPS datasets are discussed for potential commercial applications.

3. Wireless monitoring and tracking system for vehicles by A.J. FernándezAres, A.M. Mora, S.M. Odeh, P. GarcíaSánchez, M.G. Arenas , Journal / 2016

This paper describes the application of a Wireless Traffic Monitoring and Tracking System in the Spanish city of Granada, as an approach for addressing important tasks in the field of Smart Traffic. To this end, several nodes of the so-called MOBYWIT system have been developed at important urban points. They collect real-time vehicles' movement information based on Bluetooth signals detection. The gathered data have been processed in several ways,

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showing some of the applications that the system has, such as the composition of Origin/Destination matrices, the computation of accurate displacement times. The traffic flow monitoring, analysis and prediction, which could be used as a part of an intelligent transportation system.

4. **Architecture and Implementation of Real Time Vehicle Tracking System Using Wireless, Sensor Devices and Google Maps API by Syed Khizar Ahmed, Kiran Kumar Sreenivasiah, S. M. Ahmed, Shiva Kumar A, Journal / 2012**

The integration of different technologies potentially provides support to wide variety of applications and systems with vastly varying requirements and characteristics. Vehicle tracking system is one of such applications possible by embedding wireless sensor devices on the vehicles. In these systems, the device installed in the vehicle can transmit the location information, speed of the vehicle at that particular instance, total kilometer run of the vehicle, ignition status, battery status and many other custom parameters in real time to a remote data centre using SDCP protocol. In this paper, we present the design and implementation of a real time VTS that incorporates a hardware device installed in the vehicle and a remote data center with tracking server and a web application with Google Maps API to depict the trail of the vehicle.

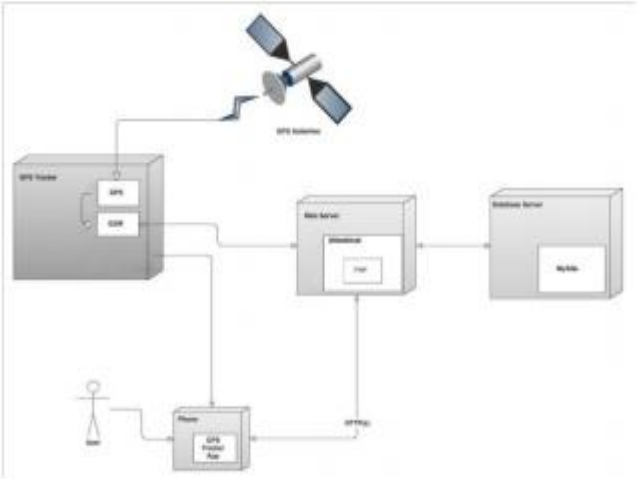
III. PROPOSED MODEL

We devised an android application to find out to the location of the college bus. So, initially, our application determines the student's location using the GPS system by tracking the student's Smartphone. Within the 5km radius, from the position of the student ,our application finds out the available bus stops. Using the Shortest Path Algorithm, the algorithm which considers the Student's Location as the source node and the available bus stops as the destination nodes. This algorithm is applied to find out, the one destination node, which is closest to the source node, finally results in finding the nearest bus stop. The Shortest Path Algorithm finds out the nearest bus stop from the Student's Location, using an optimum Calculation. After the student reaches the bus stop, it then finds out the buses approaching the respective bus stop, and our application constantly updates the student with the dynamic location of the buses.

The changing Latitude and Longitude of the buses is stored in the Database, which we created at the back end. The information from the Database is linked to our devised application using the MYSQL Language. Therefore, as the values of the location of each and every bus in the Database gets updated, it is being exposed in our application, to the respective students constantly. How our application tracks the buses, is by keeping the GPS Devices in each and every bus, which is to be tracked. Therefore, our Android Application tracks the GPS devices fitted inside the bus, and constantly, shows the location of the bus in Google Maps API, which is utilized in our application.

If a Student prefers to board a particular bus, our application, provides a facility, i.e., if a student manually, types a bus number, our application will eventually shows the location of that particular bus, based on user's needs.

A. System Architecture



B. Modules

1. GPS Devices

These devices are being utilized in our project, which is used to track the bus. Initially, these devices are fitted in each and every college bus, so if the device is switched on, when the bus starts, our application constantly tracks the bus, from source to destination.

2. Android Studio

An Android Studio is the basic platform to create an Android Application. In our Project , we utilized Android Studio to create the GUI of our application, and also initialized some JAVA code, to determine the Student's current location. And also with the help of Android Studio, we created the Login Page, and the registration Page, so that only authorized Person can utilize our application.

3. MYSQL

The Language used to link the Database to our Application. Using the MYSQL Language, it is possible to show the dynamic location of the respective buses, in our application. And also, MYSQL verifies the authentication of each and every student who uses our application.

4. Database Server

The Database does the Back-end work and storage in the implementation of our application. Database stores the changing latitude and longitudinal locations of each and every bus and transfers these locations to the front-end application, which we devised using the Android Studio, using the SQL queries.

IV. RESULTS

The Proposed System, has been successfully designed, and is approved as one of the best projects in our college, and here are some of the snapshots, as an evidence of our implementation.

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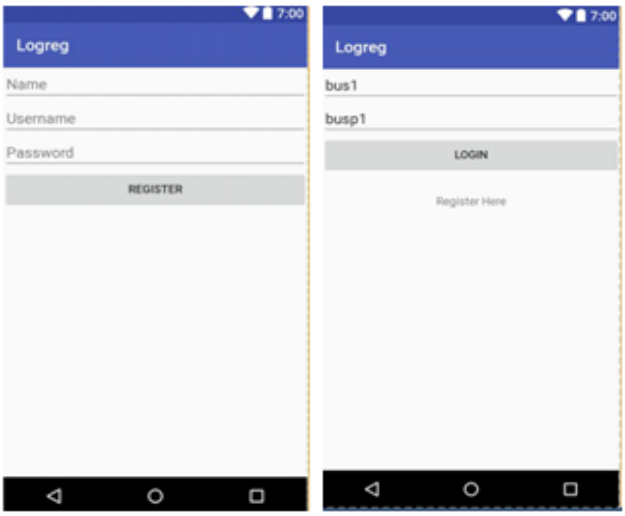
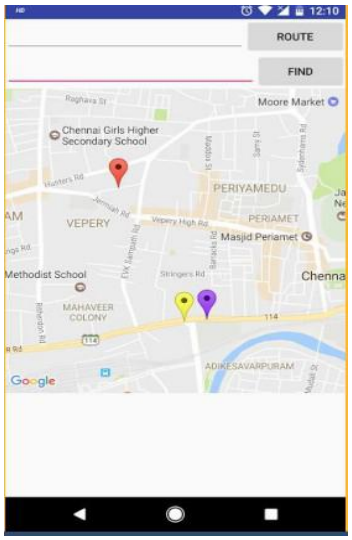


This is the Login and the Registration Page. If a person needs to access our application, he/she needs to successfully complete the Login or the Registration page.

This is the page which appears on our application, as soon as a student completes the Login Page.



This page comes as an output page, which determines, the Student's Location, as well as the Buses' Location, approaching the Student. Here, the red marker indicates the Student's Location and the Other Markers indicates the Buses' location.

V. CONCLUSION AND FUTURE WORK

This Project is an attempt to simplify tracking concept as a whole and provide hassle free bus tracking experience for students. The application would make students, catch their buses easier and would also help them to make the process of finding their buses through a mobile application. A future enhancement to this project would be provide navigation to the students to reach his nearby bus stops. As of now we implemented our Proposed model successfully, but we have planned to add Navigation, which apart from showing nearest bus stop, but also navigates the student to reach his respective bus stop.

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