

UDAN - An RCS Flight Booking Application

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Abstract-- India is the third largest aviation market in the world's aviation industry. In order to help the citizens in getting the advantage of affordability, improve connectivity and provide more jobs to the people, the RCS UDAN scheme was launched. UDAN is an RCS scheme i.e. Regional Connectivity Scheme launched by our Hon'ble Prime Minister Narendra Modi. RCS is vital as connectivity is the key to development in any country. In India, air connectivity between some regions is not so good. Hence, the RCS scheme was launched. Our main aim is to build an application for booking of flight tickets, be it regular tickets or tickets under RCS scheme. For booking tickets under the RCS scheme, certain conditions are to be satisfied. It is necessary to create an awareness about the scheme and thereby, help the common citizens of the country so that they can avail the benefits of the scheme.

Keywords-- Air ticket booking, Regional Connectivity, Airline reservation system, Booking, Flight booking system, RCS, Reservation, Ticket booking system, UDAN.

I. INTRODUCTION

India is the third largest aviation market in the world's aviation industry. It is of great concern that tier-II and tier-III cities are connected by air [1]. As a result, to enhance regional connectivity and connectivity to tier-II and tier-III cities, UDAN Scheme was launched by the ministry of Civil aviation and government of India [1]. The UDAN scheme aims to bring connectivity to unserved and under-served airports of the country. This will be done by reviving existing air-strips and airports. It would benefit all stakeholders: the citizens would get the advantage of affordability, connectivity and more jobs. It will provide viable and profitable business to operators. It aims at promotion of tourism, increasing employment and promoting balanced regional growth.

However, the main issue is that very little or nothing about the scheme is known to the people of the country. There is no proper awareness about the scheme. So, this application will also create awareness among the people and to make air travel affordable for the people, we thought of creating an RCS flight booking application.

Our main aim is to build a software for booking of flight tickets, be it regular tickets or tickets under RCS scheme. So, our application will help the passengers to book tickets easily and conveniently. Passengers can also book tickets under the RCS scheme. Booking, payment, cancellation, viewing the current bookings, viewing previous booking history can be done using this application.

II. PROBLEM DEFINITION

In today's world where technology is in lead people tend to book flight tickets through third party applications. Till date no third party application has created awareness or aimed at including RCS benefits for people. Normally, these third party applications are indulged in earning more profit and they end up buying RCS tickets in bulk and sell these tickets at normal rates to people keeping them unaware of the scheme.

Our application "UDAN - An RCS Flight Booking Application" aims at preventing the frauds of third party by including biometric module for every user who wants to book a flight under RCS. This module aims at capturing the image of an individual and storing it which will help in verification and ultimately prevent frauds as the ticket for the user will contain the captured photo. The passengers get benefits of this scheme only after the thorough validation of RCS route, RCS flights. If he/she has selected a valid RCS route and wishes to travel with an RCS flight, then he/she will be allotted the RCS ticket. Otherwise, he/she will have to proceed for normal booking.

The application provides one more benefit. If any passenger has cancelled his/her RCS ticket, the ticket would automatically be transferred to the next eligible passenger. The application will also take care of refunding extra money paid by the subsequent passenger and a part of the ticket payment will also be refunded to the traveller who has cancelled the ticket.

Refunding of money on cancellation of a normal ticket will be done based on the number of days left in the departure of the flight.

Refunding of money on cancellation of RCS ticket will be done based on following policy: If the RCS passenger cancels his/her ticket and the next passenger has a normal flight ticket and is eligible for RCS ticket then he/she can get the benefit of this scheme by getting a specific amount refunded which is equivalent to the difference of price of normal ticket and price of RCS ticket.

III. LITERATURE SURVEY

A. Udan - A New Paradigm Shift In the Tourism Industry With Reference To North East India:

The main key to the development of any country is the connectivity of its various regions. The better the connectivity, the stronger will be the employment sector of the country. It will also boost the economy and tourism sector of the country [2]. Moreover, building connections to tier-II and tier-III cities creates a network by bringing in additional people into the aviation network [2]. Economic value across the chains are going to be enhanced by the new passengers. They also increase the worth of already-served airports. The efficiency of the businesses will be increased. India's vast tourism potential will be made accessible by this scheme. Also, responses to medical emergencies will be made viable and national integration will be promoted [2]. This study aims at studying the impact of UDAN in the aviation and travel & tourism industry. This study is based on various secondary sources of data, collected from newspapers and the internet. According to this study, the main aim of this scheme is conversion of the dream of a common man to travel by airlines at pocket friendly fare, into reality.

B. Influence of 'UDAN' Scheme on Network and Regional Connectivity of Indian Airports:

This research focused on the influence of the newly launched UDAN scheme on the overall connectivity of the Indian airports, be it Network or Regional connectivity. It says that a considerable growth in terms of passenger traffic and connectivity was demonstrated by the Indian domestic aviation. Since 2013, an annual growth rate of 15-20 percent in the domestic sector alone was recorded by the sector according to [3]. Various new connections are also established to the already existing airports as well as the new airports. This is because there was an addition to huge demand on high frequency routes. Following that, the demand in lower tier cities saw a rise rapidly. RCS-UDAN is considered as a regional connectivity booster and hence aviation policies were drafted along with this booster. This paper [3] studies NCAP (2016) and UDAN scheme with respect to domestic connectivity perspective and interactions among airports in India. Evaluation of the growth of existing airports in relation to the tier system is done by the scheme. The Domestic network community of India is classified into four sub-communities. These communities are North, Central, East and South zones, with at least one metro hub in each. Degree, k-value, Z-score, and participation coefficient (P.C.) and other such network connectivity attributes are assessed over sub-communities. This is done in two scenarios: the network without UDAN routes and overall network including RCS-1 & 2. Hubbing Potential Index (H.P.I.), Community Index (C.I.) and Inter Community Coefficient (I.C.C.) and other such terms were coined by this study. Additionally, connectivity indices in community level (whole domestic network) were also examined. This was done so as to estimate its global outlook and accordingly draw conclusions. The connectivity of Indian domestic network is augmented multiple times according to this study. This is due to UDAN routes and formation of new hubs in different classes. Average community indices of all airports have improved further, proving better regional connectivity. Many unconnected regions in India, especially the NorthEastern part, are now visible in the aviation sector map. In short, this scheme has boosted various sectors of the country in various ways and has proved to be beneficial for the country) [3].

C. Online Airline Reservation System:

Online Airline Reservation System is a Web based application for a specific Airlines company [4]. A regular flier should be able to login and key in all the details of his travel in their application [4]. The application can be used by frequent users. Airline reservation System is a computerized automated system [4]. It stores and retrieves information and conducts various transactions related to air travel. The project exposes the relevance and importance of Airline Reservation Systems. The relationship between customers and airline agencies is enhanced by this project [4]. This project makes it convenient for the customers to book the flights as per their requirements. It helps in searching, retrieving and generating information for the requests by the user. The advantages are Reduced manual entry work, Easy information retrieval, reduced errors due to human intervention, user friendly screens, portability and flexibility for further enhancement, web enabled and fast finding of information requested.

D. Airline Mobile Reservation Development:

Nowadays, technology innovations are quickly developed including mobile technology, mobile applications, etc. So, the reservation services can enhance individuals' life, making it less complex. This research showcases a mobile based reservation system for airline companies to simplify the process of booking a flight [5]. The proposed system overcomes manual system problems by making booking from home possible. It saves time and effort [5]. Since the manual system is slow and it consumes much time, it is boring and it is troublesome for every individual to book through office operators, collect information about the client that they got through telephones, and solve problems in updating passenger information if any changes are required. With the development of information technology, using it in an orderly and proper manner helps to overcome the existing problems in the manual system. Booking system saves the customer information in a database. It makes it easier in a way to save the entire information. Customers can book, reserve and buy tickets accordingly. Time and efforts are less for both the employee and the user.

IV. IMPLEMENTATION DETAILS

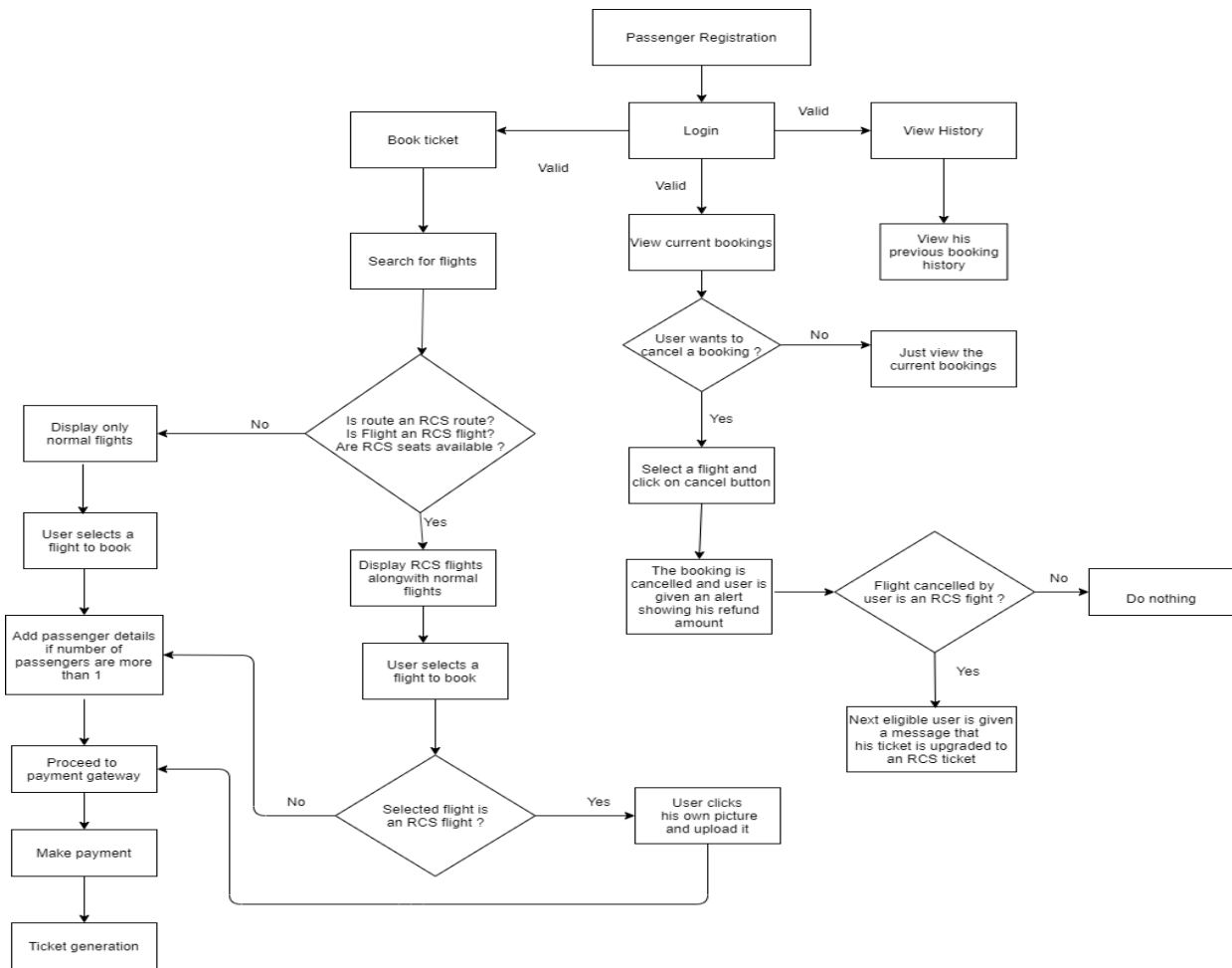


Fig. 1 Workflow diagram

Information about RCS routes and flights was important in order to implement the RCS booking module [6]. Various routes were declared as RCS under various RCS UDAN versions [6]. However, not all routes operate successfully. Hence, we obtained the information about operating RCS routes from the official website of the Airports Authority of India. Other RCS related information was obtained from the official RCS UDAN website. It consists of LOI(Letter of Intent) of various selected airline operators in PDF form [7]. The PDF consists of various RCS routes, the respective RCS airlines , their aircrafts, the length of the route., the fare, the total number of seats and RCS seats. The information is very useful in the implementation of RCS booking in our module [7].

The workflow diagram shows the working of our flight booking application. It is a flowchart for the users of the system.

The explanation for various modules involved in the flowchart is as follows:

Our project consists of following modules:

- A. Login and Register module
- B. Normal Booking module
- C. RCS Booking module
- D. Camera module
- E. Payment module
- F. Ticket Generation module
- G. View History module
- H. Ticket Cancellation module

Below is the description of all the modules.

A. Login and Register module

Before proceeding to book a ticket, the user should register in the application. He should login by entering the valid credentials. After doing so, he can move to the booking screen. Async storage package of react native is used to store the user-id of the logged-in user inside the application.

B. Normal Booking module

The user has to choose between one way and round trip. Then, he enters the origin and destination, date of travelling, the class he wants to travel, number of passengers and can search the flights. If the route entered by the user is a non-RCS route, then it is normal booking. Once a user clicks on search flights, various flights will be displayed. The flights displayed are real time flights, which are displayed by using Tripadvisor API. The user can select a desired flight from among the flights displayed. On the next screen, details of the chosen flight can be seen. Further, the details of the passengers will be asked on the next screen before the payment process.

C. RCS Booking module

If the route entered by the user is an RCS route, then it is a case of RCS booking. If there exist flights that are RCS flights and there are seats available on the flight, then RCS Flight message will be displayed on that particular flight result. The price of such a flight will be less, as per the RCS UDAN scheme. The user can select a desired flight from among the flights displayed. If he selects an RCS flight, then on the next screen, alongwith the chosen flight details, a message will be displayed which says that the user can book only one RCS ticket at a time. Also, the user will be asked to click his picture as the flight is an RCS flight and the picture of the user will be displayed on the final ticket of the user. As only 1 person can book an RCS ticket at a time, passenger details will not be asked. After clicking the picture, the user can proceed to the payment gateway.

D. Camera module

If the flight is an RCS flight, the user will be asked to click his picture before further booking process. The user can click his own picture, click on the Upload to server button and then proceed for payment. The package used for implementing this is react-native-image-picker.

E. Payment module

Various methods of payment include Net banking, payment using Cards, UPI and Online banking. The user can select a suitable method for payment, enter the details as per the method and then proceed to pay. The payment will be done and then an alert will be shown showing the status of payment i.e success or failure. Thus, the booking process is completed and an alert is shown. Razorpay payment gateway is used for the payment module.

F. Ticket Generation module

After payment is successful, an alert is shown to the user which states that the booking was successful. Then, the user is taken to the next screen. Here, users can click on the button which says generate a PDF of the ticket. Once the user clicks on the button, a PDF is generated and the path where the file is stored is shown to the user. Users can then view the PDF file there. If the flight is an RCS flight, it is mentioned in the Ticket along with the image of the user clicked at the time of booking the RCS ticket.

G. View History module

A user can view his previous booking history. To do so, he has to click on the View History option in the navigation drawer. Entire history of his previous flights will be displayed.

H. Ticket Cancellation module

A user can view his current bookings. To do so, he has to click on the Current Bookings option in the navigation drawer. All his currently booked flights will be displayed. The user can then cancel a ticket if he wants to, as the Cancel option is provided. Once his ticket is cancelled, an alert will be shown stating that the cancellation is successful and a particular amount will be refunded back to him depending on the number of days left in flight departure.

If the ticket cancelled by the user was an RCS ticket, then the next person, according to the booking timestamp stored in the database, will get an RCS ticket. To inform the upgraded user, a message will be sent to the user on his contact number. Msg91 API is used to send messages to the users. The message will state the amount that will be refunded back to the upgraded user. If the ticket cancelled by the user was a normal ticket, then only that person will be shown an alert stating the refund amount.

Use of TripAdvisor API to fetch flight results

One of the major modules of our application is fetching live flight data, so that the users can get live flight results as per their requirements. For this purpose, we have used Tripadvisor API. The TripAdvisor API helps you search for flights & get flight prices from TripAdvisor's database of prices, as well as get live quotes directly from ticketing agencies. We have used this API in order to fetch live flight results. It is a very popular API with a success rate of 98%. The response from the API was in JSON format. We filtered the information as per our requirements and used it in our application.

Flights Live Prices : Querying live flight prices is done using sessions. A session can be created with the query details (origin location, destination location, cabin class etc...), and then we get a session ID. We can then use that session ID to poll results, sort results and filter results further [8].

Steps:-

1. Use the endpoint GET flights/create-session from Tripadvisor API to create a query session for flights.
2. Get back the session ID in the response from GET flights/create-session.
3. Poll the results using the endpoint GET flights/poll.

V. SCREENSHOTS OF IMPLEMENTATION

The screenshots of a few major modules of our application are shown below.

A. RCS booking

If the route entered by the user is an RCS route, then RCS flights will be displayed to the user, if they are available. The user will be asked to click a picture of himself on the next screen. The image will then be uploaded and will be shown on the final ticket generated.

Normal booking is similar to RCS booking. But, instead of clicking an image, he will be asked to add traveller details, if the number of travellers is more than 1.

An example is shown in the screenshots below.

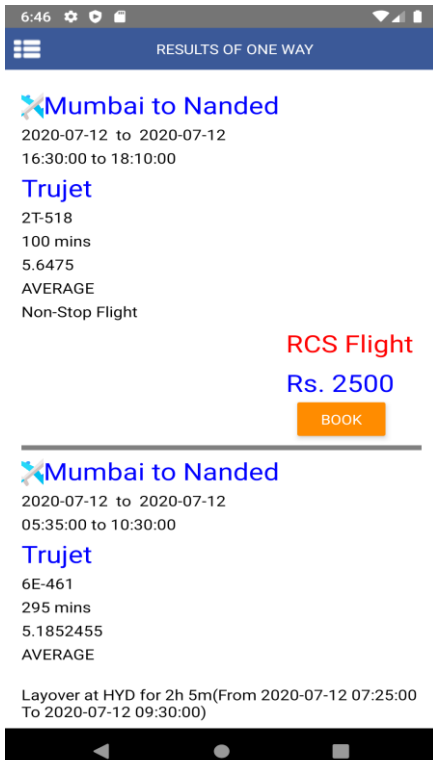


Fig. 2 Results of RCS flight search

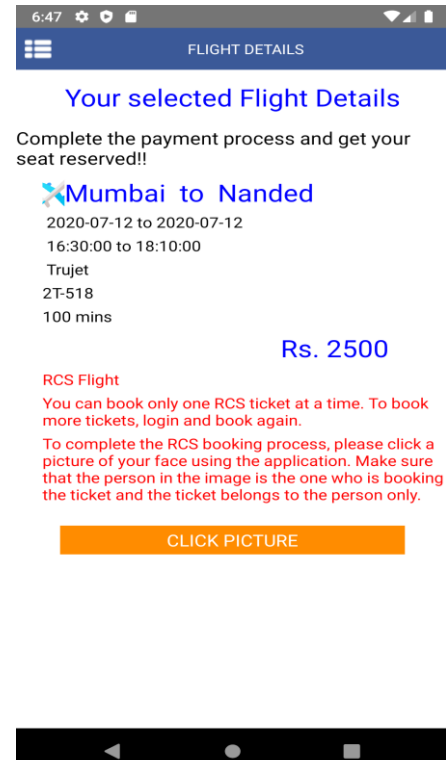


Fig. 3 Flight details of selected flight

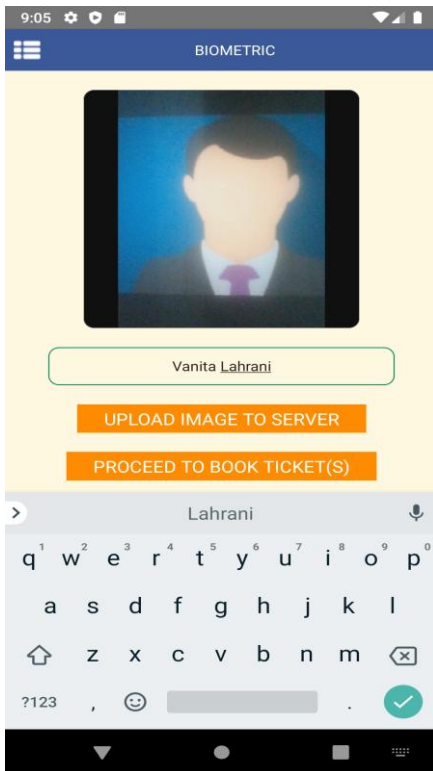


Fig. 4 Biometric module screen

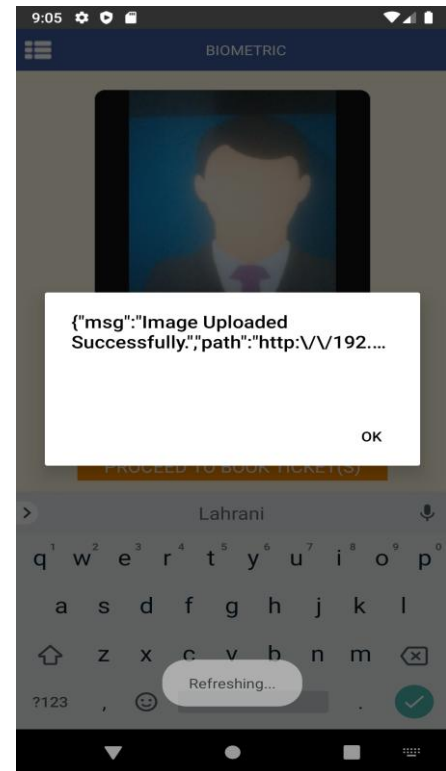


Fig. 5 Image successfully uploaded

B. Ticket Cancellation

A user can view his current bookings. To do so, he has to click on the Current Bookings option in the navigation drawer of

the application. All his currently booked flights will be displayed. The user can then cancel a ticket if he wants to, as the Cancel option is provided. Once his ticket is cancelled, an alert will be shown stating that the cancellation is successful and a particular amount will be refunded back to him depending on the number of days left in flight departure.

If the ticket cancelled by the user was an RCS ticket, then the next person, according to the booking timestamp stored in the database, will get an RCS ticket. To inform the upgraded user, a message will be sent to the user on his contact number. Msg91 API is used to send messages to the users. The message will state the amount that will be refunded back to the upgraded user. If the ticket cancelled by the user was a normal ticket, then only that person will be shown an alert stating the refund amount.

An example of RCS ticket cancellation is shown in the screenshots below.

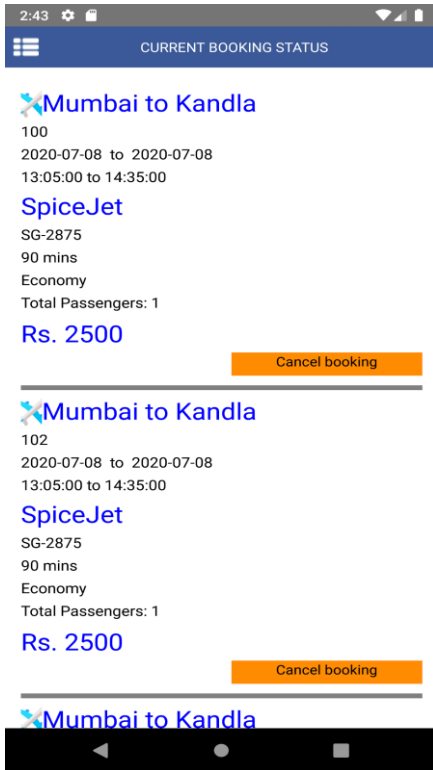


Fig. 6 Current Bookings screen

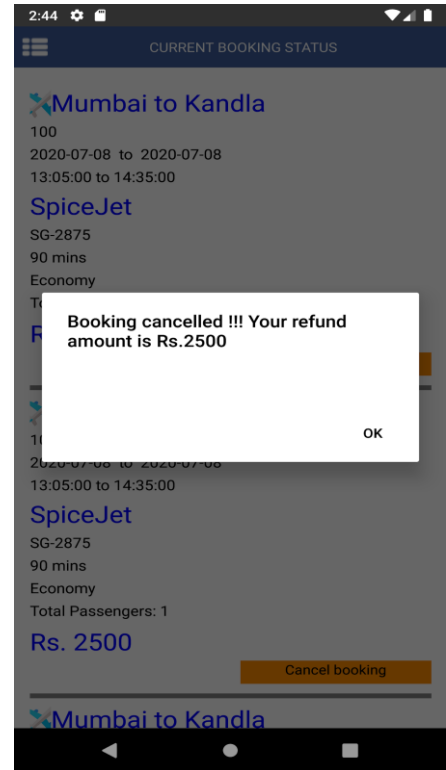


Fig. 7 Ticket cancellation

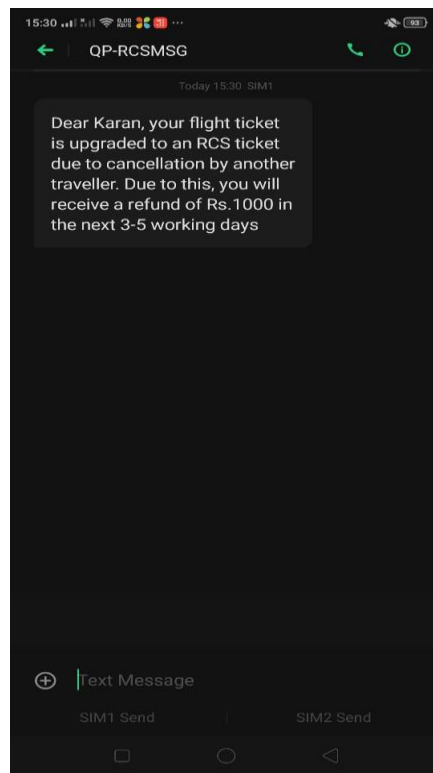


Fig. 8 Message received

C. View Booking History

A user can view his previous booking history. To do so, he has to click on the View History option in the navigation drawer. Entire history of his previous flights will be displayed. An example of Booking History of a user is shown in the screenshot.



Fig. 9 View Booking History

D. Ticket Generation

After payment is successful, an alert is shown to the user which states that the booking was successful. Then, the user is taken to the next screen. Here, users can click on the button which says generate a PDF of the ticket. Once the user clicks on the button, a PDF is generated and the path where the file is stored is shown to the user. Users can then view the PDF file there. If the flight is an RCS flight, it is mentioned in the Ticket along with the image of the user clicked at the time of booking the RCS ticket. If the ticket is of a normal flight, no image is present and instead the number of passengers are displayed.

An example of a PDF of an RCS ticket generated is shown in the screenshot below.

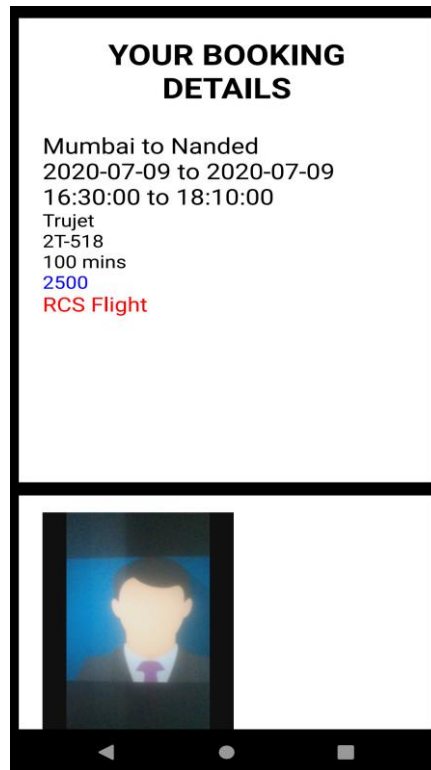


Fig. 10 Generated PDF

VI. FUTURE SCOPE

- The Ministry can use this application to book tickets as well as perform other tasks such as generation of reports, performing analysis etc. To book a ticket, the Ministry will have to login as a passenger/user. To generate reports, they can enter a particular name of an airline, a particular route and duration. Then, a report will be generated which will show the fraudulent and non-fraudulent bookings. Thus, fraud detection is performed. The Ministry can view various analysis reports and visual pie charts such as the revenue generated by various airlines, total number of flights and bookings under a route, etc.
- Reports and Analysis : The Ministry can generate various reports from the data as well as perform analysis of data.

VII. CONCLUSION

By creating this application, it not only becomes easy for people to book normal tickets, but also, people of RCS category are benefitted. Booking of RCS tickets is done only if the route and the flight is valid as per the RCS scheme and also, if the seats for RCS booking are available. Cancellation of normal as well as RCS tickets can be done using this application. This application will also help to prevent frauds that take place in booking of flight tickets.

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