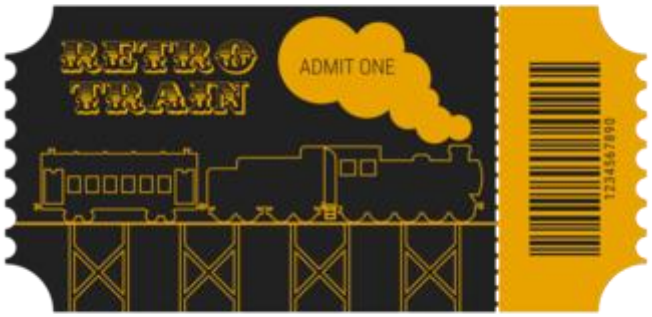
E-Season

Higher National Diploma in Software Engineering

Final Project Proposal

GA/HDSE23.2F



School of Computing and Engineering

National Institute of Business Management

GALLE

Innovation and Entrepreneurship Project

SUBMITTED BY

GAHDSE232F - 009 KAUSHALYA M G T P

GAHDSE232F – 013 CHANDIMA M M R

SUPERVISED BY

Ms. SANDARUWANI PATHIRAGE

Table of Contents

1. Title and Introduction of E-Season

1.1 Introduction

Railways has managed to occupy a strong position in the transport sector of Sri Lanka. A large number of Sri Lankans fulfill their transportation needs through railway service and this is the most popular mode of transportation. But unfortunately, still we can see long queues to get train season. Due to this, the passengers as well as the train staff will be in dire straits.

We realized that there is a need in the country for a more efficient and faster solution with new technology to manage the inconvenience caused to the passengers as well as the railway staff due to this problematic situation.

To solve these problems, we suggest a mobile app called **E-Season** to easily get train season from home. The aim is to provide an improved experience to passengers by saving time and effort by being able to get the train season without standing in long queues.

1.2 Problem Definition

Sri Lanka Railways currently relies on a manual method for managing and distributing train seasons. This approach has several significant drawbacks that affect both passengers and railway staff.

For Passengers:

- **Inefficient season Process:** The current method of obtaining train seasons involves long queues at ticket counters, leading to significant waiting times.
- **Passenger Frustration:** Prolonged waiting periods can lead to dissatisfaction, impacting the overall travel experience.
- **Lack of Convenience:** Passengers are unable to secure tickets from home, adding to the hassle of their daily routines.

For Railway Staff:

- **Increased Workload:** High customer volumes at ticket counters place additional pressure on staff, complicating their ability to assist effectively.
- **Operational Inefficiencies:** The manual process can lead to errors and delays, further straining staff resources.

Need for Improvement:

There is a pressing need for a technological solution that addresses these challenges, simplifies the Season purchasing process for passengers, and alleviates the workload on railway staff.

2. Objectives and Goals of E-Season

2.1 Objectives

Enhance Convenience:

- Make a mobile app that will enable passengers to buy train seasons using their tablets or smartphones, and hence get rid of physical ticket counters as well as the inconvenience brought by long queues.
- In addition, add saved payment methods and quick access to previous purchases so as to simplify the purchase process.

Streamline the Process:

- Create a digital season buying process, which automates sales and reduces manual interventions, thus minimizing human errors.
- Include things like mobile ticket validation so as to improve user experience thereby reducing the probability of fake tickets.

Make User Experience Better:

- After designing the app, ensure that it has user-friendly navigation as well as intuitive interface needed for a diverse range of users including those unfamiliar with the technology.
- Make sure there are options for accessibility such as text-to-speech and larger font sizes that will help accommodate different types of users.

Season Availability Increased:

- Ensure the app provides real-time updates on ticket availability, helping passengers plan their travel and avoid disappointment.
- Offer notifications for ticket releases and promotions to keep users engaged and informed

.

2.2 Goals

Reduce Queue Times:

- Aim to decrease the average time passengers spend obtaining seasons by at least 50% within the first year of launching the app, thereby improving overall user satisfaction and travel experience.
- Track all user interactions and, through this, identify as well as remove bottlenecks that may be in the sales process.

Boosting Operational Efficiency:

- Aim to reduce the workload on railway staff at ticket counters through the automation of seasons sales, allowing staff to focus on customer service and other operational tasks.
- Track staff interaction data to measure the effectiveness of the app in easing pressure at ticket counters.

Gather User Feedback:

- A feedback mechanism set up within the application to keep track of customers' views for app improvement ensures such changes are made in line with real users' needs.
- To improve features and performance of the app in response to consumers' preferences, a target of 80% consumer satisfaction will be attained by collecting responses within one year.

3. Scope and Features of E-Season

3.1 Functional Requirements of the system

User Registration and Authentication:

- Users should have the ability to create accounts either by email, phone number or with any of their social media accounts.
- The should of users to login securely and restore their passwords when they forget is crucial.
- Train staff should be able to securely log in to the system using their credentials.

Season Purchasing:

- Users should be able to browse available train seasons based on routes and dates.
- Users should be able to process transactions through a secure payment gateway supporting multiple payment methods (credit/debit cards, digital wallets).
- Train staff should be able to validate mobile Seasons by scanning or verifying the digital season shown by passengers on the app.

Real-Time Season Availability:

- Users should be able to view real-time information on Season availability and price for each train route.
- Users should be able to receive notifications of any changes in Season status (availability, price changes).
- Train staff should be able to access real-time information on Season availability and passenger details for verification purposes.

User Profile Management:

- Users should be able to manage their profiles, including updating personal information and payment methods.
- Users should be able to view their purchase history and download Seasons.

Notifications and Alerts:

- Users should be able to receive push notifications for Season availability, promotional offers, and reminders for upcoming travel.
- Users should be able to receive alerts for any service disruptions or changes in schedule.

Feedback and Support:

- Users should be able to submit suggestions and report issues through a feedback mechanism.
- Users should be able to access a help section with FAQs and contact options for customer support.
- Train staff should be able to access a support section to report issues and receive assistance with the app functionalities.

Multilingual Support:

- Users should be able to use the app interface in multiple languages to cater to diverse user demographics.
- Train staff should be able to use the app interface in multiple languages to effectively communicate with passengers of diverse backgrounds.

Mobile Season Validation:

- Users should be able to show their Season on the app during travel for mobile Season validation.

Data Security and Privacy:

- The app should be able to ensure compliance with data protection regulations, including the secure storage of user data and payment information.

3.2 Nonfunctional Requirements of the system

Performance:

- The app shall be able to load within 2 seconds for any action or screen transition.
- The app shall be able to handle a minimum of 10,000 concurrent users without performance degradation.

Scalability:

- The system shall be able to scale horizontally to accommodate an increasing number of users and transactions.
- The architecture shall be able to support adding new features without major changes to existing components.

Reliability:

- The system shall be able to ensure 99.9% uptime, with minimal downtime for maintenance.
- The system shall be able to implement redundancy and failover mechanisms to prevent service interruptions.
- The app shall be able to have an intuitive user interface, requiring minimal user training.
- The app shall be able to ensure consistency in design and navigation across all screens.

Security:

- The app shall be able to use encryption for data transmission and storage to protect user information.
- The app shall be able to implement multi-factor authentication for account access.
- The app shall be able to be regularly updated to address security vulnerabilities.

Compatibility:

- The app shall be compatible with the latest and previous two versions of major mobile operating systems (iOS and Android).
- Ensure the app works seamlessly on various screen sizes and resolutions.

Maintainability:

- The app shall be able to use modular and well-documented code to facilitate easy maintenance and updates.
- The app shall be able to implement automated testing to ensure new updates do not introduce bugs.

Portability:

- The app shall be able to be easily deployable on different cloud platforms if needed.
- The app shall be able to ensure that data can be migrated between systems without loss.

Localization:

- The app shall be able to support multiple languages and regional settings, allowing users to choose their preferred language.
- The app shall be able to ensure proper formatting for dates, times, and currencies based on user preferences.

3.3 Scope

Project Overview:

The E-Season project hopes to create a mobile app that will help Sri Lankan commuters buy train season tickets in a more straightforward way. It will be easier for customers because the application is convenient, effective and user-friendly; therefore, it makes the long queues and manual ticketing obsolete. To increase efficiency, the E-Season app will leverage on innovations such as digitalization of railway staff's workstations so as to make life easier for travelers and their hosts.

Scope

User Registration and Management:

- Account creation and authentication.
- Profile management, including updating personal information and payment methods.

Season Purchasing System:

- Browse and select train season tickets based on routes and dates.
- Secure payment gateway integration supporting multiple payment methods.
- Real-time ticket availability display.

Mobile Seasons Validation:

- Digital Seasons that can be validated on mobile devices.
- Integration with existing railway validation systems.

Notifications and Alerts:

- Push notifications for Season availability, promotions, and travel reminders.
- Alerts for service disruptions and schedule changes.

User Feedback and Support:

- In-app feedback mechanism for user suggestions and issue reporting.

- Help section with FAQs and contact options for customer support.
- Accessibility and Multilingual Support:
- Multilingual interface to cater to a diverse user base.

Security and Compliance:

- Data encryption for secure storage and transmission.

Performance and Reliability:

- Ensuring the app is performant and reliable with minimal downtime.
- Scalability to handle increasing user numbers and transactions.

4. Target Audience of E-Season

Daily Commuters

Description:

- People who use trains consistently for commuting to their places of work or study. They depend on public transport to prevent road traffic jams and reduce travelling expenses.

Needs:

- Quick access to season tickets to avoid long queues.
- Reliable and consistent service for timely travel.
- Seamless integration with their daily routines.

Age Group:

- 18-60 years.

Students

Description:

- School and university students who travel by train frequently.

Needs:

- Affordable ticketing options to manage their limited finances.
- Convenient and fast ticket purchasing to fit their busy schedules.
- Discounts or special offers tailored to students.

Age Group:

- 12-25 years.

Senior Citizens

Description:

- Aged people who totally depend on trains as a means of transport in most cases for the purpose of social visits, medical appointments or leisure.

Needs:

- The app is made simpler and accessible through features like larger text, voice assistance and easy navigation.
- Reliable information on train schedules and routes.

Age Group:

- 60+ years.

Railway Staff

Description:

- Employees involved in ticket sales, customer service, and train operations, seeking to improve operational efficiency and passenger management.

Needs:

- Reduced workload through automated ticketing processes.
- Training on app features and mobile ticket validation procedures.
- Reliable and secure access to passenger data and ticketing information.

Age Group:

- 25-60 years.

5. Technical Requirements for E-Season

5.1 Proposed Technologies

Front-End Development:

React Native:

- JavaScript and React-based framework which is very famous in cross-platform mobile app development that makes it possible to write code only once for both iOS and Android.

Redux:

- This is a predictable state container for JavaScript apps, which helps to deal with the application state management.

Expo:

- The universal platform or framework that assists in building, deploying as well as iterating quickly on mobile applications that are based on react.js technology.

Back-End Development:

Spring Boot:

- It is a framework for developing production ready Java applications; it includes an opinionated view of the Spring platform – "Spring Boot Starter Projects", which allow developers to get started without spending time configuring spring dependencies manually.

Node.js with Express.js:

- JavaScript runtime plus a server-side web application framework built on Chrome's V8 JavaScript engine; express.js also contains tools for making HTTP requests from one computer (server) to another (client).

6. Project Timeline of E-Season

6.1. Gantt chart