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Route Application Technology Using GPS System

Kasthuri Priya R[1], Niranjana P [2] , Saida A [3],Prof. C. Balamurugan[4]
[1](Department of Computer Science and Engineering/Adhiyamaan College Of Engineering, India)
[2](Department of Computer Science and Engineering/Adhiyamaan College Of Engineering, India)
[3](Department of Computer Science and Engineering/Adhiyamaan College Of Engineering, India)
[4] (Assistant professor, Department of Computer Science and Engineering/Adhiyamaan College Of Engineering, India)
Corresponding Author: Kasthuri Priya R

Abstract: *In most cases, people have a chance to miss their bus timings and there be a possibility of missing the reporting time to their institution. We here aim to overcome this problem by providing an application for the institution and its students. This can be done using the major technologies like navigation and easy to use interface application. The above problem can be overcome by using a software application. The proposed system provides the administrator access of both the end-user and driver application to the institution. When the student starts to track his/her bus location there would be a result of the navigation page of each bus and meanwhile, the concerned driver would access the application on his journey. Further, we add the facility to calculate the timing remaining for the driver to reach the destination when he comes to know that a particular student is late to his/her bus stage. This is done through programming inside the application facilitating the accurate journey timing. This system thus provides a good workflow process between the institution and students avoiding the misconception of transport facility provided. The entire system works over the internet.*
Keyword*: Navigation, GPS, Bus stage, driver, institution*

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I. Introduction

In the past era, digitalization not being a common one and all the operations being showcasing manual implementations alone. Later we could find a rapid usage of the internet and technology everywhere. We find the use of the internet in every sector and people slowly change their practices of handling things from manual to technical. Though decades have passed, people are more concern about their children safe when they pursue their education in institutions and in concerning that education organizations provide transport facility to each student to their respective location. Although it satisfies the user convenience their lies few drawbacks in this service.

There is a chance to occur a lot of misconceptions when it comes timing of boarding and departing. This problem arises due to a lack of communication. People can't always be in person for an inquiry. So we have designed a solution for this most needed problem solution. Our "RAT locator" gives an accurate location to each student and meet their every requirement. This system also provides a convenient way for the student to place a complaint on the driver on his irregularity and get a quick response. This promotes the organization to have a disciplined transport system. At last, we developed a facility for the student to mention his/her delay in arrival to the bus stage, further the inbuilt program will help them with confirming whether the bus will be available for them or not. This is much helpful for the driver to be aware of no of the students on the bus on that particular day.

II. Literature Survey

Author [1] has a point of view that the existing system in the current scenario has although satisfied with the end-users, there is a lag in existing applications when it comes to the usage of it and understanding the user-interface. Due to which users have difficulty in finding the aid for their queries in the existing applications. Currently used application had been developed in the motive to give good communication among the parents and schools/colleges. [2]In considering the above cons we are going to implement an advanced system. In our system, we develop the complaint filling facility and finding the time in case of any delay of the student which will be helpful for the institution to develop their transport system. [4]

III. Related Work

Many apps have been developed this navigation purposes and adding other features focusing on tracking and locating the individual, few of them are;

- Buswhere.
- Treker.
- Here Comes The Bus.
- Tripspark Education.
- Ubica Bus.
- Citymapper
- Here we go
- Waze

And other navigation apps be like, Googlemaps, Sygic, Komoot

IV. Methodology

We designed a solution for this most needed problem, our "RAT Locator" will suggest an aid to users in providing the location of the bus. We have used reliable modules such as login form, registration form for new users, bus list for individual students and their bus stages, and navigations pages and all these are connected with firebase working in the backend for storage purpose and the front-end is designed with Android Studio.

[6]This application can bring a change desperately as greater aid in terms of usage and user-friendly interface. In our system, we use the Global Positioning System (GPS). Our major part of development be designing and it is done on Android Studio and a few other editing tools for content in the application. Due to the high accuracy of the satellite, we find it easy for the users to locate their buses easier and to avoid delay with our user-friendly application.

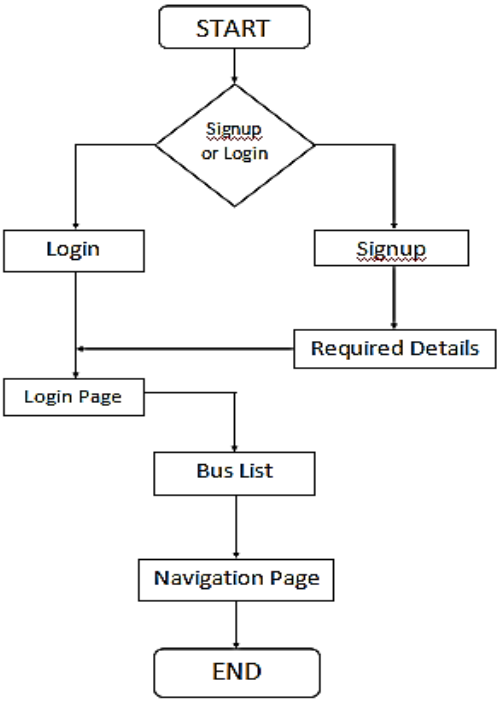

Fig.1 Flowchart of application start and working

Initially, the application starts with the appealing interface to the student, asking them to login if they already have the account or else the new student should register with their details like name, email-id, password, and their phone number and add an image for their account as identification for each student. The email-id and password be the credentials of the students for authentication purposes, and which is completely accessible and monitored by the admin of the transport office alone. Later the users are led to choose their respective bus number and his/her bus stage and find their navigation. According to the context, it is clear that both the student as well as the driver would see the same navigation page at the same time, where synchronization of map updates take place at regular intervals. Meanwhile, users (students) have the facility to file a complaint about the driver or particular journey, and also to write feedback about the transportation, which helps the institution to

work for the well-powered transportation system. On the other side, the driver has the facility of multi-language option in case if he is considered to be low-educated. Adding to these there would be an option for password recovery which is to send us an e-mail link to the user when he/she forgets the password.

After these navigations in the application the students would have another option of knowing the arrival of their bus timings and as an enhanced facility they could mention their delayed timing if any, and driver be notified about that and our in-built program would calculate the time difference for the driver stating that whether to wait for person or to send notification for them as "we would not be able to reach at that particular time". This can useful for the student to decide their timing for the bus stage meanwhile driver would be aware of the students who boarded the buses.

V. System Design

The solution implementation process is done with – software

5.1 GPS

The **Global Positioning System** (**GPS**), originally **NAVSTAR GPS**, is a satellite-based radio navigation system The GPS does not require the user to transmit any data, and it operates independently of any telephonic or internet reception, though these technologies can enhance the usefulness of the GPS positioning information The GPS concept is based on time and the known position of GPS specialized satellites. The satellites carry very stable atomic clocks that are synchronized with one another and with the ground clocks. Any drift from true time maintained on the ground is corrected daily. In the same manner, the satellite locations are known with great precision. GPS receivers have clocks as well, but they are less stable and less precise.

[9] Each GPS satellite continuously transmits a radio signal containing the current time and data about its position. Since the speed of radio waves is constant and independent of the satellite speed, the time delay between when the satellite transmits a signal and the receiver receives it is proportional to the distance from the satellite to the receiver. A GPS receiver monitors multiple satellites and solves equations to determine the precise position of the receiver and its deviation from true time. At a minimum, four satellites must be because of the receiver for it to compute four unknown quantities (three position coordinates and clock deviation from satellite time).

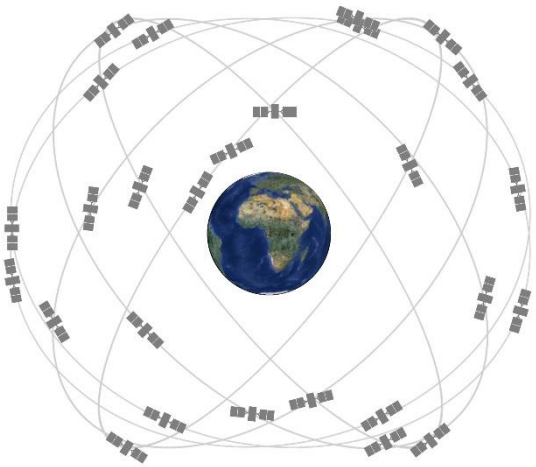

Fig.2 GPS Constellations

5.2 Android Studio

Android studio is a platform to develop android applications in a certain way that it can be designed by the user's specification. It consists of a drag and drop solution to develop applications. Whenever the user develops the application the XML code will be automatically generates and the optimization of the programming code will be based upon the JavaScript. The certain conditions like button and other specifications can be optimized through the Java code.

5.3 Driver Application

In order to have clear clarity and to avoid confusions we have made an interface to the driver which is similar to the student in its design as well as working process.

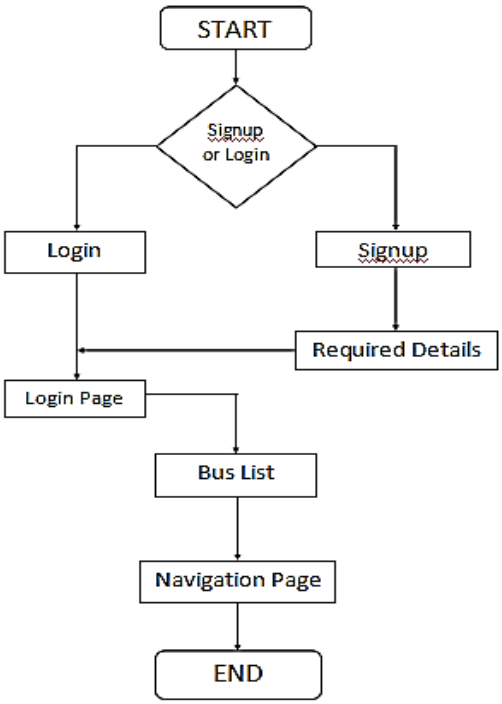

Fig.3 Flowchart for driver application

Since the working flow for both the driver and student application follows the same, we represent the flow diagram as together one, but both the Apk's follow different login procedure based on user (driver) credentials for their working procedure.

5.4 App Screenshot

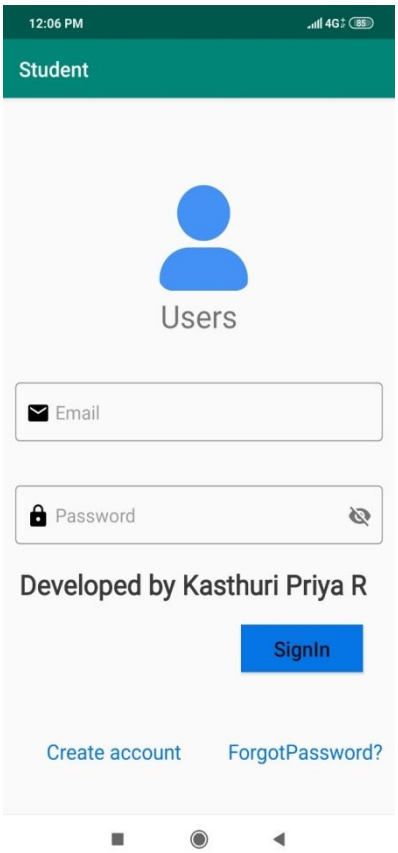

Fig.4. Student login page

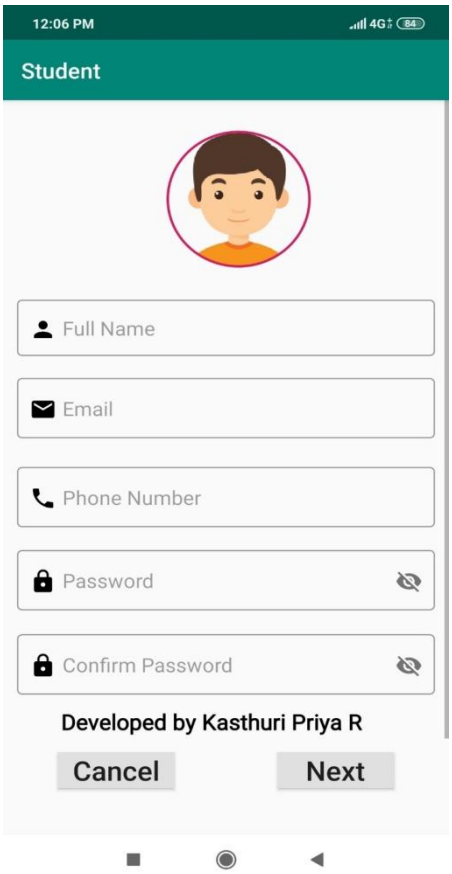

Fig.5. New user registration page.

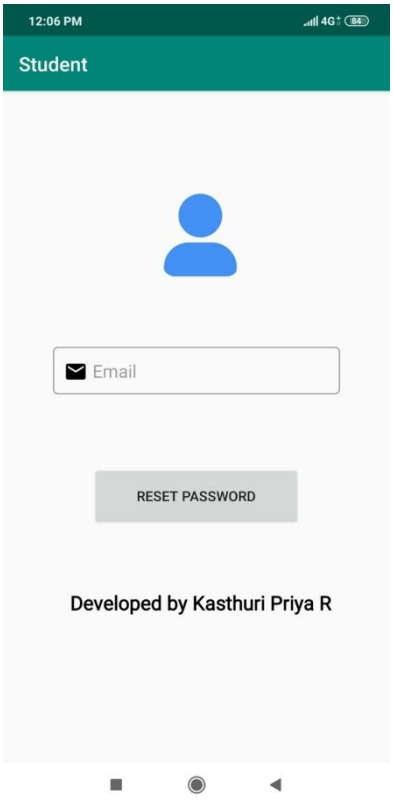

Fig.6. Password Recovery or reset page.

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VI. Conclusion

Our solution design makes this problem statement simple providing for each student ensuring to meet their requirements and providing a good transport system on behalf of the institution. We had overcome many testing's to make sure that whether the student reaches the destination correctly or not. At the starting, our approach is based upon by considering the existing system for the navigational system. It does not have high accuracy as well as it fails to meet user understandings. For concerning an institution, our system aimed to maintain a highly accurate application that promotes finer way of running a transportation system, and it ensures the true location data for sharing to others.

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