# RAILWAY RESERVATION SYSTEM

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## ABSTRACT

Indian Railways are one of the largest employers in the world with the revenue of 1.47 lakh crores serving the biggest democracy in the world. In recent years that Railway adopted multiple Technologies to offer better services like online booking on portal or app however getting the confirm and quick reservation sometimes become difficult for citizens. We are trying to implement an AI solution which will increase the probability of getting tickets confirmed. AI will provide the best possible solution to users so that his chances of getting confirm ticket will increase leading to more customer satisfaction. Since the application is available in the Smartphone it is easily accessible and always available for all users.

**Keywords:** Key Words: Waterfall Model, Prior Station, Decision Tree Model, Trains Between Two Stations, Live Status, Recommendation System, Booking Of Ticket.

## I. INTRODUCTION

The Indian Railways (IR) carries about 5.5 lakhs passengers in reserved accommodation every day. The IRCTC services the online booking and cancellation of tickets from any of the 4000 terminals. These tickets can be booked or cancelled for journeys commencing in any part of India and ending in any other part, with travel time as long as 72hours and distance up to several thousand kilometers. Usually due to heavy rush in railways it sometime become really difficult to get reservation and even if someone get it, it comes with large digits of waiting. Getting quick and early reservation with confirmed seats becomes really challenging for passengers. Also, there is no use of AI in Indian Railway bookings. So, to solve this problem in the given project we will be developing an AI and ML based solution which will help users to find train seat availability details of their desired source and destination. This system will suggest users the probable options and Alternative within predefined time on limited frame once user enters origin and destination, the system will provide best alternative for booking to users. With the help of this system people can enquire about ticket availability online through internet, sitting in their home by a single click of mouse. people can easily get tickets enquired within minutes. This system will also suggest users of the filters or seat type such as Senior citizen, female quota, handicap quota etc. Because users are usually unaware of such filters. The system is developed using python, Django for API, TensorFlow, Machine Learning and Natural Language Processing using decision tree algorithm also SQL for database. Decision Trees have been previously used as a model-based approach for recommendation systems. The use of decision trees for building recommendation models offers several benefits, such as: efficiency and interpretability and flexibility in handling a variety of input data types (ratings, demographic, contextual, etc.).

The decision tree forms a predictive model which maps the input to a predicted value based on the input's attributes. Each interior node in the tree corresponds to an attribute and each arc from a parent to a child node represents a possible value or a set of values of that attribute. The construction of the tree begins with a root node and the input set. An attribute is assigned to the root and arcs and sub-nodes for each set of values are created. The input set is then split by the values so that each child node receives only the part of the input set which matches the attribute value as specified by the arc to the child node. The process then repeats itself recursively for each child until splitting is no longer feasible. Either a single classification (predicted value) can be applied to each element in the divided set, or some other threshold is reached. A major weakness in using decision trees as a prediction model in RS is the need to build a huge number of trees (either for each item or for each user). Moreover, the model can only compute the expected rating of a single item at a time. To provide recommendations to the user, we must traverse the tree(s) from root to leaf once for each item in order to compute its predicted rating. Only after computing the predicted rating of all items can the RS provide the recommendations (highest predicted rating items). Thus, decision trees in RS do not scale well with respect to the number of items. We propose a modification to the decision tree model, to make it of practical use for larger

scale RS. Instead of predicting the rating of an item, the decision tree would return a weighted list of recommended items. Thus, with just a single traverse of the tree, recommendations can be constructed and provided to the user.

Decision trees can be used with collaborative filtering approach for better recommendation:

• Collaborative Filtering - We used decision trees for building a collaborative filtering system. Each instance in the training set refers to a single passenger. The training set attributes refer to the feedback provided by the passenger for each item in the system. In this case a dedicated decision tree is built for each item. For this purpose, the feedback provided for the targeted ticket (for instance like/dislike) is considered to be the decision that is needed to be predicted, while the feedback provided for all other ticket is used as the input attributes (decision nodes).

## II. LITERATURE SURVEY

Railways are providing important facilities to the passengers like an online IRCTC booking portal for trains resulting in the convenience of the passengers and which will result in increase of number of passengers. In present system there is no ticket alternative system for the passengers, by taking this problem a railway reservation system is built which will provide user alternatives for ticket, by implementing this system can check for available tickets from previous source stations or to later destination stations. The action performed can make the travel still easier. 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. 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, alternate recommendation 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. This model is an inevitable trend, which means a common platform for ticket booking and reservation has become a priority. More also, people have no patience to spend time in searching for train by looking various options manually, and therefore this system is needed.

## III. 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 PyCharm IDE is being used in which the user requirements were assumed by us and they are developed in Web languages and then all the modules are combined together using python 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, 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 alternate 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 Waterfall Model, 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, search alternatives, 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).
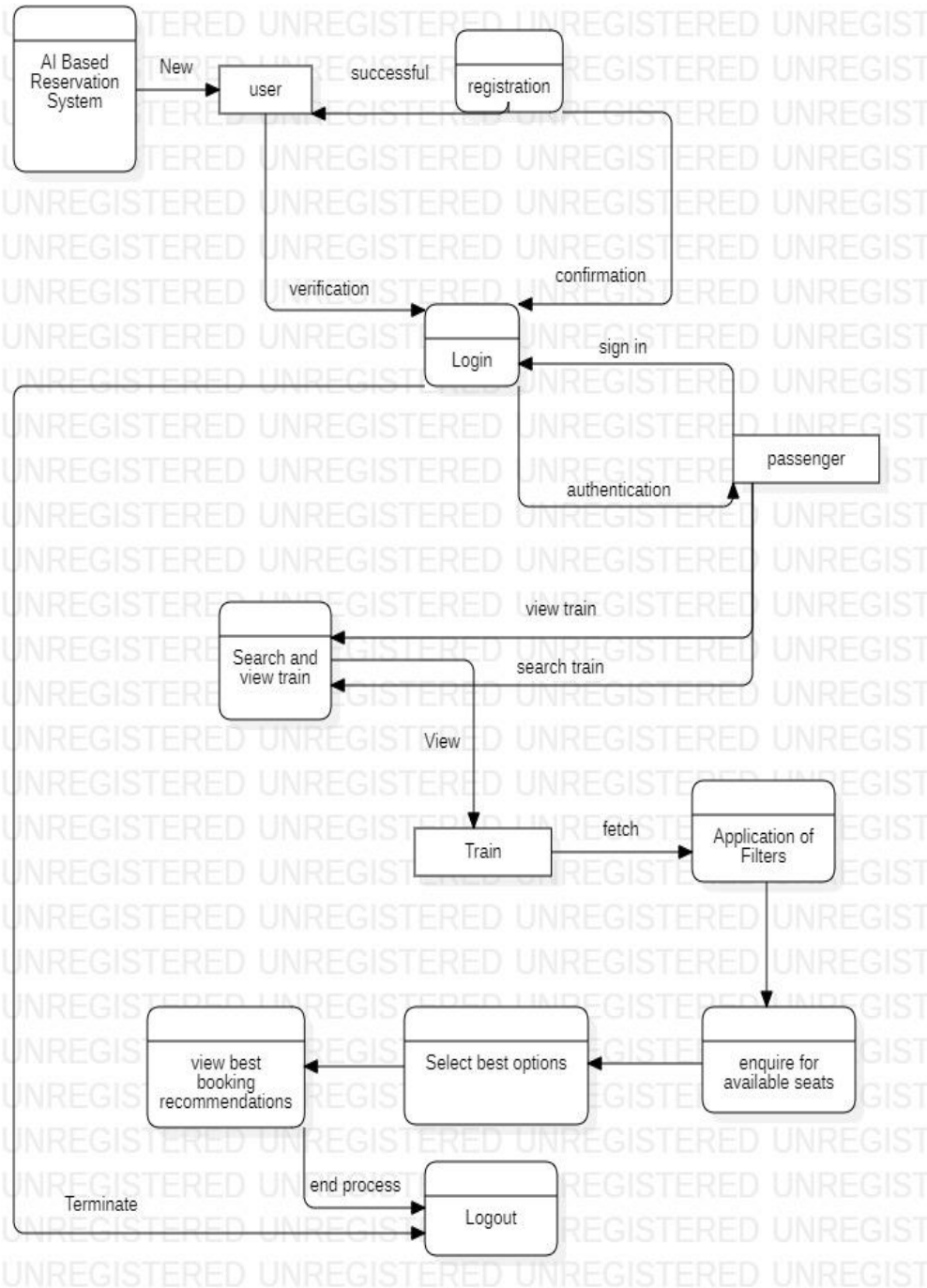
**Figure 1:** DFD Diagram

We all know that their 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. The changes which make our application better are included in the next 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 web application and can get detailed information about our web 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 webs 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:
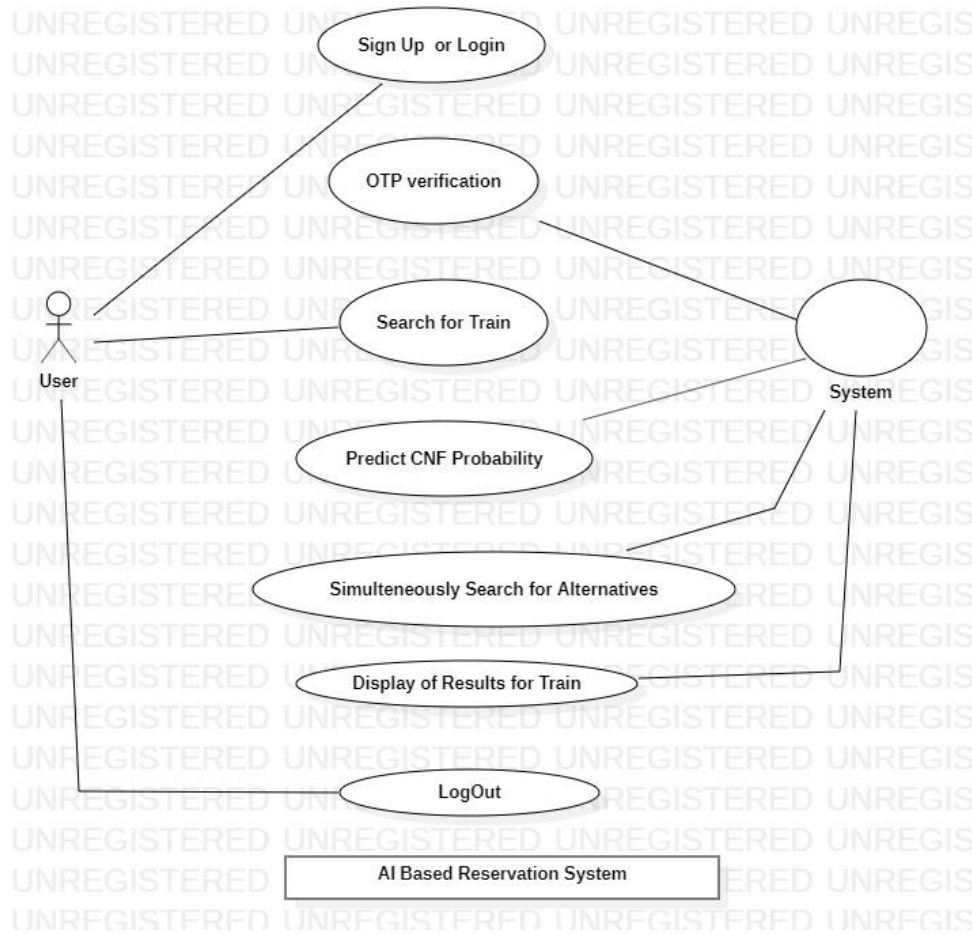
**Figure 2:** Use case Diagram

## IV.    COMPARATIVE STUDY

**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. Th application can easily find the trains between the stations. The fare for the different classes can also be known. There is a 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 a recent train 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 are using the app.

**PRESENT WORK**

Although IRCTC has many advanced features but we don't know in which train alternates are available.  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 to select when ticket is not available unless we compare all the trains. In this busy world everyone wants to reach them destination as early as possible. If anyone chooses transportation by 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, if not then system will look for the previous source to later destination, we can know which trains are available. When all possible available options are gathered the system will display 5 best options for user according to the decision model built. The choices of decision are best on attributes such as gender, previous booking history and previous choices made by user, booking class usually user opt for, train

time usually user prefer and fare that if user like to go for lesser fare. By this one can reach the destination as early as possible. These all the sorting methods conclude that the train which is having time to reach the station will have the route among all available trains between the stations which the passenger wants to travel will be satisfied as in application it shows best alternate train on top of list in a suggestion box so that user can easily reach his/her destination.

## V.    IMPLEMENTATION

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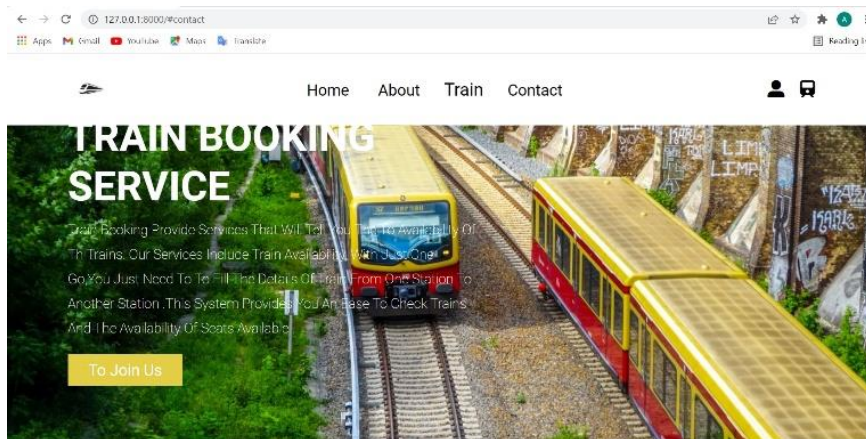


**Figure 3**: Home Page
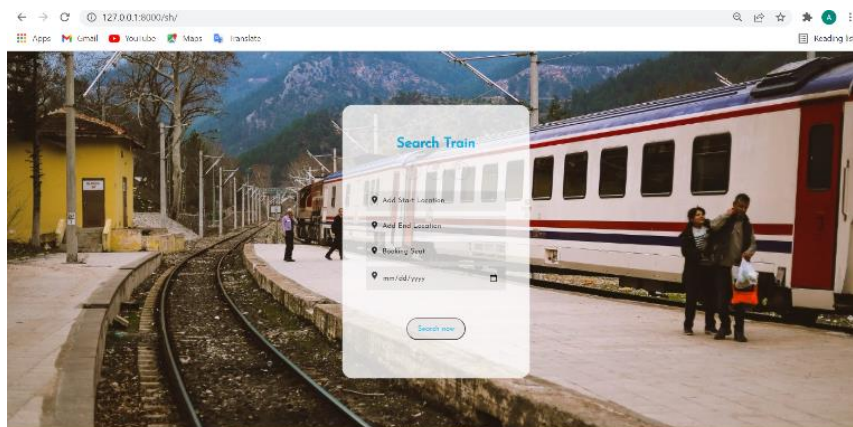


**Figure 4**: Search Train
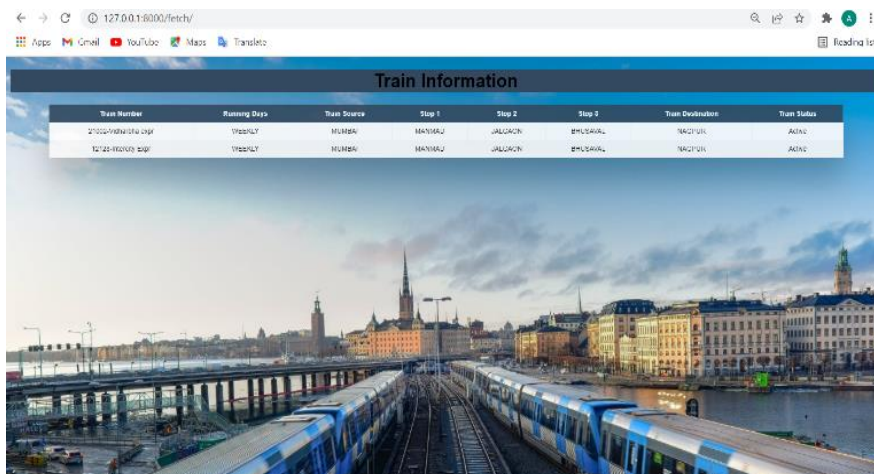


**Figure 5**: Display Of Trains

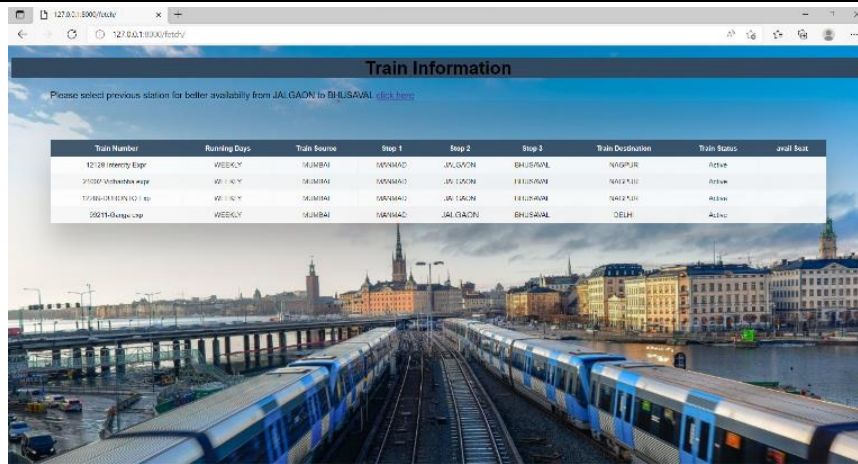**Fig 6**: Alternatives Suggestion

## VI.      RECENT TRENDS AND FUTURE WORK

It is not possible to develop a system that makes all the requirements of the user. User requirements keep changing as the system is being used. Some of the future enhancements that can be done to this system are:

As the technology emerges, it is possible to upgrade the system and can be adaptable to desired environment. Because it is based on object-oriented design, any further changes can be easily adaptable. Based on the future security issues, security can be improved using emerging technologies. Recommendation module can be enhanced. An in-built web browser can be added. The future plan of this project is to improve design, implementation and documentation in such a way that anyone can use this project for better perform. We will develop the site more dynamically and the database work as well. In future we will add the more modules for better improvement of the project: More security in the system, more user-friendly system. Besides automatic Tatkal booking can be set.

## VII.      CONCLUSION

Nowadays Artificial Intelligence is a very effective technology to cater the customer services along with the ease in operation and variety of products. Considering the above study, we can safely conclude that AI based reservation system is a new experience and will greatly impact the lives of railway passengers in short time. This will enhance the probability of getting ticket for passengers with great features which allow them to opt for best alternate options for booking tickets. This may create easier way to get reservation and serves a small part in countries development.

## ACKNOWLEDGEMENT

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