International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 07 Issue: 04 | Apr 2020 www.irjet.net p-ISSN: 2395-0072

Bus Arrival Notification System

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Abstract - With the growing number of school buses, the parents are willing to know the exact time of bus arrival at their respective bus stops. There can be many reasons for the delay in the bus arrival such as vehicle congestion, accident, bus failure, etc. This project provides a common platform to the parents and school/college authorities, to better ensure students well-being.

Keywords - Notification system, real-time navigation, android application, web application.

I. Introduction

In the growing and evolving environment the time is very precious and you cannot compromise with it. School or college students cannot miss their bus or even cannot afford to be late as it is the crucial time for their studies. During exam days, reaching late in the school may create a situation of panic.

Most of the schools now-a-days have a pick and drop system and this has made it necessary to establish some connection between the school authorities and the parents in order to ensure student's security and safety. For this reason, monitoring school bus location online is the most demanding application for parents.

With this project, we wish to create a connection between the parents and the school or college authorities, which could better ensure the student's security and peace of mind to every parent.

We propose a GPS based school bus tracking and auto notification system, about the stoppage and arrival at particular drop point to selective list of users or parents. With this we can get the real time monitoring of the school bus along with the bus route. Apart from this, in case of any emergency, the driver of the bus could notify the reason for the delay.

The school or college authorities would enter the student data. The student's UID, assigned to him from the school authorities, would be used as the login ID in their parent's application. This will make the application access simple as well as limited.

II. Architecture

The Bus Arrival Notification System mainly has three important actors namely - Admin, Driver, and User. The Admin enters the Student data through the web interface and stores it for further use. This data is stored in the Firebase Database.

This database is referred by the other modules for tasks like data validation, and location reference, etc. The login ID of the user and the Drivers is their UID, which is entered by the admin during the data entry. Whenever a request is generated from the user or the driver application, the login ID is fetched from the user of the app and is validated with the database. If any entry exists with the entered ID, the request is approved else the user is denied permission.

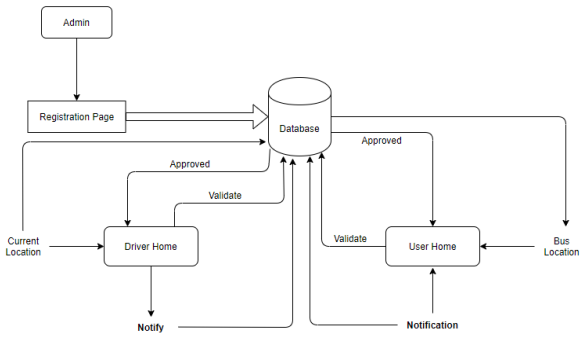


Fig. Architectural diagram

The Current location of the bus is updated into the database. Once the user (Parent) logs into the User Application, the map displaying bus route of the concerned bus along with its current location is displayed on their screen.

In case of Emergency, the driver can notify the parents of the delay and the reason behind this delay. The User can see this notification on their application. These notifications are also sent through the main (firebase) database.

III. Components

The system is composed of three major parts: The Driver Interface, The User Interface and The Web Interface. These modules are interlinked by the Firebase Database.

3.1 The Web Interface - The Web Interface will be used by the school authorities to enter all the details of each and every students who are going to access the bus facility. These details may include the student name, parents' name, parents contact number, address, bus stop, and most importantly, the UID of the student. This UID would be further used as the login id by the parents. The Web interface is made using the CSS and JavaScript framework.

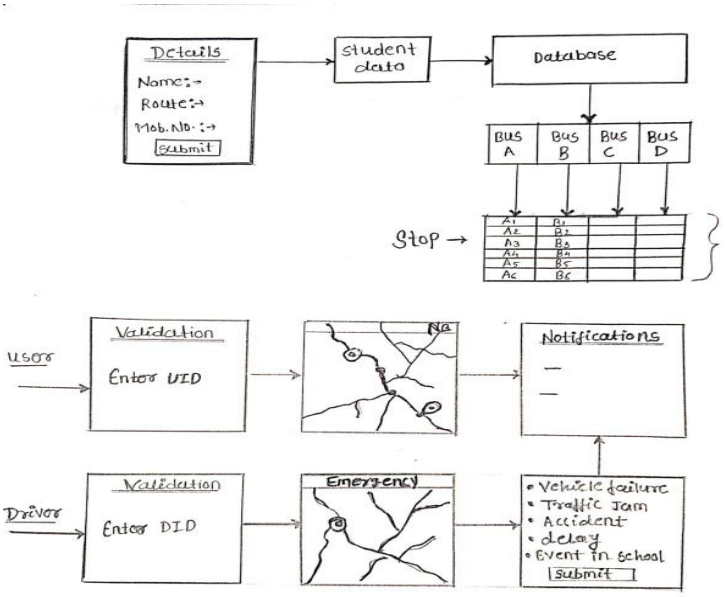
The web data would be ultimately saved into the firebase database. This data would be further sorted based on the bus stop, bus route and other bus related details. And this sorted data will be referred from the application.

3.2 The Driver Interface - The Driver Interface is nothing but an android application, which will catch the current location of the bus and this location will be further referred through the User Application. The Driver Application will refer the firebase database, which contains the data entered from the Web Interface. This module will refer the data by sorting it, based on the bus route (Final Destination of the bus) or the bus number of the concerned students. All the students travelling through that particular route, to which the bus is associated, are grouped together. The Driver App will have a 'Notify' option, which the driver can use to alert the parents in case of any emergency circumstances.

3.3 The User Interface - The User Interface is also an Android Application, which will show the current location of the student's bus as well as the route that the bus is supposed to follow, to the concerned parents. The parents can get the emergency alerts from the driver on the Notification window of the User App. This module will refer to the data which will be sorted based on the bus stop that the student arrives at.

IV. Implementation

The system has a huge data which needs to be sorted according to the requirement. The Drivers application accesses data by sorting it based on the respective student's bus stops. Similarly, the user application accesses data by sorting it based on the bus number. Following is the snapshot of the overall process. The figure very clearly depicts how the data is sorted before getting actually used by the respective modules. The figure also shows the view of the proposed modules and their interconnection which plays a very crucial role in the entire process.



V. Conclusion

This project provides a common platform to the parents and school/college authorities, with which they could easily keep a track of the students and also get notified in case of any emergency or delay. The web and android application are simple and easy to use. From this we can conclude that this project can be used by the school/college authorities and the parents to ensure students security.

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