Railway reservation and route optimization system with implementation

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Abstract - *In present situation railway has become the basic mode of transport to travel for longer distances. This mode of transport is more affordable and convenient for everyone to travel. To travel in railway we need reservation in advance as we may plan our journey only as per the reservation and so in case of emergency anyone can book tickets in tatkal in order to save people from agents who demand high amount of money for booking tickets in order to avoid these a platform is necessary that is our application for booking tickets as per present situation many people are hesitated to go to railway reservation counter and book their tickets so to resolve their problem an platform has been designed so that they can book their tickets anyone can directly book the tickets as per user requirements and the users can even cancel ticket and check live status of train, check live station info and checking PNR status of ticket and other additional feature which being added to this implementation is shortest route for all trains available between two stations and gives suggestion for users which train travels in shortest time between two stations. These all features will be discussed further.*

***Key Words*: RAD model, PNR Check, Trains Between two Stations, Live Status, Shortest Route Between Stations, Booking of ticket.**

1. INTRODUCTION

Railways transportation has become more demanding these days as travelling is a major priority of the people, It also helps user to easily to identify trains by its shortest path so that the user can reach their destination in easy way and quickly making it user friendly by developing a better interface. User will be able to select train between stations (Finding the train with the Shortest path).User can get live status where the train is at a particular time. User can check the PNR Status which means, whether the ticket is confirmed or is it in waiting.

User can check for the seat availability, book tickets for a train through an e-booking system, check the train route and the stations where the train goes through, has the choice to cancel his ticket. The specification in this method is that if there are many routes to the same source and destination, the user gets the minimum route to the destination which helps in saving of time to the passenger. As we are using RAD process model,by assuming the user's requirements the application is being developed, So that most of the user requirements may be satisfied.

As we know that we are using Rapid Application Development process model and in this we are using traditional view point in which we will be trying to apply all user requirements and all the users may get use of it and nowadays whole world has become busy with electronic devices and running with time and to satisfy their needs and people who have very few experience with technology may suffer using various apps which are already in existence for them this application will be quite helpful.

2.LITERATURE SURVEY

Railways are providing important and mandatory basic facilities to the passengers like

(I)Healthy food (II)Good sanitation (III)flexible reservation system (IV) electronic scrolling inside trains and enquiry facilities at all stations and in trains resulting in the convenience of the passengers and which will result in increase of number of passengers. In present system there is no query system for the passengers, by taking this problem PNR status enquiry system was done in which passengers who was in waiting list can enquire about their status if this system is not used have to wait up to TTR arrival and have to provide a bribe, by implementing this system can check their own status and can utilize it anytime. The action performed can make the travel still more informative and safety. Present reservation is having problem in which passengers cannot choose their seats, members of the family is not getting seats in sequence and therefore seats are in different coaches or different place in same coaches[9]. Indian Railway will continue to play a Crucial role in the economy of the country in the many years to come. The need of the hour is to have an exclusive advanced reservation system, PNR status checking system, location identification through effective communication system, fire sensing system and catering services in place that would Fulfil the requirements of the whole spectrum of passengers[1]. In present system, there is no passenger intimation in a train that is persons who are travelling during night time are unaware of the exact place now they are in and no prior intimation of when they reach their respective stations. The information about arrival of the respective station can be checked using live status option in application[2].IPMIS model is an inevitable trend, which means a common platform for mobile booking and reservation has become a priority. More also, people have no patience to spend time in queue waiting, and therefore

IPMIS is to relieve the pressure of queue congestion due to the contradictions of supply and demand between people and social resources as well as achieving well ordered management of social resources[3]. The model uses input data from relevant time events of train runs calculated by a simulator. The model can be integrated into a decision support system used by operators who make decisions to change train routes or orders avoiding conflicts and delays [6].

3. METHODOLOGY

The Railway Reservation application is developed in a user friendly way to access all features, which is a type of incremental model. Each group develops a module which has different functionalities depending upon the user requirements. The design of this product utilizes a modular and a functional approach where in the entire code will be split up in different modules or functions and be called upon when required. In the application Android studio is being used in which the user requirements were assumed by us and they are developed in XML language and then all the modules are combined together using java language and these modules will be linked to API's and so information can be provided when query is raised by the user. The major functions of the products are, acquiring and monitoring the major issues of user while booking or any other query such as the cancellation, pnr status, live status of train, train info and if there is any problem faced by user we give contact information such that they can let us know about their problems. After the development of all the required modules, then they are combined to form the required application. In addition with the normal functionalities the Shortest path optimization is aimed to give train information which reaches through the shortest route and this helps the user to save the time and help to reach their destination in the less time taken to reach their destination out of all available trains. As it is completely based on Rapid Application Development we assume the user requirements and develop the application and all requirements may not be satisfied but the requirements assumed by us will satisfy the user requirements in best manner. The User Side in the application contains the options to book a ticket, cancel ticket, check PNR status, Check Live train status, station information whereas the Server side have the options to give data to users as per the request given by user in form of API's (Application Programming Interface).

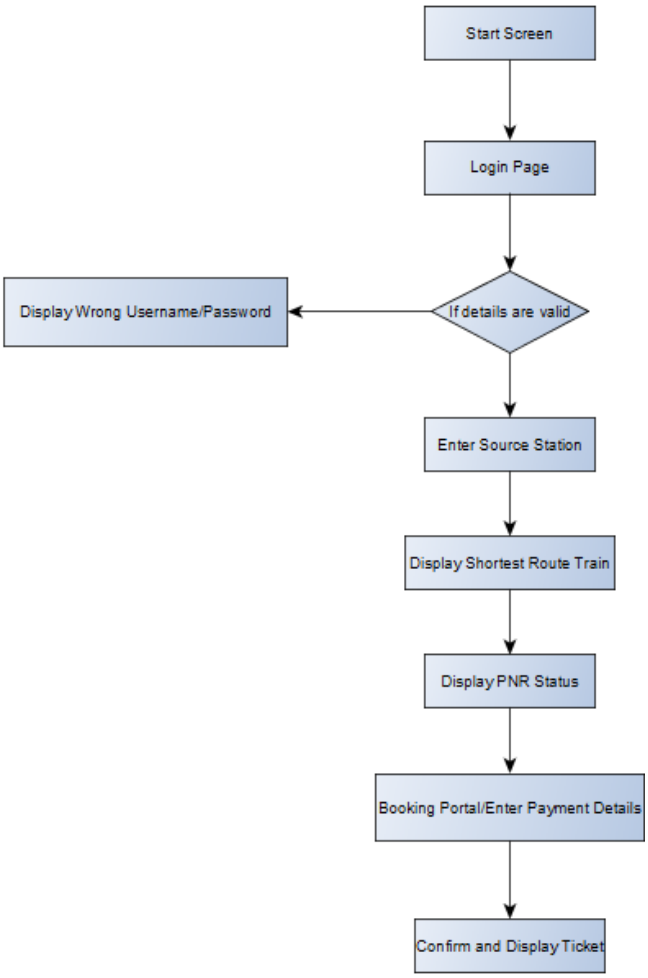

Fig -1: User Interface Flow Diagram

We all know that there various apps including all features of booking and other features may be familiar to everyone but here the application which is being developed will be new to the users who don't have even basic knowledge on all features may utilize the application due to its friendly user interface and may utilize features and additional feature which helps users is it gives suggestion to users that which train reach in shortest time to their destination. The changes which makes our application better are included in the third part of our paper.

Here an overview of application will be displayed how user can access all features of application and user studying this paper can easily understand the features that can be accessed or utilized by the application and can get detailed information about our mobile application which is developed for benefit of users and user can handle it easily due to its interface which is simple and can be accessed by people who even don't have basic knowledge on usage of apps can handle it very easily and all features which are developed in our application will be displayed in the paper with photos so that anyone can get a detail on the paper. The below diagram shows an overview of application:

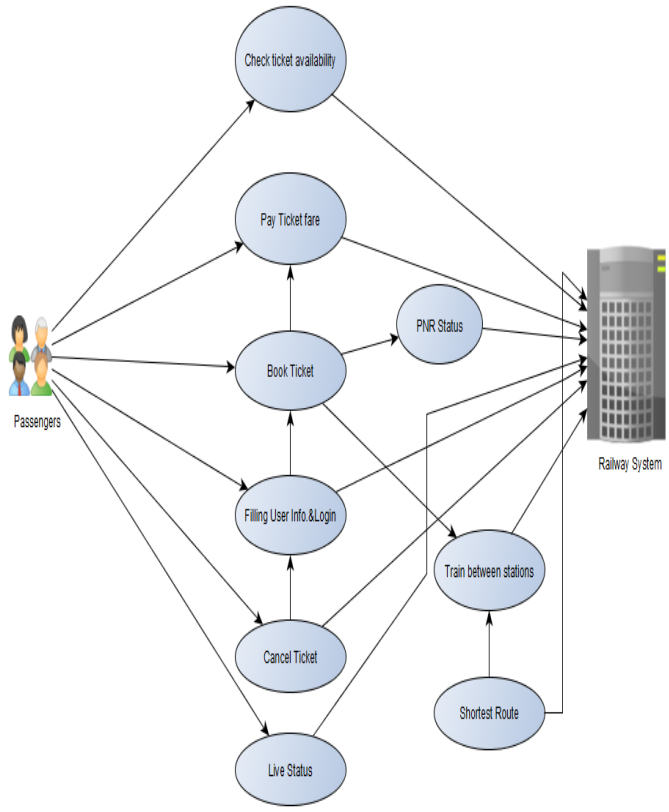

Fig -2: Overview of Application

4. COMPARATIVE STUDY

4.1 PREVIOUS WORK

IRCTC is the Indian Railway Application that is developed with the latest technology. It contains many features that are very helpful for the passengers. IRCTC is very helpful in searching trains, checking pnr status, finding the train route, status of running train, availability of seats. Ticket can also be booked through web view.

The application can easily find the trains between the stations. The fare for the different classes can also be known. There is an search option to navigate in order to check the availability of seats, running status and also the train route. We can also manage the recent searches like recent railway stations searched, recent pnr status, an recent trains of Indian Railways.

The information of passengers as well as trains are stored in databases that are managed by the local administrators. The application retrieves the data from the servers and provides the information to the passengers. Millions of passengers will be using the app. So the app must be efficient in retrieving the data.

4.2 PRESENT WORK

Although IRCTC has many advanced features but we don't know which train reaches the destination with smallest time. By using IRCTC we can get the list of available trains from the present location to the destination. But we don't know which train reaches the destination in shortest time unless we compare all the trains.

In this busy world everyone wants to reach their destination as early as possible. If anyone chooses transportation buy train then they must be aware of the train which makes them to reach the destination quickly. So, we are adding an additional feature to this so that one can easily find out which is the best train available at that time to reach the destination quickly.

We are using sorting algorithms with some conditions. We will be sorting the all the available times of the trains. Then by selecting the present time we can know which trains are available. If the first train is not available then we move on to the next train and so on. By this one can reach the destination as early as possible. These all the sorting methods conclude that the train which is having shortest time to reach the station will have the shortest route among all available trains between the stations which the passenger wants to travel will be satisfied as in application it shows shortest time taken train on top of list in a suggestion box so that user can easily reach his destination.

5. IMPLEMENTATION

We have implemented railway application using Android through which the modules are written in XML language and all these modules are combined together using java language and some photos which represent our application and these photos show functionality of our application:

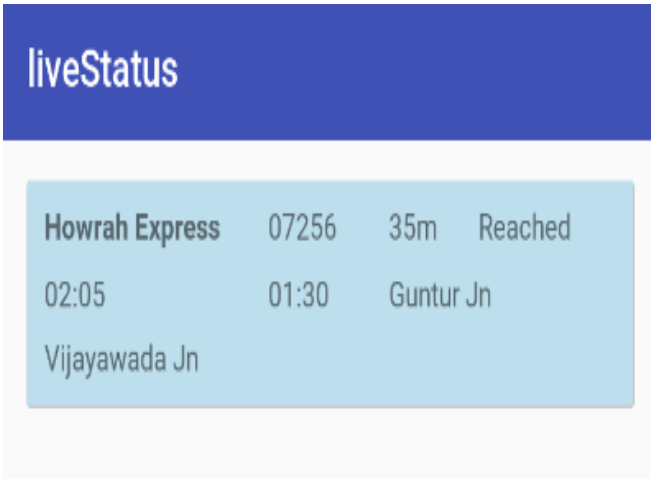

Fig-3: Live Status

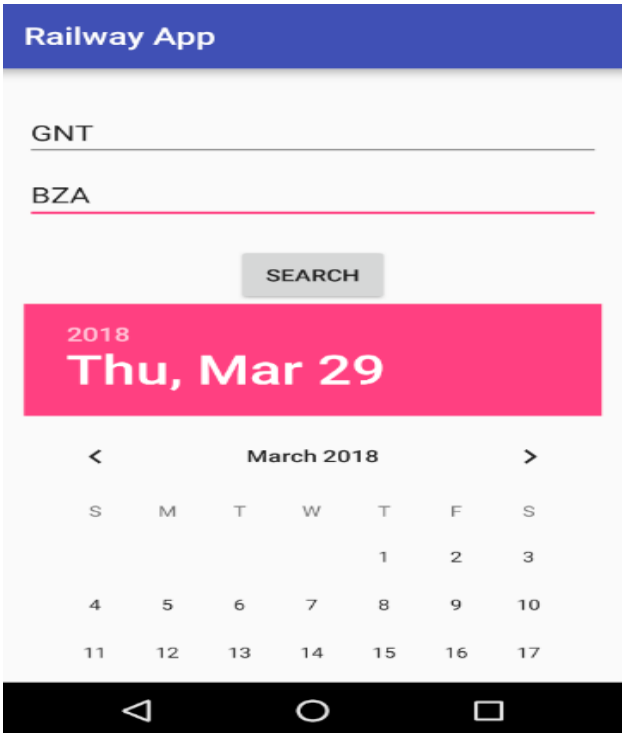

Fig-4: Search between two stations

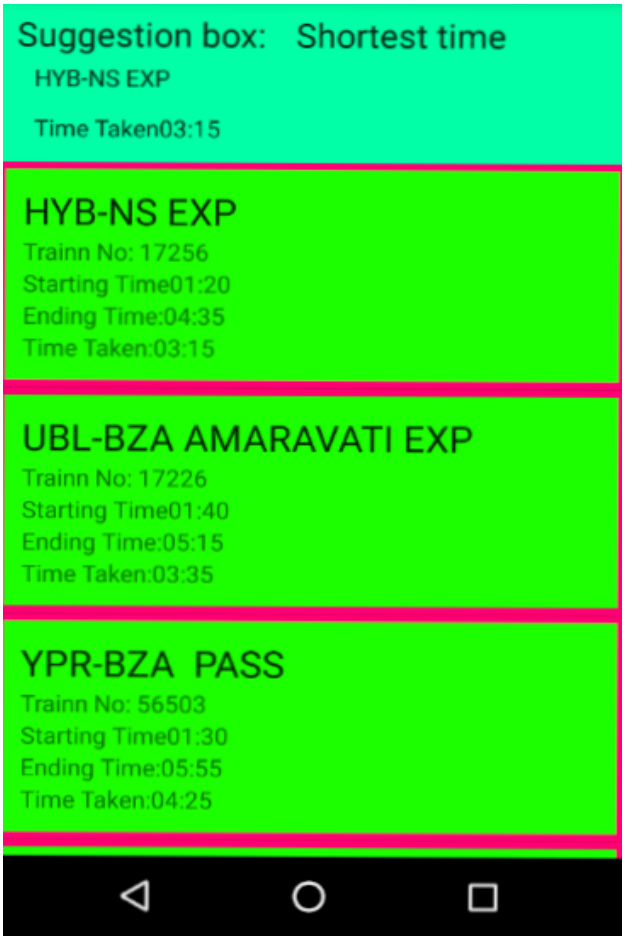

Fig-5: Shortest time travelling train suggestion

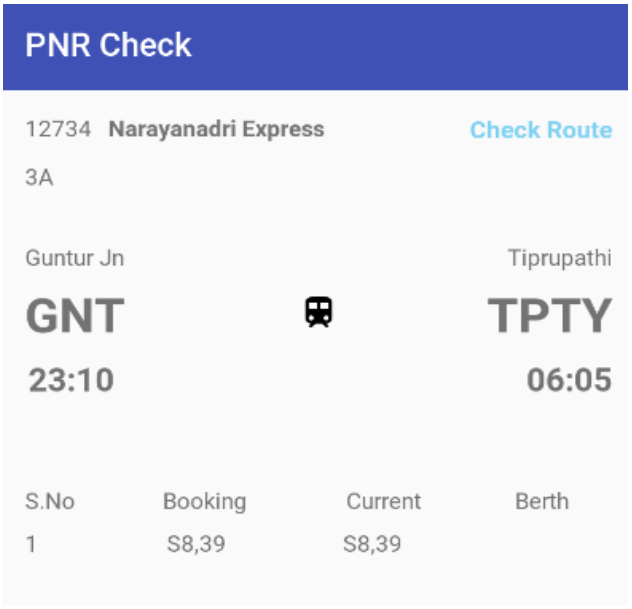

Fig-6:PNR Check

6.RECENT TRENDS AND FUTURE WORKS

At present there are all appropriate features to find train status not so accurate and so to avoid this problem we need to include GPS system so that we can navigate train easily and in some regions like forest the signal will be lost so the trains must maintain mini signal which can be tracked by station officers which work with help of satellite and there are tracks to be lay down in future so that trains may increase users comforts by arriving the destination in shortest path and if trains use electricity or natural forms of energy to run the trains then we can save our natural resources.

Many of tickets will be cancelled before few of the passenger journey those tickets must be given to the people who are in waiting list and so the information must be sent to TTE regarding cancellation through an electronic device which must be regularly updated with API's and another major problem which passengers will go through it is with cleanliness and lack of other mandatory facilities which must be done daily but in most of trains these will not function properly. These must be taken care and when comes to their safety not only in trains outside of trains as in stations they need to maintain rules and none of them follow rules and for this need to get necessary sessions on awareness of rules and regulations that need to be followed in railway station. There are many things to be improved but when we keep ourselves clean then only our surroundings will be clean. This part tells what improvements can be done in future and other things which needs to be maintained by everyone for their safety.

7. CONCLUSION

The main aim of our paper is to develop an application which satisfies all user requirements. The application is developed in perspective of user convenience and the friendly user interface of application which helps users without any complicated searching process and other software requirements are data security and maintainability as anyone can access with their own login so the data will be secured and the maintainance of the software will be done by the developers who will be maintain the app and so in this application with booking of ticket it also includes cancellation of ticket, pnr status of ticket, live status of train and live station info all these features will be included in this application and the additional feature which is being added to the application is the shortest time is calculated for all trains between two stations and it will suggest the train which will travel in shortest time to our destination and therefore these features will help users and the user interface is also simplified such that anyone can easily use it.

The main theme of this paper is to develop a user friendly interface for all users which helps them in all ways as per the query given by the user. This application must be useful to all the users who use this application and must satisfy their needs.

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