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SMARTUS

Varsha Babu, Sandra Mariya M Anil, Neha P, Liya C George, Reshma K V
Dept. of CSE, Jyothi Engineering College Thrissur, Kerala, India
varshababu26@mail.com sandramariyamanil@gmail.com neeksha998@gmail.com liyageorge7890@gmail.com

***Abstract* – Smartus System is an android software, which helps people to travel in the bus in a safe and convenient manner. The software is designed in such a way that it helps for crowd detection within the bus and enables the user to take the bus when needed. It helps the owner to recognize the passenger count and thereby reduce corruption of the workers in the bus. It provides a bus booking mechanism for long distances and also facilitates to reduce the crime instances in the bus. That is, if the bus is met with an accident, then the corresponding statistics will be sent to the proprietors of the bus or the person can send the message to near- by control room. We can also rate the travelling experience through this and hence the owner of the bus can improve the quality of service provided to the passenger. This can increase the profit for owners and good travelling experience for the passengers. From the rush count, we can determine the peak hours, hence, more buses can be made available at those hours. This is also a small step towards the digital world, because the bus ticket and bus counting are all digitized. If travel is safe and good, then it provides a good experience. Here, the application is made in Android Studio using Java language. In addition, PHP language is used for the front end of software and the back end is designed using MySQL. Using this application, enhances improvements in passenger's travelling convenience and safety.**

***Keywords* – Android Studio, PHP, Java, MySQL, Xampp.**

I. INTRODUCTION

With millions of population in India, an efficient transportation is a great problem in today's world. Nowadays, people are more intended to use private vehicle than public transportation due to the unavailability of vehicles on time. This has increased pollution in the atmosphere. India, a land of diversity, people find it difficult to travel from one place to another. If the bus timings and details are updated, this problem can be solved. This is what SMARTUS focus on. SMARTUS provide details on bus timings and rush inside the bus. It provides the GPS route through which the bus travels. Hence, passenger will know about their travelling route and also realize them about the bus timing, i.e., when bus reaches your location and destined location.

For the project, we have understood the need of the source, destination details along with route details and real time location as an important aspect. The project aims with no need of the hardware and do with the software only [1].

The public transports generally takes large number of passengers than allowed. This may sometimes cause accidents and cause the peaceful travelling of the passenger. For this we can identify the peak hours and more number of buses can be assigned. This software applications informs subscribers about departure time of the bus terminal. It also mentions the real time location and time details of the bus. This system is made for consumer friendly service. It acknowledges people to be on time and the bus stop. This system make transportation a smart and easy convenience way that the public can travel.

With the help of this application we can get the details of subscribed passengers can estimate their travelling details and the passenger can estimate their total monthly travel expenditure. Since it provides proper details of bus and its timings passengers can plan their trip efficiently. Since the rush inside the bus can be estimated, pregnant ladies and disabled people can choose their buses and travel safely. This will notify about congestion and delays to have greater visibility on next stop of journey.

In our research study presented in this paper, as an initial step to designing of the proof-of-concept application, we developed an android application that can monitor the location of bus and measure bus's worker's performance while inside the bus. Subse- quently, based on the performance measure, our admin can im- prove their quality of service. The rest of the paper is organized as follows: In section 2 we present system design. Section 3 discuss the method carried out for the study. Section 4 presents the results obtained from the methods. Section 5 summarizes the contribution of the present study and its scope for future research.

II. SYSTEM DESIGN

The system is divided into basically 3 modules. They are: admin, driver and user modules. The whole information is taken from the database and is connected to the system

using retrofit. The starting page of the application is sown in Figure 1.

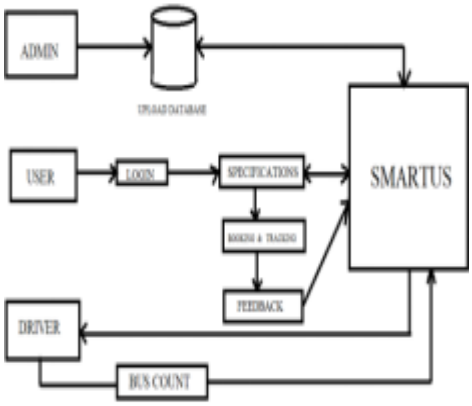

Fig.1 starting page of the application .

1. Admin Module

The admin module consists of login details, manage bus by adding the source and destination bus stops, giving the approval to drivers, view users, add and view payments, add the notifications of bus and feedback collection. The login sub module takes the details of the owners of the bus. If they do not have any login then hey can register it and hence can be logged in to the application. The privileges of an admin will only be given if the required details that prove it to them as admin, like RC book, vehicle number, etc. The next sub module is bus management gives the details of the vehicles owned by the admin and corresponding bus details.

The bus details include the vehicle number and related information of the vehicle. The next sub module in the admin module is to manage the source and destination stops. In this sub module, the admin needs to give the starting location and the main points of bus stops to indicate which part the bus takes and the final bus stop.

The corresponding route will be taken by different drivers. So, only the admin can approve which driver needs to drive in which direction. Hence, the next sub module of our admin module is the approval of the driver. The next two sub modules are interrelated, i.e., view users and payment sum and visualization. These two sub modules help the admin to check if there is any corruption done by the workers in the bus. Similarly, the next two modules are about notifications and feedback. That is, which stops the bus has now reached and what are the common comments of the travelers travelling in the bus. This helps in improving the services provided by the bus owners. The registered admin page will be shown to user as Figure 2.

bus will be traversed and sees whether there is any stop matching to the final destination. If not the alternate way will choose, that is to travel through two buses. If the source and destination stops are in different rows, we will look for a common stop in the rows and accordingly suggest to the customer and corresponding amount will also be suggested. The next three sub modules in the user module are the short distance details, notifications and feedback. The short distance travelers will also get to know the rush of the bus by setting the rush parameter to 1, for slightly rush parameter[4] [5] as 0.5 and no rush as 0. The notifications for the user gives the current location of the bus through the GPRS system [3]. Through GPRS, we will get to know the upcoming bus distance from the current location of the user through the GPRS vehicle tracking mechanism. This system provides you the timing details of the upcoming bus. Lastly, the feedback is taken from the user at the end of his travel. The common words that appeared in the messages will be summarized and sent to the admin. The below figures the user pages. The Figure 3-a shows the user login page, Figure 3-b shows the filling of source and destination page, Figure 3-c shows bus list, Figure 3-d shows user details filling page.

Fig.2 the user pages.

2. User Module

The user needs to do the registration before using this app. Also when the user registers it will be automatically recorded into the user table that contains details of the user. Now, next time when the user login, the username that is set in the user table will be traversed and looks up if the password which is entered is the same as recorded in the user table. If it is not then the user is not allowed to login. If the user forgets the password an OTP will be send to his email. This is done by the first two modules shown in the Fig.2 Next two modules help the users to view the details of the bus and the payments. The user will send the requests for the source bus stop and the final destination bus stop. As already the admin had given the

routes of the bus and the relative time where they reach. So, when inserting the source bus stop, the table of the

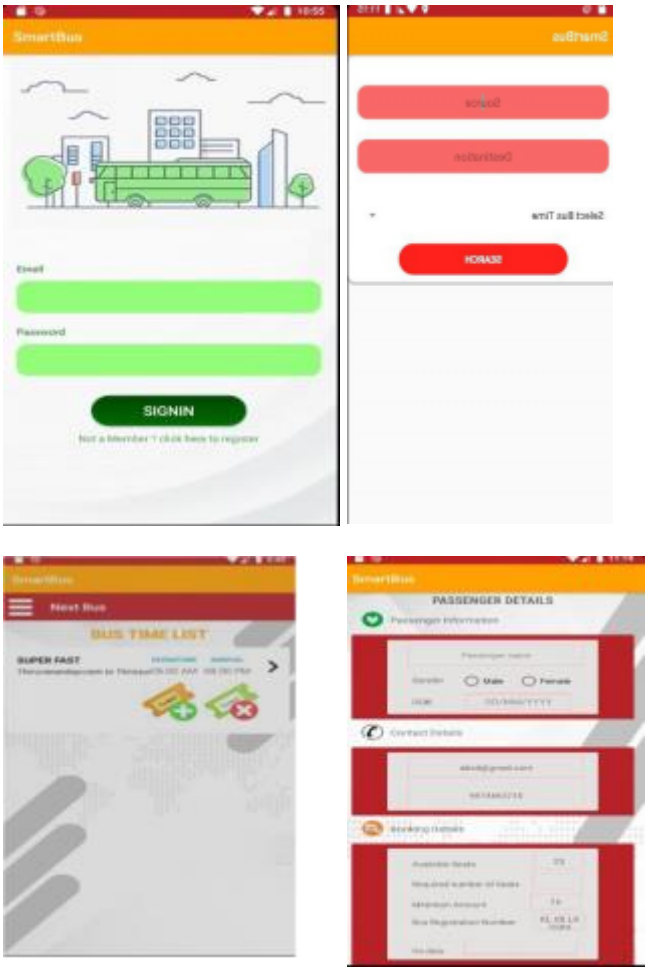

Fig.3.

3. Driver Module

There are 8 sub modules in the driver module. The first two modules are registration and login. The driver registered into this section and it will be saved into the driver table. The driver can again login into the application. The details of the bus driver are made available in the bus table. The next sub module in the driver module is the view and request bus. Here, the bus to be driven by the drivers is made available to the drivers. The drivers of each bus request to drive the required vehicle. After giving the permission by the admin, the driver can drive the required vehicle. This data is set by the admin module. From the table of source we will be given the source and destination stops of the required bus. This will be already set by the admin. According to the admin and the routes the driver can drive the vehicle. The next three sub modules are based on the user, user payments and updates if required can be given. The number of users to be taken in each stop is determined and the GPRS [2] tracking system is made to be in an ON state, then only the drivers can drive the vehicle. If the vehicle abruptly stops at any stops randomly, then there is something wrong in the bus travel and the corresponding signals as an alarm to the admin. Admin gets to know the accident details and crime related issues. The below Figure 4 shows driver login page.

Fig.4.

III. EXPERIMENTS AND METHODS

Here we are introducing a system which is very beneficial to the common people who rely on the public transport for the day to day practice. We are introducing a system by which the overall digitalization can happen in an efficient manner. The more the people use public transport, the more will be the people moving towards the digitized system. Initially, the bus owners are allowed to register the account with their valid account. The valid account by providing the details of the identity of the owner and the R C Book number. After verifying the identity, the owner can give the details of the bus. The owner can ideally visualize the profit details of the bus and the workers of the bus cannot secretly keep the money with them.

The users are visible with the details of the coming bus when the checking process is over. In this way the licensed drivers will have the permission to drive the vehicles and the owners remain safe from seizing the bus by government officials. At the same time the users will be provided with the safe journey. The users can see the details of the arriving buses upon giving their source destination to the destination buses. The details of the buses will be seen in the application depending upon the source stop and the destination stop. If the user wants to reach the destination stop immediately they can provide the timing urgency.

The source stop and the interested bus will be also recorded. The bus details and the bus name are also provided to the users. The bus ticket can also be booked by the users and can pay the money using the online payment options. If the user is not aware of this

option then the user can take the bus and take the tickets by the conductor. The conductor by login into the driver module can only book the ticket and the corresponding amount will be recorded.

The Smartus is an efficient and good travelling experience providing application. It not only provides a good travel experience but also provides a clean safe travel experience. This is a boon for women as they can care freely and travel at night. This application is a need for today's society. The people have the right to know the location and the paperless ticket enables a world of digitalization. The people will get to know the location of the current area and rush inside the bus at any time. The number of buses will increase and the buses will be more frequent at a given time. The owners upon launching new vehicle updates the vehicle information .

He has the right to assign the drivers with specific buses. The drivers upon assigning the duty need to be on the GPRS tracking system in their mobile. This way the users who are students, even blinds will know about the arriving bus immediately. The driver needs to update the license number and reconfirm the R C Book number and it matches the information with the admin details. Based upon the ticket booking and camera surveillance, a rough estimation will be made that if the bus is crowded or not. The corresponding details are updated to the user. The user can also know the current position of the bus and also the current rush in the bus.
After reaching the destination stop the user need to give up a feedback to the admin. The further booking can only done upon submitting their feedback.

IV. RESULT AND DISCUSSION

The feedback mechanism gives rise to a full chance of making profits in the buses. Moreover, it leads to usage of public transport more. This application is more useful in remote areas where the fast ongoing metros has not yet reached out. The application interface will be provided to the user and at the same time the administrator side, it may appear as a website where all the information regarding the admin's bus details will be available. The retrofit enables the data to the admin's side.
The PHP is used for website development whereas the android development is made by the android studio with Java as the programming language. PHP is easily connected with the database and makes the connection securely with databases. Also, PHP is platform independent. It is also the fastest programming language and hence it can be loaded over slow internet speed also. PHP frameworks built-in features and tools makes it easier to protect the web applications from the outer attacks and security threats. Java is preferred because java is more secure, gives the property of object oriented paradigms, have a rich set of core features, the quality of the apps can be leveraged and the speed and redundancy of the Java is comparatively higher than other languages.

V. CONCLUSION

As a part of digitalization, this paper proposes a digital bus management system. It is an online bus tracking system using GPS/GSM. Here passengers are well informed about their buses and approximate time required to reach from their location to their destination. It also informs about the rush inside the bus using image processing technology. It also provides a bus booking system for long distances. Owners are well informed of the bus details and passenger count. Accidents and crimes inside the bus can be reported through this to the nearby control room as well as to the owner. This provides an economical bus travelling experience to the passengers and profits to the bus owners.

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