



COLLEGE BUS TRACKING SYSTEM (TRAVELINE)

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Abstract: In a world filled with busy schedules it becomes almost certain that a person is not able to keep up with his commitments on time due to a number of reasons. One of the main reasons being the inability to commute on time, i.e. we might be late to catch the vehicle or the vehicle might be delayed due to traffic, roadblock or a breakdown. Due to this very reason a lot of work is left unfinished and considerable amount of valuable time is lost. In this work we address this very problem which is quite prominent in institution, due to which a lot of teachers and students are unable to arrive in time and proceed with their classes. This prompted us to come up with an application that allows us to track all of the busses in institution, providing an alternate bus, along with the shortest route from the user to the bus and also informing the student or faculty when the bus is missed.

Keywords: Current Location, track, maps, firebase.

I. INTRODUCTION

One of the most essential commodities possessed by man is time. Be it any endeavour, it is important to complete it in the stipulated time, ranging from tasks like, keeping up with some appointment or meeting a deadline to just watching a movie, time is of the essence. But that might not be quite as easy, due to the present day traffic, busy schedules and unforeseen events. Navigation is also a key aspect of reaching to one's destination in time, be it any mode of commute it is important for the user to know its current location, which is his/her right. Therefore we have developed an Android Application that allows the students and faculty of institution to reach in time, by tracking the current location of the college bus. But there could be a number of reasons that might hinder this vital task. Firstly, when one is travelling it is essential to get the current location of the bus, its time of arrival and details regarding it. Secondly, when there is a new user from elsewhere unaware of the locality or an existing user has changed his address he/she this might lead to difficulties in finding the bus despite the location being shown. Thirdly, the user might have an unfinished task that he/she wants to do but is unsure whether to proceed with it or not as he/she doesn't know where exactly the bus is.

Application *traveline* is an user friendly^[2] solution to all these problems. It provides the user with all the details of the busses in institution, like the bus number, driver name, driver number, along with the current location of the bus and the user. In addition to that it provides the shortest route between the user and the bus and reduces the overload of the stakeholders of computing the route from some other applications. It even provides a great deal of flexibility to the stakeholders, which enables them to carry out their chores flawlessly.

II. LITERATURE SURVEY

In this work^[4] everyday life, many passengers will be affected by the movement of the bus by different unsure conditions so instead of using an alternate transportation a message showing the arrival time of the bus will help the passengers to reduce their stress. A real time trance bus tracking system can help to solve this problem by providing opportunity to track the bus location in real time and use the information for future predictions of bus arrivals at the stops along the entire route. When this information is shared with passengers they can spend their time efficiently and reach the bus stop before the bus arrives or can take the alternative bus if they are delayed.

According to Sameer Darekar^[5] maintaining all the vehicles is very hectic job so we need a system which could maintain all the important details so that we can provide the live location of each vehicle and finding their path and also by determining the current speed through GPS system. In the GPS system user segment consists of radio navigation receiver, decode and process the GPS satellite. GPS receiver calculates positions by timing signals sent by the GPS satellite. The receiver uses the message to determine the transit time and to compute the distance of every satellite.

In public transportation buses might be delayed due to a number of reasons as quite aptly pointed out in^[3], as a result passenger would have to wait for a long time without knowing when bus would arrive or had left so taking into account all these problems. This system provides all the necessary details regarding arrival, departure, its location and expected waiting time. The location of the bus is determined using GPS and then this information is transmitted. Once the location data along with the other custom data is collected and a wireless communication system is used for transmission.

Many students in the college does not have complete information regarding the buses in order to solve this problem information such as bus name, timing of the bus, destination, entire route of the bus, current location and providing the arrival time at each stop is presented to the students. This application uses the GPS function which is mostly available in all smart phones when needed the co-ordinates are sent to the server and SMS alerts are sent to the students who all have registered onto this application.^[6]

III. PROPOSED SYSTEM

The below diagram depicts the architecture of our proposed system, wherein the user has to first register onto Application. The user information is then stored in the database.

Following which the user is allowed to request for the location of the bus, which is retrieved from the bus driver's phone and mounted on the map in the user's phone.

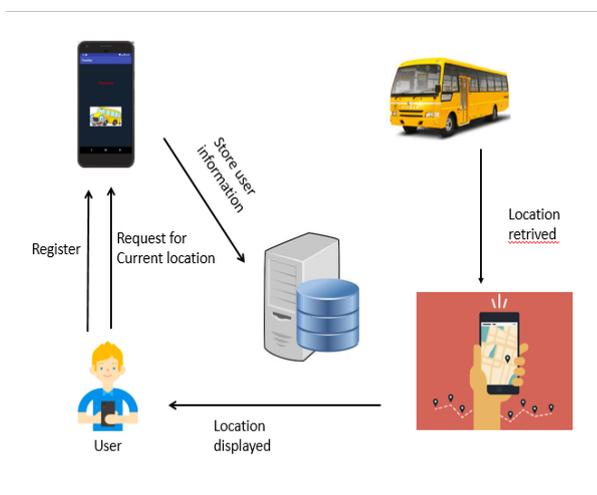


Fig 1: Block diagram of Traveline

Application is divided into two parts i.e., one for the user and one for the driver. The driver's application enables the user to select the bus which he is driving. On selecting the bus the current location of the driver is sent in form of latitude and longitude and stored into database that is firebase.

The user's application is the one that is used by everyone, on opening. It presents the user with a splash screen that lasts for 3 seconds. Following which a screen appears that asks the user to enter the phone number. Once the phone number is entered for the first time a one time password (OTP) is sent for verification and a registration form appears for student and faculty wherein all the details like the name, branch, and bus number are entered with validation^[1] and stored in the database and a home screen appears. For the second time onwards when the user enters the phone number and the number is already found in the database the registration process is skipped and the user is redirected to the home page. In the home page the user is presented with the details of all the busses. On clicking a bus number a map opens and the location corresponding to that bus number is fetched from the database at an interval of 5 seconds and mounted on the map using a marker. On clicking the marker, the shortest path between the user's current location and the bus is plotted on the map.

Application is developed in Android Studio version 3.0.1^[7] using Java as the programming language with xml being responsible for designing of the interfaces, this comprises of the front end. The front end consists of multiple activities each activity consisting of a java file and it's corresponding xml file. The latter consisting of all the components in that particular screen and the former being responsible for the code that adds functionality to the components and provides interactions if any.

The front end even needs to be induced with the appropriate (Software Development Kit) SDK's to match with the device (Application Programming Interface) API's, necessary plug-ins, and dependencies if any external reference is provided.

The back end consists of *firebase* which includes authentication, database (real time), storage, crash reports, whose dependencies are to be loaded into the Android Studio. It provides complete details of application and analytics regarding it, like the daily and monthly active users, the change in them is also represented along with the number of crashes.

IV. RESULT AND DISCUSSION

We were able to obtain the results for the objectives that were set. An interface is developed for the driver that sends the current latitude and longitude to database i.e., firebase. The student's application that is developed fetches those coordinates from the database and mounts them on a map.

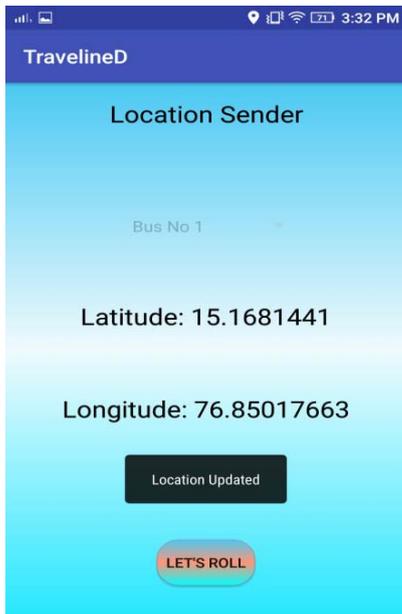


Fig 2: Snapshot of the driver's application

The above snapshot is of the drivers interface wherein the latitude, longitude are being updated for every 5 sec and sent to the database.

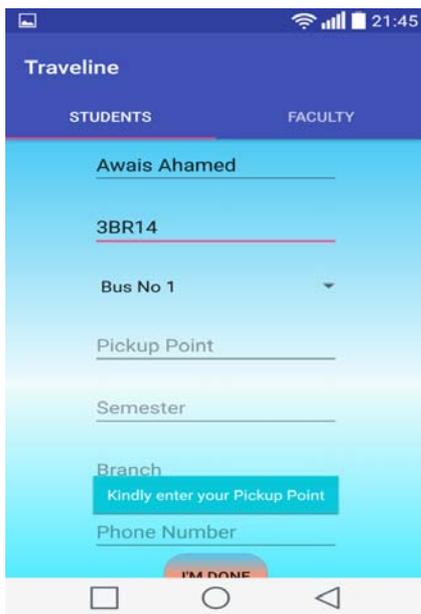


Fig 3: Snapshot of the registration form

The above snapshot consists of the registration form that is presented to the user, be it faculty or students;

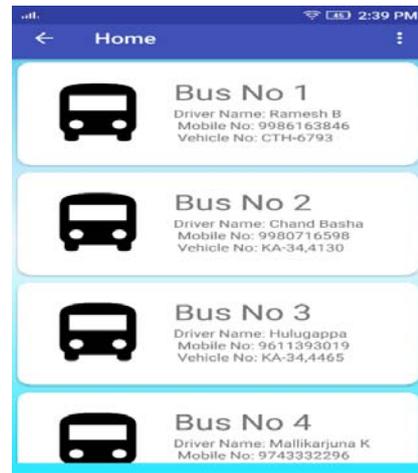


Fig 3: Snapshot of the home screen of the main application

The above snapshot is of home screen which provides the user to select the bus no. to know its location.

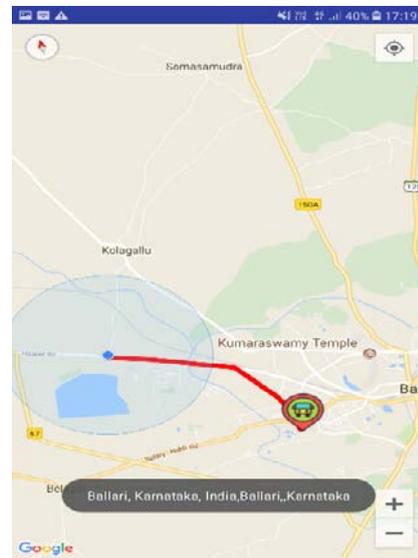


Fig 4: Snapshot of the current location of the user and bus with route

The above snapshot is of the current location of the bus along with the users current location, and a route between the two is plotted when the user clicks on the bus marker also displaying the physical address of the bus.

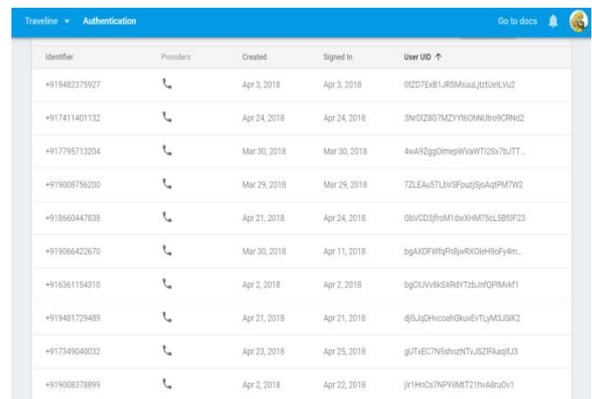


Fig 5: Snapshot of the firebase authentication.

The snapshot consists of a list of the users registered onto application using their mobile numbers.

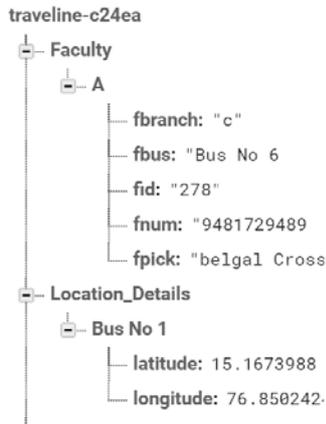


Fig 6: Snapshot of the firebase database

The above snapshot consists of the data entered into database using the registration form or even the driver's application.

V. CONCLUSION

The proposed system is successfully designed, implemented and tested and the following conclusions are made. It enables the user to catch the bus on time, provides an alternate bus and the shortest route till the bus. Also keeping track of the number of students registered and the current location of the bus at regular time intervals. It is better in terms of other applications as it does not use any hardware, It enables the driver to select which bus he is driving, the technique used is unique. The following additions can be made to the project,

This application can be used in the transport system of any institutions, industries, companies to know the current status of the buses. It can also be used to keep track of number of students and faculty registered and travelling by bus. It can be extended to provide the management a control centre in order to monitor the status of the bus and also provide an aid to the management in case of emergency.

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