Ticketo

PROJECT PROPOSAL

GROUP 25

SCS 3214 /IS 3113 - Group Project II

SCS3214 / IS3113: Group Project II - 2022 Project Proposal

Proposed Project Title: ***Ticketo*** -An Automated Ticket Purchasing System

Project Group Details:

1. Group number: 25
2. Group members: 06

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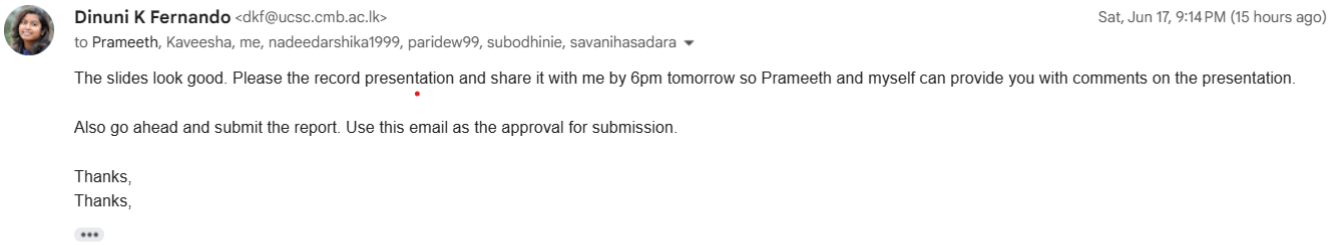
Details of Project Supervisor, Co-supervisor

Proposed Project Supervisor (Academic Staff of UCSC):

Name of the supervisor: Dr. M.G.D.K Fernando



Dinuni K Fernando <dkf@ucsc.cmb.ac.lk> Sat, Jun 17, 9:14 PM (15 hours ago)
to Prameeth, Kaveesha, me, nadeedarshika1999, paridew99, subodhinie, savanihasadara

The slides look good. Please the record presentation and share it with me by 6pm tomorrow so Prameeth and myself can provide you with comments on the presentation.

Also go ahead and submit the report. Use this email as the approval for submission.

Thanks,
Thanks,

Date: 18 / 06 / 2023

Proposed Project Co-Supervisor (Assigned by Course Coordinator):

Name of the co-supervisor: Mr. Prameeth Madhuwantha

……..

Signature of the co-supervisor:

06/18/2023

……

Date:

The client of the Project (If applicable, otherwise supervisor will be considered as the client)

Name of the client: Dr. M.G.D.K Fernando

Address of the client:

Contact person at client:

Contact number of the contact person:

e-mail address of the contact person:

Table of Contents

Project Details

1. Project Title : Ticketo

2. The Goal and Objective

2.1 Goal of the Project

The manual process of booking and purchasing train tickets in the current Sri Lankan Railway system can be quite a hassle. The goal is to reduce the problems faced in railway ticketing and booking in Sri Lanka and give both local and foreign passengers a better passenger experience through user-friendly and interactive ,mobile responsive web application.This will be more time-efficient and safer. This mainly aims to reduce waiting times in long queues in railway stations and improve the efficiency of the railway ticket purchasing process using digital technologies.

2.2 Objectives of the project

The main objective of the project is to transform the current manual ticketing process into an automated and efficient system. This will be achieved through the implementation of an advanced e-ticket purchasing system. The project aims to enhance the overall experience for passengers by providing real time train information and tracking facilities. It also seeks to improve journey planning by offering detailed train schedules, including accurate arrival and departure times at each station. The project objective is to provide following features to the system users,

- Convenience - The system limits the need for physical ticket collection, allowing passengers to purchase and store their tickets electronically. This convenience saves time and effort for passengers and leads to shorter queues and faster ticket validation processes, as they can access their tickets anytime, anywhere through a mobile device or computer.
- Reduced Manual Efforts - By automating the ticketing process, the system significantly reduces the manual effort required for ticket checking. This helps to streamline operations, minimise errors, and free up staff to focus on other important tasks.
- Enhanced Efficiency - The system improves overall efficiency of the ticket validation process. Digital tickets can be quickly scanned or validated using QR code scanning technology, reducing the time and effort required for manual ticket checking.
- Real-Time Train Information - By providing real time train information and tracking facilities to passengers, the system enables better journey

planning.Passengers can access up-to-date train schedules, including arrival and departure times.

- Enhanced Customer Satisfaction - The combination of convenience, efficiency, real-time information, and user friendly interfaces improves the overall customer satisfaction. Passengers experience a smoother ticketing process, reduced waiting times, and leads to positive customer experience.

3. Problem Definition

The train system in Sri Lanka faces challenges due to manual procedures, resulting in inefficiencies and inconveniences for passengers. One major problem is the manual handling of ticket tasks. People have to wait in long queues for ticket purchasing and checking, which leads to frustration and wasted time, especially for passengers with busy schedules or other commitments.

Additionally, even if online railway ticket booking is an option, passengers must still physically visit the train station to collect their tickets. The ease and effectiveness that online booking seeks to provide are lessened by this additional requirement. For passengers, especially those who might have to travel for a long time or have transit difficulties to get to the station, this causes unnecessary difficulties.

Furthermore, passengers frequently face challenges with train delays and a lack of real-time train location information. The absence of accurate and timely updates leaves passengers uninformed about possible delays or cancellations, compelling them to wait uncertainty for extended periods at train stations. Furthermore, in situations where train breakdowns happen, passengers often receive notifications only after a significant amount of time has passed, leading to frustration and wasted time.

Also, there is currently no centralised and trustworthy platform that offers a complete and reliable schedule of train services, including precise arrival and departure times at various stations and the seat booking facility.This lack of readily available and updated information poses difficulties for passengers in effectively planning their trips. Passengers remain unaware of train stop stations, stop durations, and exact arrival and departure times, thereby complicating their travel arrangements and affecting their ability to reach their destinations punctually.

It is essential to provide a comprehensive technical solution that may improve and optimise Sri Lanka's train system in order to address these issues. We can completely transform the way customers experience train travel by using the potential of modern technologies like automation, digital platforms, and real-time data. For local and foreign train passengers in Sri Lanka, this solution will help to save wait times, provide correct information on train schedules and locations, and ultimately improve overall satisfaction and convenience.

4. Introduction to the project

The proposed system aims to address the existing challenges and inefficiencies within Sri Lanka's train system by providing an integrated and user-friendly technical solution. Leveraging modern technology, the system seeks to streamline and automate various procedures, offering users a seamless and hassle-free experience throughout the ticket booking and train travel processes.

The proposed system incorporates an efficient online platform for ticket booking, serving as a key component. Passengers can access the system, enabling them to register and log in. By utilising the app, individuals can conveniently check train schedules by specifying their departure and destination locations, select their preferred route, and proceed with online ticket reservations. Unlike the current seat reservation system in Sri Lanka, which allows a maximum of five seat reservations at once, the system offers customers the flexibility to reserve any desired number of seats. Additionally, passengers can conveniently purchase daily train tickets through the system. Upon inputting their departure and destination details, passengers can check if the balance in their wallet is sufficient. If the balance is enough, they can include their starting point and train class and generate an e-ticket containing a QR scode and journey information. Ticket checkers at the train station will validate the e-ticket by scanning the QR code, allowing the passenger to commence their journey. Similarly, at the destination station, the QR code will be scanned by the ticket checker, and the payment will be deducted from the passenger's digital wallet. The platform ensures a secure and swift transaction process, providing passengers with a safe digital wallet. Once the payment is completed, the generated e-ticket will be rendered invalid.

As mentioned above,the system we develop will include automated ticket validation in order to increase the effectiveness of ticket checking. To avoid long lines and cut down on manual ticket checking time, passengers can just submit their electronic tickets, which will be validated by the system.

The system will incorporate a crucial feature that offers real-time train updates and information. Passengers will have access to accurate and up-to-date train schedules, including arrival and departure times for each station. The system will provide real-time train location tracking, enabling passengers to stay informed about the current position of the train. This functionality will significantly enhance passenger comfort and facilitate improved journey scheduling and planning. To address train breakdowns and delays, the system will integrate an automatic notification system. Passengers will promptly receive information and notifications in the event of train delays, cancellations, or other disruptions. This feature ensures that passengers stay informed about any disturbances to their planned train journeys.

In conclusion, the proposed approach presents a transformative solution for Sri Lanka's train system, offering passengers a seamless and user-friendly experience. The objective is to enhance the ticketing process, minimise waiting times, provide precise train schedules, and promptly communicate any delays through automated and real-time updates. Through the integration of these technical advancements, the solution is poised to significantly enhance the overall efficiency and passenger satisfaction of Sri Lanka's train system.

5. Scope of the project

5.1 Actors in the system

1. Passenger
2. Ticket clerk
3. Station master
4. Train Driver
5. Ticket Checker
6. Admin

5.2 Main functionalities of the system

1. Passenger

- Login/Signup
- Check train schedule
- Seat reservation

  Passengers get to enter the starting station, destination, no of passengers and generate a ticket which they can present to the station when checking in. We will be providing the option to choose the seats to their liking and will be able to receive a refund in case of a cancellation of a train.

- Cancel reservation

  If a passenger cancels their reservation within 2 days of the scheduled trip, no refund is provided. This means the passenger will not receive any money back for the cancelled reservation. If a passenger cancels their reservation between 2 to 7 days before the scheduled trip, they are eligible for a 50% refund. In this case, half of the total amount paid for the reservation will be returned to the passenger. If a passenger cancels their reservation more than 7 days before the scheduled trip, they are eligible for a 75% refund. Here, the passenger will receive 75% of the total amount paid for the reservation.[1]

- Purchasing ticket

  Ticket purchasing will be done through the system which will contain a wallet feature that can be topped up through their bank card.

  In the beginning of a passenger's journey, they may enter the starting station and the destination and check if the needed fare is available in their wallet. If the fare is available in the wallet then they can generate a ticket with a QR code including the starting station, class and number of passengers.

  When entering the station through the gate the passenger has to scan the QR code of the ticket, which will then mark their journey as started. At the destination they will once again scan the QR code to end the journey, when the total fare will be calculated for the two stations to be deducted from their wallet.

  If a person doesn't have enough credit in their wallet, the ticket will be rejected at the checkout which will result in a fine for the passenger. To avoid being fined they may top up their wallet before checking out.

  Once a passenger scans the ticket at the destination that particular ticket will be nullified, paid for and no longer valid. If a passenger fails to scan the ticket at

the destination, they will be unable to book another ticket since the previous ticket is not paid for. In a situation like this the system will be checking for all tickets bought within the last 4 days and have not been paid for. The passengers who purchased these particular tickets will be tracked with the information in their accounts and will be fined accordingly by the authorities. (Please note that implementing legal actions or fines on passengers is out of the system's scope)

Once a ticket is scanned at the starting station it will be non refundable unless it was a reservation.

- Top up the digital wallet of the passenger through a bank card
- View train delays/arrival notifications
- Add complaints
- Buy and share ticket for a peer

  Passengers have the ability to buy a **sharable ticket** for another passenger who does not possess the application. The ticket fare will be reduced from the booking passenger's account.

  The ticket will be similar to the normal ticket with a share option.
- View purchased ticket history
- Give Coin Rewards

  Passengers who frequently purchase tickets are rewarded with coins.When a passenger accumulates a specific amount of coins, their account can be recharged with a fixed amount of credit. This credit can then be used to purchase tickets, covering the remaining ticket price for their trips.

2. Ticket Clerk

- Login
- Seat Selection & Reservation

  This applies for any passengers who will be using the traditional over the counter seat booking system instead of the web portal. The ticketmaster books the seats on behalf of the passengers and updates the reserved seats in the system. He will hand over the generated ticket to the passengers afterwards.
- Cancel reservation

Similar to the seat selection & reservation, the ticketmaster will be able to cancel the booking manually upon a passenger's request, prior to a certain time period to the start of the journey.

3. Train Driver

- Login
- Share live locations

  The trains will be installed with a device which will be sharing its geocode in a fixed time interval. The system will compare this geocode to be within a certain radius from a station. If the train is within that radius the train is considered to have arrived at that particular location.

  We can calculate the delays with this method as well.

- View train schedule

4. Ticket Checker

- Login
- Ticket validation at the checkin and checkout

5. Station Master

- Login
- Add Ticket checkers/ticket clerks to the system
- Update Train delay times

  When a train is delayed for a mechanical or other unavoidable reason, the train must stay at a designated station where the station master can update the delay time

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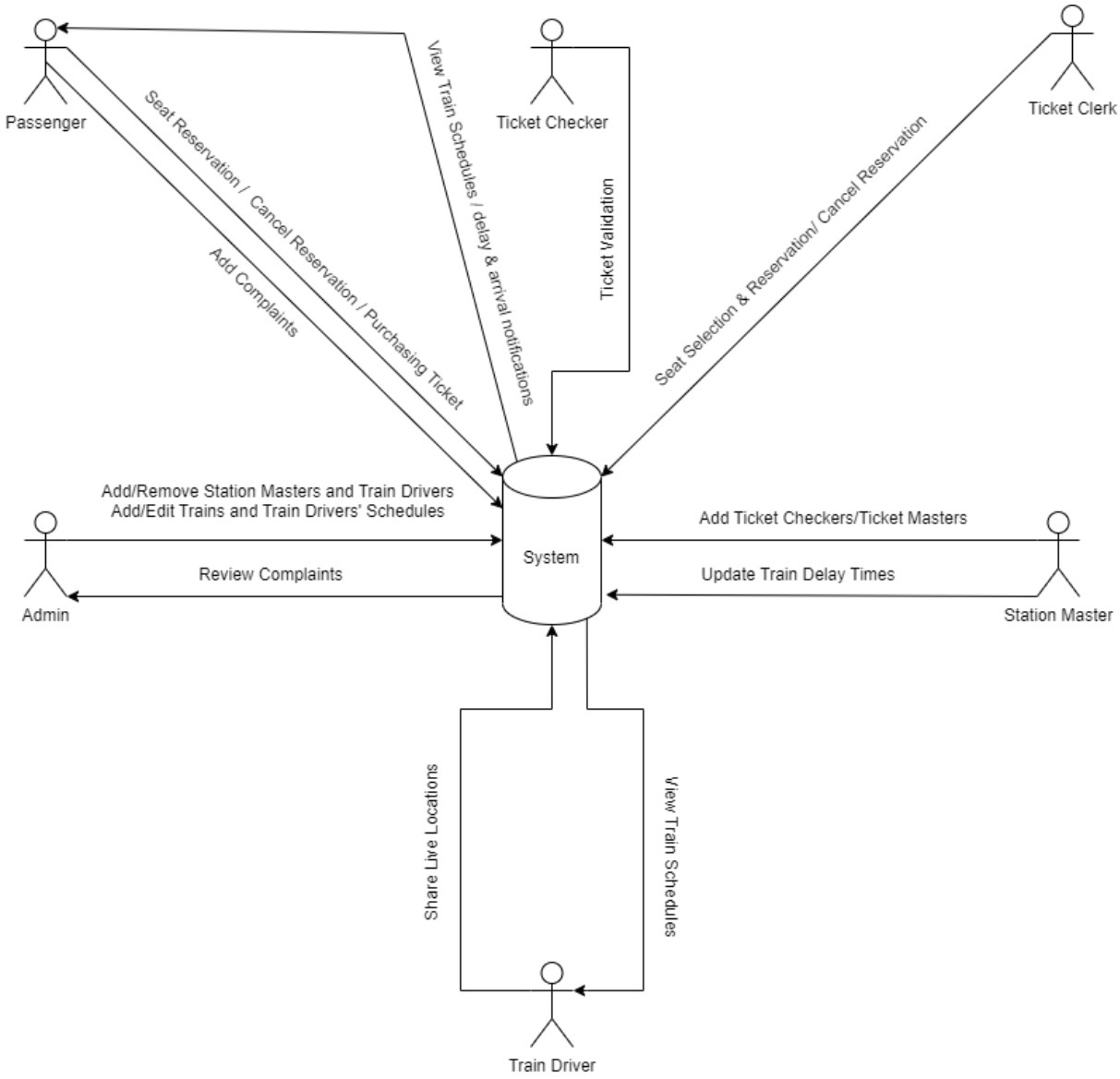
6. Admin

- Login
- Add/Remove Station masters
- Admin can assign station masters/train drivers
- Add/Edit Trains Schedules
- Assign/Edit train driver Schedules
- Review Complains
- Report generating



6. Tentative Technologies

- Front End Technologies - ReactJs

- Back End Technologies - NodeJs/ExpressJs

- Database - MySQL

- Other tools - GitHub
  Trello
  Figma
  Draw.io

7. Feasibility Study

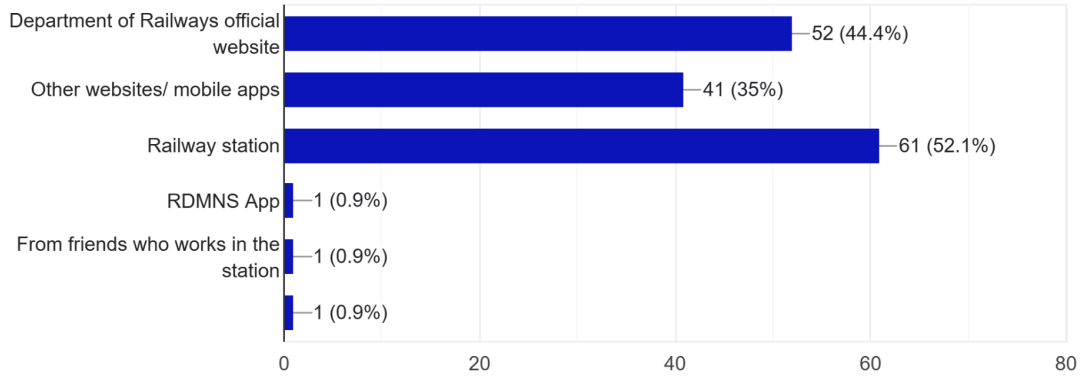
7.1 Operational Feasibility

The system addresses most of the issues that arise for people when travelling in trains. The system would be helpful for people in day-to-day transportation from the train. It provides passengers with an easy, convenient, and user-friendly experience. The system will speed up the ticketing process, reduce wait times in long queues, give accurate train schedules, and ensure immediate awareness of any delays through automation and real-time updates. So,the system will be helpful for both local and foreign passengers.

A survey was conducted to assess the feasibility of a proposed solution intended to alleviate issues in railway transportation. Utilising a Google Form questionnaire, data was collected from respondents to ascertain their opinions and requirements.

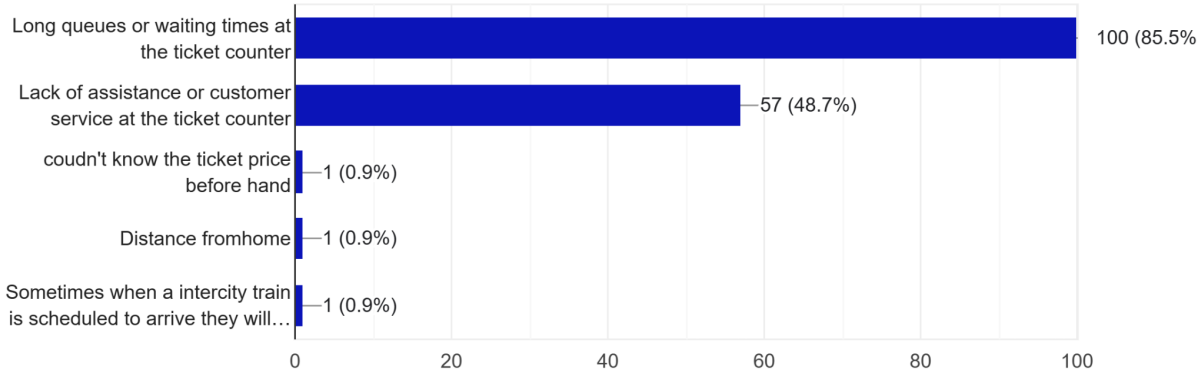
How do you know the train schedule/ delays or changes?

117 responses



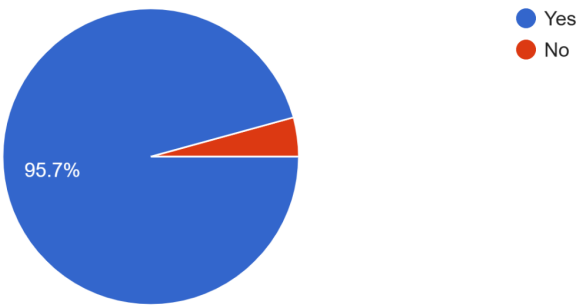
What difficulties have you encountered when purchasing train tickets physically from railway station for a normal journey?

117 responses



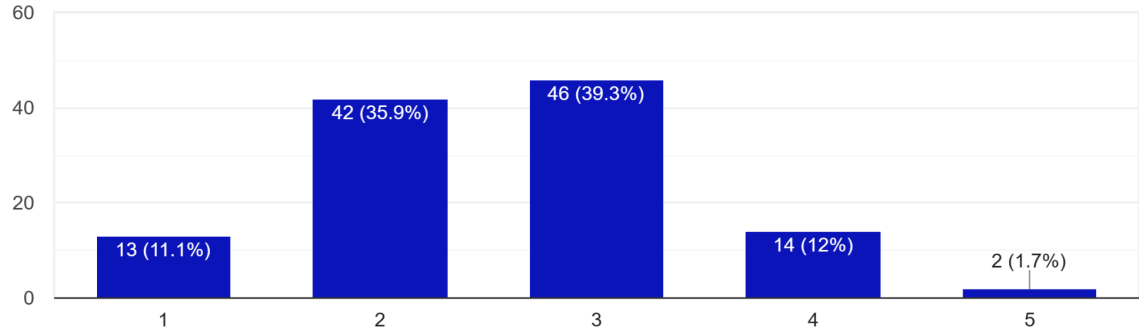
Would you like to have a method to buy train tickets for normal journeys via paying online with an e-wallet?

117 responses



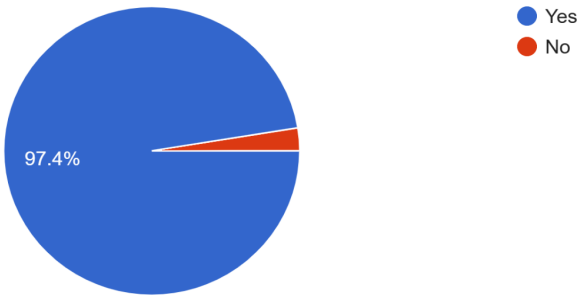
Please rate your satisfaction with the current process of reserving train tickets

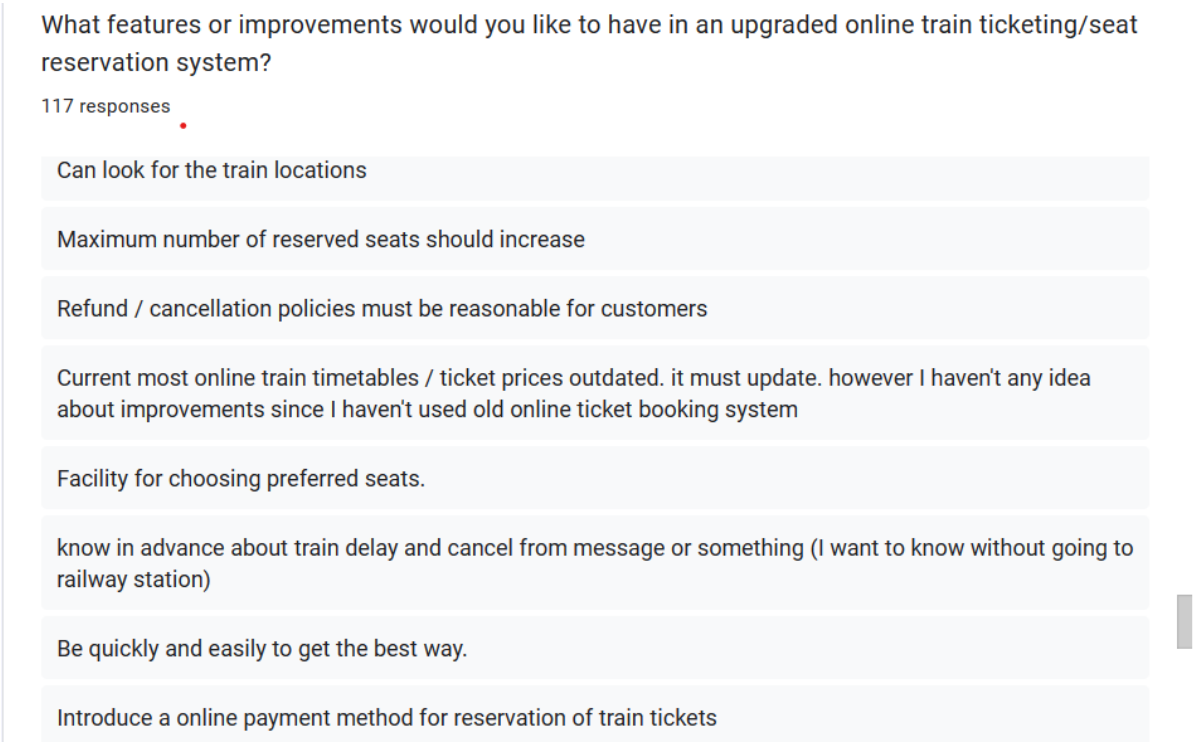
117 responses



Would you be interested in receiving real-time updates about the current location and delay time of your train that you are planning to board?

117 responses





The analysis of the survey responses unequivocally indicates that the proposed solution is both feasible and in high demand. It is evident that individuals facing challenges in railway transportation necessitate this type of solution to mitigate their problems effectively.

7.2 Technical Feasibility

"Ticketo" consists of a mobile responsive web application. Users of this system will gain an interactive user experience. The chosen front-end technology for this project is Reactjs, while the backend technologies include Nodejs and MySQL for databases.

Online collaboration tools such as GitHub and Zoom have been selected for effective communication among team members. For documentation purposes, Draw.io and Google Docs are utilised to create UML diagrams and other relevant materials. Trello serves as the chosen project management tool. The team members possess the required experience with these tools, having previously utilised them in the second-year group project. Additionally, they possess a fundamental understanding of the programming languages involved.

7.3 Schedule Feasibility

The completion of "Ticketo" is projected to be achieved by the conclusion of September, based on the established schedule. The development and testing phases are expected to be finalised according to the proposed timeline. Consequently, the system implementation is anticipated to align with the planned timeline by the end of the current semester. With the available resources and the comprehensive requirements gathering and analysis conducted, the project is poised for successful completion within the specified timeframe. The team has diligently planned and distributed the workload to ensure timely achievement of milestones and adherence to deadlines.

- Work-hours per member per week = 14 hours
- Total number of weeks scheduled = 16
- Total work-hours per member = 14 * 16 = 224 hours
- Number of team members = 6
- Total work-hours for the team = 224 * 6 = 1344 hours

7.4 Legal and Ethical Feasibility

Based on available knowledge, the proposed solution is designed to adhere to pertinent regulations set forth by the country. The development process primarily incorporates free and open-source tools, while proprietary technologies are utilised in compliance with copyright regulations. The system prioritises the accuracy and security of data, particularly in the management of sensitive information stored within the database. User authentication and authorization protocols are implemented to maintain the confidentiality of data. However, it should be noted that not all details provided by the user can be assumed to be the responsibility of the system.
Furthermore, the system strictly prohibits unauthorised access to passenger location and personal information. Robust measures are implemented to ensure passenger privacy, safeguarding their confidential data from unauthorised parties.

7.5 Economical Feasibility

During the development phase of the system, a team of six members will invest their effort in developing it throughout the semester, and therefore a development fee will not be incurred. The database, backend, and frontend components will all be developed using open-source frameworks and technologies. Additionally, free packages that are sufficient for the purposes are offered by collaboration tools. We will use third-party services like APIs that offer a certain number of free credits for integration and testing before upgrading to their premium versions. Based on this, we can conclude that the development phase is economically feasible.

We will require hosting services and integrated third-party services that can manage the traffic once the platform has been deployed. These premium services will cost some money, so there should be a way to generate revenue through the system. The system will generate revenue through ticket sales in order to pay the operating expenses.

Since there are no major expenses during development, the project is economically feasible.

8. Main deliverables of the system

The following are considered to be the main deliverables of the proposed system :

1. Complete responsive web application for all the users
2. Complete Software Requirement Specification
3. User manuals

9. Project Plan

No	Activity	May				June				July				August				September			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1	Problem Identification																				
2	Requirements Analysis																				
3	Feasibility Study																				
4	Preliminary Presentation																				
5	Interface Design Phase I																				
6	Implementation Phase I																				
7	Unit and Intergration Testing Phase I																				
8	SRS Documentation																				
9	Interim Presentation																				
10	Interface Design Phase II																				
11	Implementation Phase II																				
12	Unit and Intergration Testing Phase II																				
13	System Testing																				
14	Implementation Phase III																				
15	Final Presentation																				

10. References

[1] *Train Seats Reservation*, https://seatreservation.railway.gov.lk/mtktwebslr/. Accessed 14 June 2023.

[2] *RDMNS: Home Page*, https://rdmns.lk/. Accessed 10 June 2023.

11. Technology Justification

- Frontend Technologies

  ReactJS was selected for front-end development due to its support for component-based development, which facilitates the creation of reusable UI components. The utilisation of this modular approach enables easier maintenance and updates of the application by enabling the reuse of components throughout various sections of the project. Moreover, it enhances code reusability and contributes to the establishment of consistent user interfaces. Additionally, ReactJS employs a virtual DOM mechanism to optimise the rendering process. It selectively updates only the necessary components, resulting in expedited rendering times and improved overall performance. ReactJS encompasses a multitude of libraries, packages, and resources that augment the development process.

- Backend Technologies

  The backend application, responsible for managing the business logic, will be developed using ExpressJS, a server-side framework based on NodeJS. The adoption of ExpressJS is facilitated by its compatibility with JavaScript, which is also utilised in the frontend implementation. This reduces the learning curve associated with the development process. Additionally, the open-source nature of ExpressJS, coupled with its widespread usage and extensive developer community, enables easy access to third-party libraries and resources to support the implementation of business logic. The asynchronous nature of NodeJS aligns well with the concurrent access requirements of the system, allowing multiple users to interact simultaneously. Furthermore, the flexibility of ExpressJS facilitates seamless integration with chosen database technology. To ensure efficient communication among system actors, the backend will be implemented as a REST API, providing a range of services and functionalities.

- Database

  MySQLwill be used as the relational database. MySQL is commonly used when developing a database for web applications that are simpler and straightforward in their design and data schema. Since the majority of our data is structured, a relational database is opted for over a NoSQL database. Also considering the system, functionalities are having relationships with each other and hence it would be more convenient to map the real-world relationships to a relational database .MySQL ensures data integrity in financial transactions, allowing clients to conduct business online without worry.

Declaration

The project proposal is a contract between students who will undertake the project and teachers who will supervise and coordinate this course module. Hence, all members of the project team should declare their willingness and readiness to carry out the project in their best within the rules, regulations and code of ethics for this course.

We as members of the project titled " Ticketo", certify that we will carry out this project according to guidelines provided by the coordinators and supervisors of the course as well as we will not incorporate, without acknowledgement, any material previously submitted for a degree or diploma in any university. To the best of our knowledge and belief, the project work will not contain any material previously published or written by another person or ourselves except where due reference is made in the text of appropriate places.

Name	**Signature**
W.A.K.Gimhani	
J.V.S.Chamari	
M.G.N.D.Wimalarathna	
K.K.S.H.L. Koonpitiya	
S.C.H.Arachchi	
K.G.P.D.Gunarathne