College Bus Locator And Tracker (CBLT)

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Abstract: Most of the institutions provide transportation facilities to the students and the staff members which is safe and time saving. Due to some practical issues, sometimes there may be a delay or rearrangement in the transportation facilities. This paper discusses one possible solution, a mobile application, College Bus Locator and Tracker (CBLT). This mobile app is built exclusively for the students of Sri Sairam Institutions to live-track their route buses using GPS technology. The information provided through the CBLT application will be secured as the private data can be accessed only by the users authorized by the respective organization. This application will also provide instant notifications to the users on the arrival time of the bus to their respective bus stops helping them to plan their travel time.

Key Words : GPS Technology , Mobile Application

I. Introduction:

Mobile and Technology is inevitable in our day-to-day life andin this dynamic world a life without these tools is unimaginable. This is because these tools, when put together, help in making our daily tasks easier. Information is meant to be shared, as it is a key factor that helps in providing more efficient services to every individual. The SDG Goal - 9 targets in increasing the access to information and communication and strives to provide universal and affordable access to the internet in the least developed countries by 2020. So the main aim of this work is to provide affordable information access to all possible users and to make use of all available resources to provide services that would make our lives easier.

Hence this proposed solution will be useful in

providing better transportation services to the students and to make use of the available resources to provide better services. This CBLT is an android application that targets in solving theissues and difficulties related to the transportation services of an organization and in addition to it, this application also targets on the proportion of the population covered by the technology and mobile network who will access these serviceswhich will be helpful in achieving the SDG target 9.c. The technologies used in this work are simple, affordable and easy to access which ensures an effective usage of this application. So the proposed system

targets the effective usage of the available resources to provide quality services and secure access to the available information.

1. Literature Survey:

[1] The authors have developed a bus tracking system where the current location (latitude and longitude) of the college bus with the information from the students through their CBU application using client-server technology. The drawback of this application is that the CBU consists of two separate applications of "CBU user app" and "CBU driver app. Also, the authentication part is very cumbersome. These drawbacks are to be overcome in this work where a single application with sufficient authentication is implemented.

[2] In this paper, a bus tracking system is used with inputs from the inbuilt GPS in an Android phone. But the drawback is that the position of the bus is given in the form of latitude

and longitude which is pretty difficult for a layman to understand.

[3] This paper proposes a live tracking system where the bus conductor or driver will be providing the application with the proposed for general public transport which makes the implementation very cumbersome. The proposed work is for a constricted environment where the availability of the data is promised and implementation can be tested and verified. In [4] the authors have built a smart school bus system which is both web based and mobile app based software. It stores the information about the students, routes in encrypted format and helps the students and the parents to track the bus. A similar system is proposed by authors in [5]where the parents will be notified minutes before the bus arrives at their pickup point. Also, there is an additional mechanism for the parents to inform the school authorities about the absence of the kids. This is also a web based application and mobile application. The authors of [6] propose an IoT based approach to the school bus tracking system. The authors have proposed the use of RFID and GPS technologies which are connected to the remote server over WiFi using a microcontroller. The current location is tracked by GPS and each student is monitored using RFID while getting into and out of the bus.[7] discusses a hardware based approach for tracking the general transportation for a smart city. The authors have proposed the use of Artificial Neural Networks and Message Queuing Telemetry Transport Protocol to find the estimated arrival time to the bus stop. There is a centralized console for managing the transportation system. In [8] the authors have proposed a hardware based approach using GPS and GSM technologies and a microcontroller. The current location of the vehicle is tracked by GPS and communicated using the GSM mobile network. The authors of [9] have proposed a bluetooth technology based solution for finding the origin - destination and also the accurate measurement of travel times of the vehicles in the arterial roadways. The drawback of this work is that the monitoring units depend on the signals of the bluetooth enabled devices in the vehicles. But the authors state the privacy of the system as its advantage. Artificial Neural networks, normal distribution and a new bootstrap technique

necessary information. But the drawback of the work is that there is no substantial dataset that validates the working system. Also there are no other indications to prove that the system is actually working and has been put into use. This is

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is used by authors of [10] to estimate the probability of the vehicle being on time, ahead or behind the schedule.

2. Existing Method:

Although there are many existing systems that provides solution related to real-time bus tracking there are many drawbacks like, Usage of Hardware GPS Module for tracking which is not cost effective, Displaying the location as Latitude and Longitude coordinates which is quite difficult for the users to understand, Doesn't provide **Live-Tracking** of buses throughout the route instead locates the bus on the google maps, Doesn't update information about the available bus routes and another major drawback of these systems is that the data or information delivered by the application is open to all common people irrespective of the institution they belong to, which makes the application less secure to access as an institution's private data can be accessed by any unauthorized person and some other systems uses two different applications for sharing data which is difficult to manage.

3. Proposed Method:

Inorder to overcome the limitations of the existing system the authors propose a single mobile application **"College Bus Locator and Tracker"** is a single mobile application that is designed for Sri Sai Ram Institutions to make the bus tracking process easier and cost effective. CBLT allows the user to track their registered bus throughout the route and provides instant updates and notifications on the available bus routes everyday.
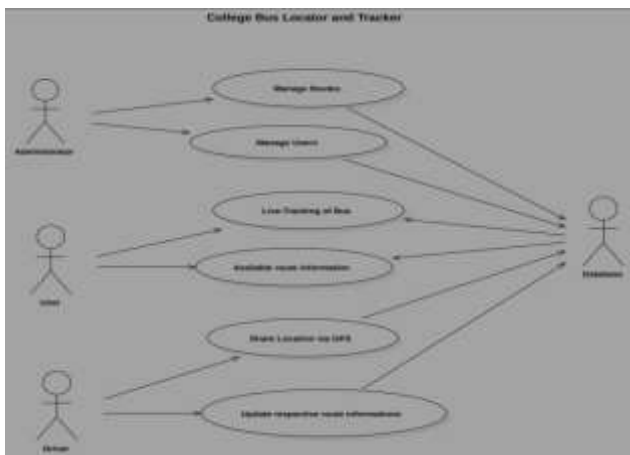

Figure 1: Use Case Diagram of CBLT

Figure 2: Architecture of CBLT

This application uses Firebase as its Real-Time database to store the data where the retrieval of information happens in no time. This application has four modules, namely

- Registration Module
- User Module
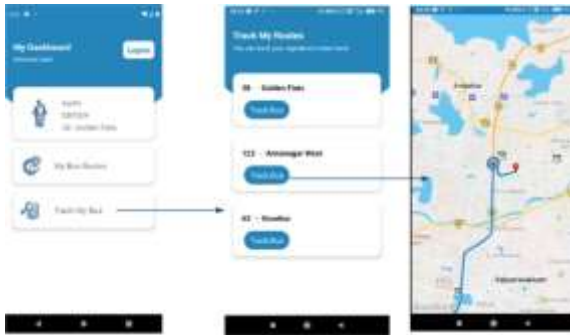- Administrator Module
- Driver Module

3.1 **Registration Module :**This module handles different registration activities which are done by the admin. (i.e) When an admin requests a new registration, the information about the registrant is verified by this module and categorized as User, Driver or Admin and then stored into the respective collections in the database. So, this categorized storage of information makes the retrieval process to happen at ease. Since the registrations are done by the administrator no unauthorized user or people outside the organization can access the private information.

3.2 **User Module :**This module provides an user interface for the authorized users to live-track and locate their registered bus routes and get instant notifications on the availability of their registered bus routes.

Figure 3: User Module login
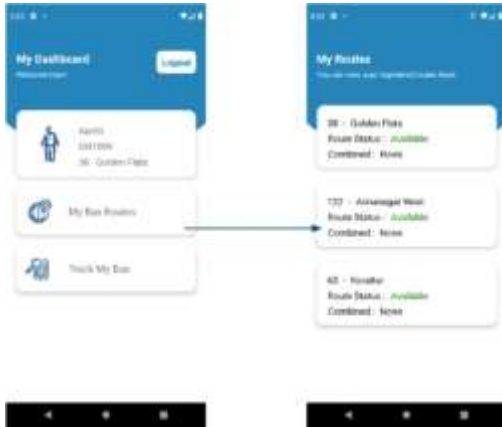
Figure 4: View Bus Status

Figure 5: Live Tracking

Figure 6: Live tracking snapshot

Figure 7 Live Tracking options

3.3 **Administrator Module :** Through this module administrators can login to their account and register new users or bus routes, edit an existing user details or bus routes and can delete or remove an existing user or a bus route according to their needs.
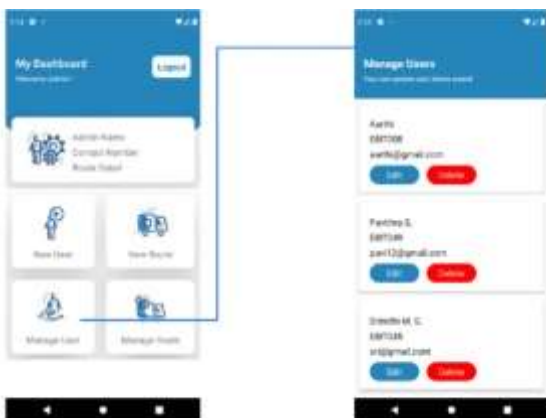
Figure 8: Admin Module Screenshot
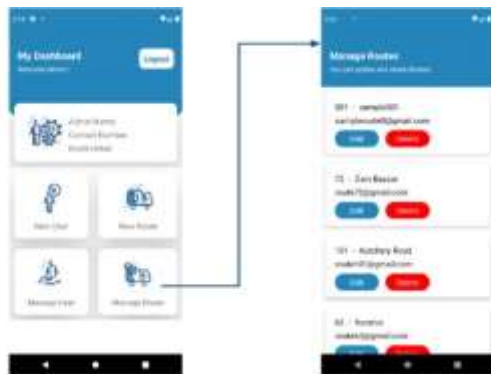

Figure 9: Manage Users
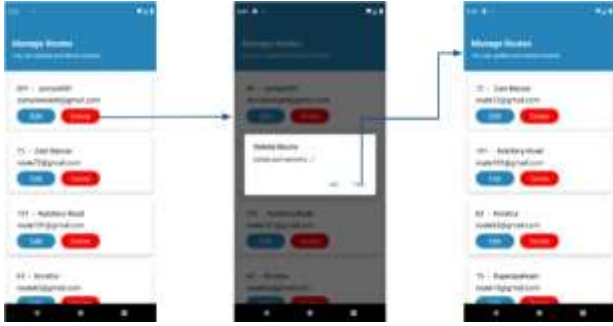
Figure 10: Edit Users
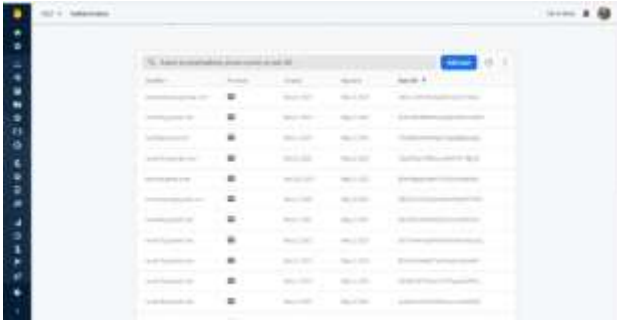

Figure 11: Delete Users

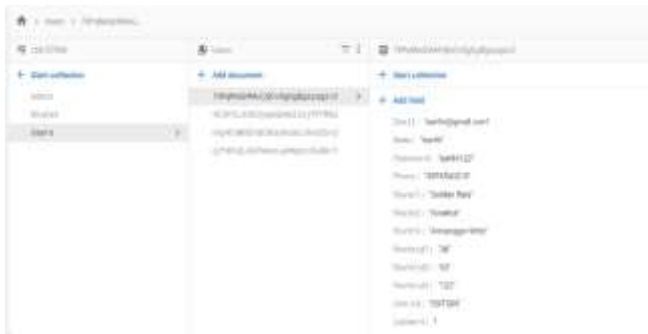**Figure 12: Manage Routes**

Figure 13: Route Activity

Figure 14: Delete Route Activity

Figure 15: Database Authentication

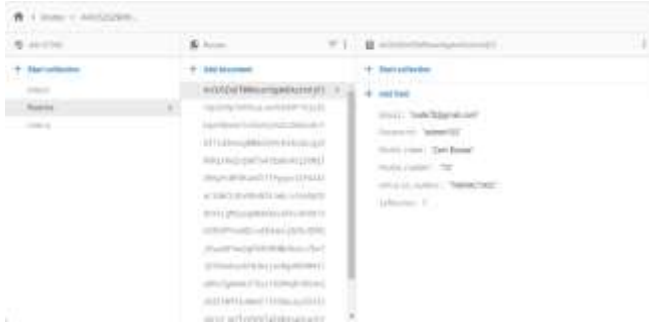**Figure 16: User Data storage in Database**

Figure 17: Route Storage in Database

Figure 18 a,b: Realtime location storage

Figure 19: Real Time Tracking - Database snapshot

3.4   **Driver Module :** Through this module the drivers can login to the route and share the live-location of the bus to the users and update information to the users related to their registered routes and combined routes. Since the route information is updated by the driver of the respective route buses, the work of the administrator is reduced and confusion while updating the information will be solved.

Figure 20: Driver Module

Figure 21: Update Route Status

Figure 22: Location Sharing

Figure 23: Instant Updates Reflection

4. Conclusion and Future Improvements:

This paper presents an idea of improvising the existing bus tracking system to provide more accurate secure informationto the users from Sri Sai Ram Institutions. In future the application can be upgraded to incorporate features like, intimating the drivers with the number of passengers waiting in the next boarding points, verifying and validating and updating the driver details (like Driving Licence , Id number.,

) constantly to the respective Transport incharge (Admin) to avoid violation against the transportation law. Further this application can be generalized, where any organization can create a login and update their route and user details to providethe best transportation service to their respective users.

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