

RAILEASE: Railway Concession Automation at College

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ABSTRACT

The "RAILEASE-Railway Concession Automation" is designed to simplify the process of applying for and availing railway concessions at college by creating a mobile application. This app design project leverages the powerful design and development tools of Flutter to create an intuitive and visually appealing interface for users to seamlessly navigate through the concession application process. Database handling is managed using Firebase.

The primary objective of this project is to offer a comprehensive solution that addresses the challenges faced by students in obtaining student railway concessions at the college. The Railway Concession App will streamline the application process, reduce paperwork, and enhance the user experience by providing a digital platform to request and obtain railway concessions.

General Terms

The Paper is subjected on the basis of the process to ease the process of granting the Railway Concession to Students by RAILEASE Application.

Keywords

Keywords—RailEase, Concession Automation, Mobile application, Firebase, Flutter.

1. INTRODUCTION

Indian Railways offers concessions for students travelling for college, provided by their respective colleges. These concessions are available under certain categories, such as students studying away from home or those going out for research, who are offered special concessions. Each college has a specific procedure to follow for these railway travel cost reductions.

In an era of digital transformation aimed at enhancing and simplifying processes, reducing paperwork, and improving user experience, the "RAILEASE-Railway Concession Automation at College" exemplifies this trend. It is a mobile application designed to streamline and modernise the process of applying for railway concessions. This report serves as comprehensive documentation of the conception, development, and evaluation of the railway concession system at college.

Railway concessions are essential for students as they provide financial relief on travel costs. Traditionally, the process of

applying for these concessions has been characterised by paperwork, queues, and occasional confusion.

As indicated by the pie chart, approximately 77% of students in a college take advantage of railway concessions, 18% are hostellers, and 5% are daily scholars who do not use the concession. To address the challenges faced by the majority of students and to offer a more user-friendly and efficient solution, the team embarked on the journey of creating the Railway

Concession application. This application's UI is designed using Figma, coded with Flutter, and the backend is managed using Firebase.

Percentage of Users taking concession

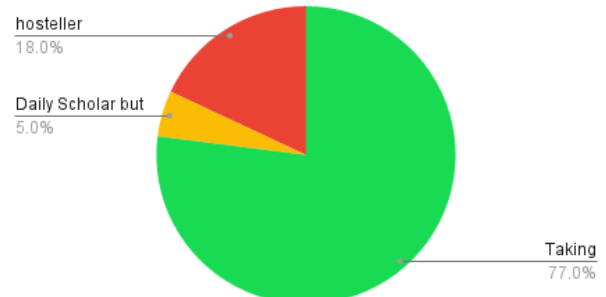


Fig.1: Pie chart showing the Distribution of Users taking concession, not taking and Hostellers

This report details the various stages of the app's development, from the initial ideation to design, implementation, and testing. It aims to provide a complete understanding of the project's objectives, methodologies, outcomes, and potential impact.

2. METHODOLOGY

To understand the difficulties students faced in obtaining railway concessions, the team conducted surveys and interviews with the student body. This approach allowed them to gather valuable insights into the students' specific pain points and requirements. By engaging directly with users, they identified the key challenges and obstacles encountered in the existing concession application process.

Based on the collected data, the team established the primary objectives of their application. These objectives included streamlining the railway concession application process, reducing the amount of paperwork involved, and enhancing the

overall user experience. By focusing on these goals, they aimed to create a solution that addressed the students' needs effectively and efficiently.

For frontend development, the team used Flutter, a powerful framework that allowed them to create a cross-platform mobile application with an intuitive and visually appealing user interface. This choice ensured that the application was accessible to a wide range of users, regardless of their device type.

For backend development, they utilized Firebase, which included setting up a real-time database, user authentication, and data storage. This ensured the smooth and efficient operation of the application, providing users with a seamless experience.

3. MOTIVATION

The motivation for creating the "RAILEASE-Railway Concession Automation" was rooted in the recognition of several pressing issues and a deep commitment to providing a practical, innovative solution. The key motivations for embarking on this project were as follows:

2.1 Simplifying Complex Processes

Applying for railway concessions, particularly for students, senior citizens, and differently-abled individuals, has traditionally been a cumbersome and paper-driven process. The motivation to create the app stemmed from a desire to simplify this process, eliminating the need for lengthy paperwork and queues at railway stations.

2.2 Enhancing User Experience

The motivation was to put the user's needs and experience at the forefront of the concession application process. We aimed to develop an app that would be intuitive, user-friendly, and accessible to individuals of all age groups and abilities.

2.2.1 Digital Transformation

In an increasingly digital world, there is a growing demand for digital solutions that simplify everyday tasks. The motivation was to leverage technology to bring railway concession applications into the digital age, making it easier and more efficient for passengers.

2.2.2 Reducing Ambiguity

Eligibility criteria for railway concessions can sometimes be unclear, leading to confusion and frustration among passengers. The app aimed to provide clarity by clearly defining eligibility and requirements, reducing ambiguity in the process.

2.2.3 Empowering Passengers (Students)

We were motivated by the concept of empowering passengers by giving them greater control and transparency in the application process. The app equips passengers with the tools and information they need to confidently apply for concessions, fostering a sense of independence and self-reliance.

2.2.4 Continuous Improvement

The motivation to create the Railway Concession App also derives from a commitment to continuous improvement and the need to confidently apply for concessions, fostering a sense of independence and self-reliance.

4. PROBLEM STATEMENT

The problem at hand is to design and develop a user-friendly mobile application using Flutter, accessible to both macOS and Android users, that simplifies the process of applying for and availing railway concessions.

4.1 Explanation of Problem Statement

The key issues to address include the current process for applying and availing railway concessions, which is often complex and time-consuming. Passengers, especially those eligible for concessions, face difficulties in understanding the eligibility criteria, gathering necessary documents, and navigating through the application process. The manual verification and approval process for concession applications can lead to delays and errors. Passengers often experience lengthy waiting times for approvals, resulting in inconvenience and frustration. Additionally, railway authorities need to implement robust fraud prevention mechanisms to ensure that concessions are provided only to eligible passengers and to prevent misuse.

The application will streamline and modernise the process of granting concessions to specific groups of students who register and apply using the app. Concessions are discounts or special rates offered to certain categories of students according to specified criteria. This application aims to make the process more efficient and user-friendly, allowing for a faster and more streamlined process, thus reducing the burden on railway staff and students. It is essential to develop an app that is accessible to all passengers, including those with disabilities, by providing various accessibility features to make it inclusive and user-friendly for all.

The app will integrate with existing railway systems, databases, and backend processes to ensure a smooth flow of information and approvals. Maintaining high-level security to protect passenger data, including personal and financial information, and ensuring compliance with data privacy regulations is crucial. The app should be designed to accommodate future developments and expansions in the railway concession system, as well as evolving technologies and user needs.

4.2 Objectives

The objectives of creating "RAILEASE-Railway Concession Automation" are as follows:

4.2.1 Simplify Concession Application Process

The primary objective is to simplify and streamline the process of applying for railway concessions. The app should make it easy for eligible passengers to understand and complete the application, reducing paperwork and bureaucratic hurdles.

4.2.2 Improve user Experience

Enhance the overall experience for passengers by providing a user-friendly interface and eliminating the need for passengers to visit physical offices or wait in long lines to apply for concessions.

4.2.3 Efficient Approval and Verification

Expedite the approval process for concession applications through digital verification and automation, reducing processing times and eliminating delays.

4.2.4 Enhance Information Accessibility

Make comprehensive information about available concessions, eligibility criteria, and required documentation easily accessible within the app to inform passengers about their entitlements.

4.2.5 Feedback and Improvement

Collect user feedback to continuously improve the app and adapt to changing student needs and preferences.

These objectives collectively aim to create a Railway Concession Application that not only benefits passengers but

also leads to increased efficiency and transparency within the railway industry while promoting accessibility, inclusivity, and data security.

5. CONTRIBUTION

The "RAILEASE-Railway Concession Automation" to streamline and modernise the process of granting concessions to specific groups of students who registered and applied using the application. Concessions are discounts or special rates offered to certain categories of students according to the criteria specified by the student. This application will specially work in order to make the process handier by making it efficient, allowing for a faster and more streamlined process, reducing the burden on railway staff and students. Thus the application is divided as student and admin portal. The student portal is to facilitate the students and admin portal which is managed by the staff that manages and grant the railway concession[1].

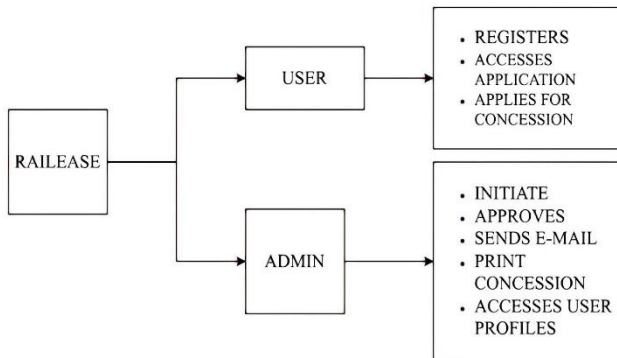


Fig.2:Architecture/Framework of RAILEASE app including two portal admin and student

5.1 Student Portal

The application will allow users to register by submitting all the required documents, such as Aadhar card, photo, etc. Once the registration is complete, users will receive a proper slot allotment and can go to the office counter to collect their railway concession at the designated time. Students who have

registered for the concession will receive notifications about updates and reminders regarding the collection of the railway concession form. Additionally, students will have the option to provide feedback related to the app. This automation makes the application user-friendly and simplifies the work for students .

Fig. 3 shows the Student Portal where users can access the steps to apply for the concession, view their e-history, and apply for the concession, ensuring the application process is straightforward and accessible.

5.2 Admin Portal

This portal is managed by staff responsible for making railway concessions available. They are provided with a proper platform and workspace, which automates their tasks and reduces effort. The automation of processing features reduces the need for manual data entry and verification, streamlining the workload for concession in-charge personnel and allowing them to focus on more critical tasks. The online system creates an efficient workflow, as applications and requests can be handled electronically, leading to faster processing of concession requests and reducing the workload on staff. With the online system, concession in-charge personnel spend less time dealing with paperwork and administrative tasks associated with manual processing, freeing them up to perform more strategic and value-added activities.

The RAILEASE-Railway Concession Automation simplifies and streamlines the tasks of concession in-charge personnel by reducing administrative burdens, enhancing accuracy, and providing valuable data for decision-making. These benefits ultimately lead to more efficient and effective management of concessions, resulting in improved customer service and satisfaction for railway passengers. RAILEASE incorporates a robust database system to store relevant information such as passenger data, concession types, validity periods, and terms of concession agreements. This database ensures quick access to essential information and facilitates accurate processing of concessions.

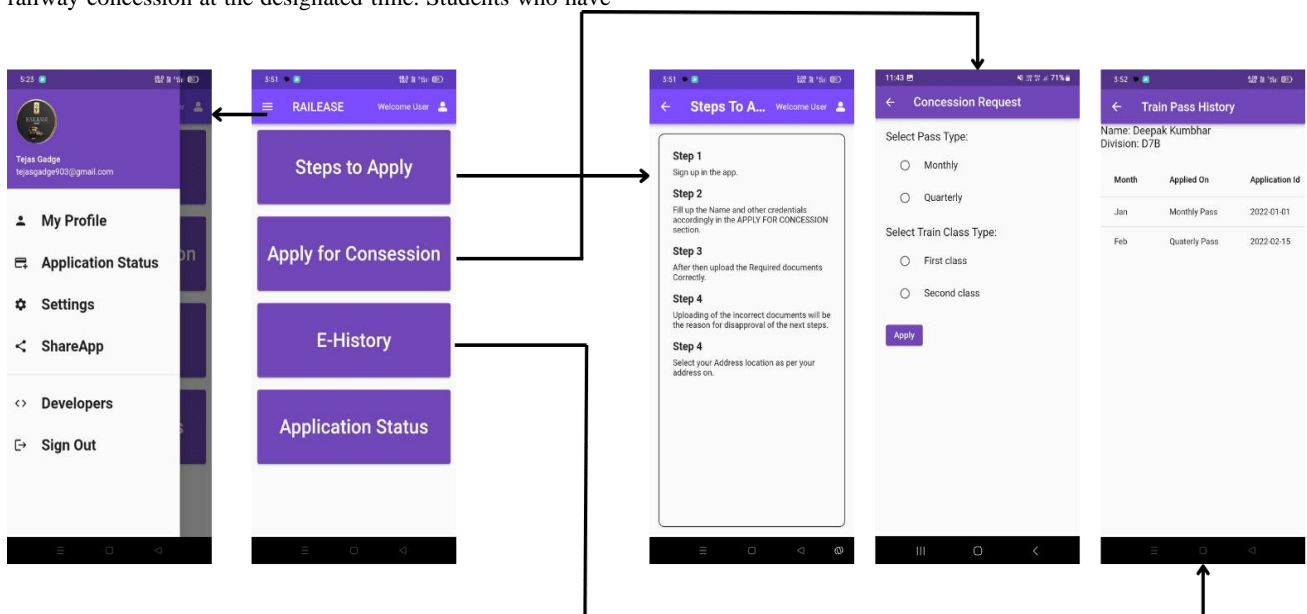


Fig. 3: Student Portal UI using Flutter

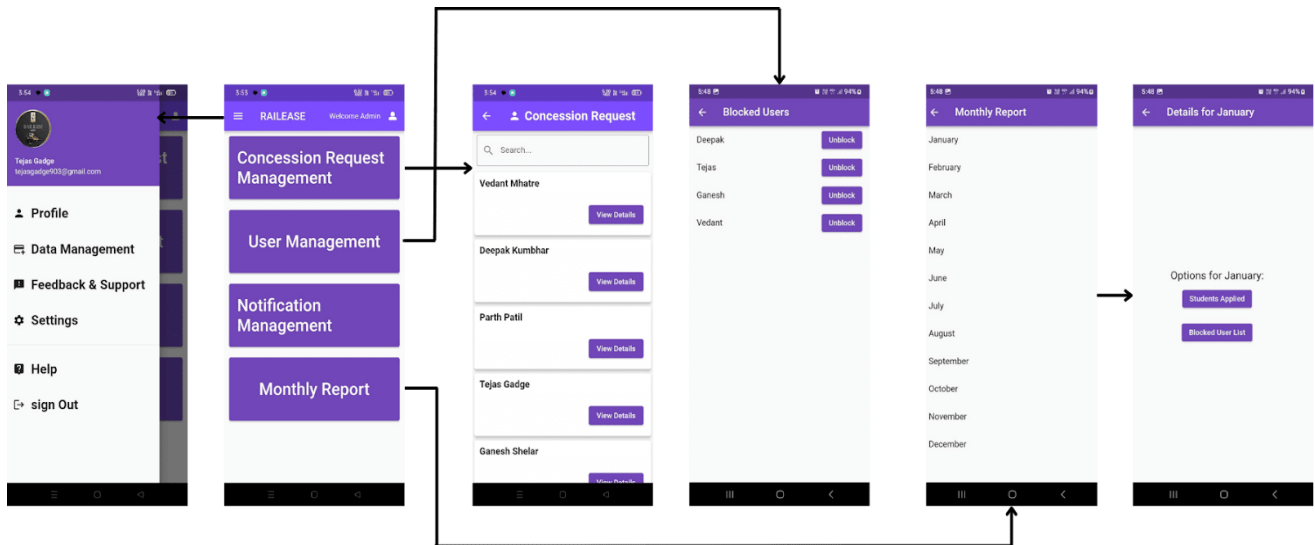


Fig.4: Admin Portal UI designed using Flutter

Through automation, the system simplifies various concession-related tasks, including issuing, renewing, and managing concessions. Automated processes reduce manual errors and save time for concession personnel.

5.3 Railway pass reminder

To implement a reminder system for expired railway passes, Once the expired passes are identified, the server-side script sends notifications to users via email, SMS, or push notifications (if using a mobile app). The notification informs the user that their railway pass has expired and provides instructions on how to renew it; this is shown in Fig 5.

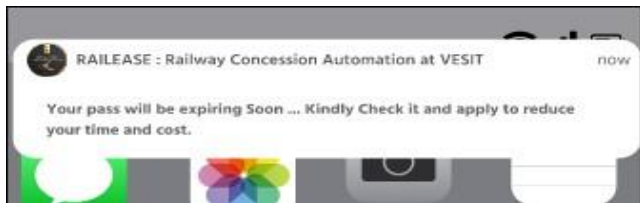


Fig.5: Reminder Notification

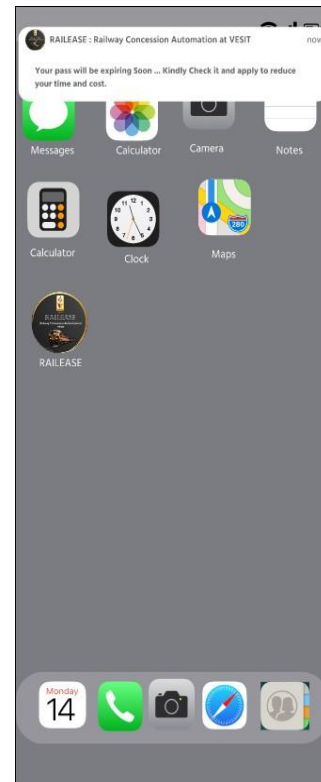


Fig. 6: Railway pass reminder

5.2. Review and feedback system

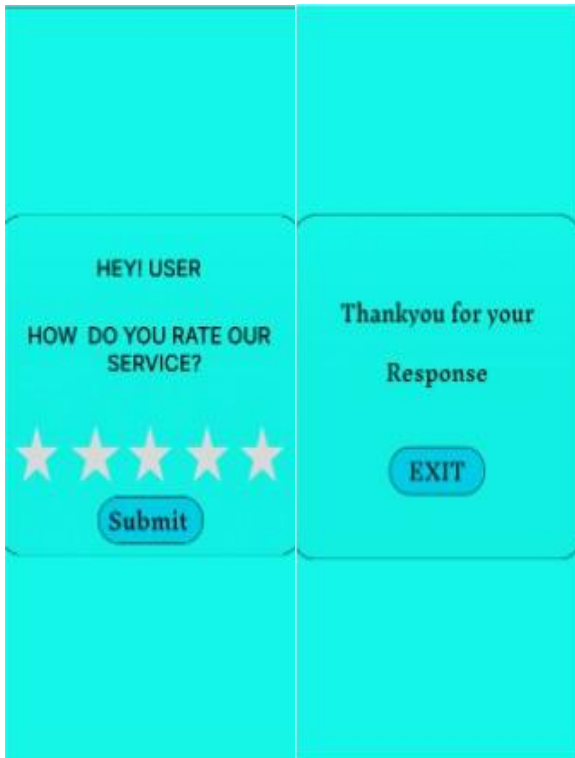


Fig. 7: Review and feedback system

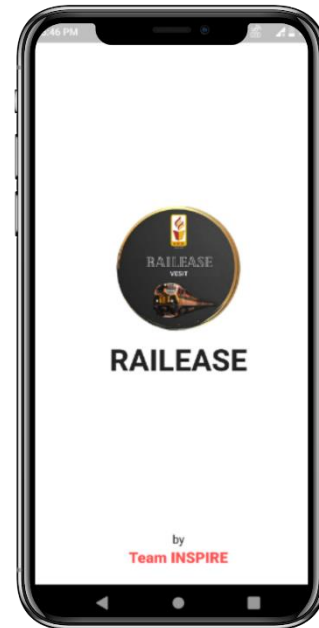


Fig. 8: UI of the RAILEASE Application

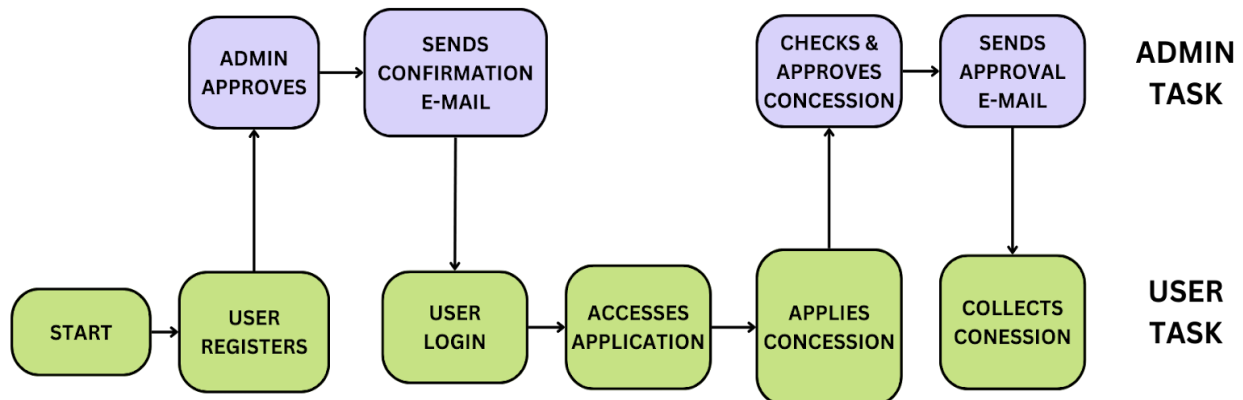


Fig.9: Flow of the RAILEASE APPLICATION

6. CONCLUSIONS

The creation of "RAILEASE" marks a pivotal step towards modernising and enhancing the process for students applying for railway concessions. This innovative solution addresses several critical needs and challenges within the existing railway concession system.

The application development is rooted in the pursuit of greater convenience, efficiency, and accessibility for railway passengers. By providing a user-friendly platform for applying for and availing concessions, it simplifies a historically cumbersome process and reduces the administrative burden on both students and railway staff.

Through automation, the app accelerates the processing of concession requests, resulting in faster approvals and reduced waiting times for passengers. This increased efficiency enhances the overall travel experience for passengers, particularly those who are eligible for concessions.

Regularly analyse the feedback received from users to identify common trends, issues, and suggestions for improvement. Use this feedback to prioritise and implement updates and enhancements to the application and the user can also review by rating the application service as shown in fig7.

Moreover, the data management and reporting capabilities of the app provide valuable insights to railway authorities. This data-driven approach allows for better decision-making, the ability to track concession trends, and necessary adjustments to policies, ultimately improving service quality for passengers.

The app's user-friendly interface and accessibility ensure that a broader range of passengers, regardless of location or physical constraints, can easily avail themselves of the concessions they are entitled to.

In summary, the creation of the online railway concession app represents a significant leap forward in modernising and improving railway services. It aligns with the growing need for technological solutions that enhance the passenger experience, streamline operations, and promote sustainability. This app has the potential to transform how railway concessions are managed, making travel more accessible, efficient, and user-friendly for passengers while benefiting railway authorities through improved data management and transparency.

7. ACKNOWLEDGMENTS

The opportunity to work on RAILEASE was a significant chance for learning and professional development for the team involved. They would like to take this opportunity to express heartfelt appreciation and gratitude to everyone who contributed with their continuous guidance in creating the "Railway Concession." The completion of this report was made possible through the collaborative efforts, dedication, and support of many individuals and entities.

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This project and report symbolise the dedication, hard work, and collaboration that are at the heart of a successful academic endeavour. The team hopes that the insights and knowledge shared in this report will be of value to their institution and the wider academic community. This project also helped the team develop their skills by learning new languages through available online resources. They would also like to take a moment to thank fellow students who contributed through brainstorming, discussions, or providing moral support during the project.

Once again, thank you all for your contributions, support, and unwavering commitment to the success of this project and report.

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