A Study on Analysing CMRL Tickets System

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Abstract
An important part of our daily lives is transportation. The purpose of this article is to create an online payment transaction process in place of a manual one. By using e-ticketing, we can lessen the burden that comes with carrying tickets for travellers. Metro cards cut down on the amount of time needed for manual ticket creation, but commuters need to make sure they have their card with them at all times. The commuters can control reservation and cancelation with our system.
Keywords: CMRL (Chennai Metro Rail Limited), Ticketing System, Analysis, Study, Efficiency, Customer Satisfaction, Data Analysis, User Experience, Operational Effectiveness, Metro Transportation, Commuter Behavior, Passenger Flow, Ticket Sales, Revenue Optimization, Service Improvement

Introduction

The Chennai Metro Rail Limited (CMRL) has emerged as a pivotal mode of transportation, offering commuters a swift and reliable means of traversing the bustling cityscape. At the heart of this modern transit network lies its ticketing system, serving as the gateway for passengers to access the metro's services. Recognizing the critical role of an efficient and user-friendly ticketing system in enhancing the overall commuter experience and ensuring the sustainability of the metro operations, this study embarks on a thorough analysis of the CMRL ticketing system.

Entitled "A Study on Analysing CMRL Ticket System," this project aims to delve deep into the intricacies of the ticketing process, uncovering insights that will inform strategies for optimization and improvement. By scrutinizing the various facets of the current ticketing system, from its technological infrastructure to its operational dynamics, this study seeks to address challenges, capitalize on opportunities, and ultimately elevate the CMRL ticketing experience to new heights.

Through a combination of data analysis, customer feedback assessment, and industry benchmarking, this study endeavours to provide actionable recommendations that will propel the CMRL ticketing system towards greater efficiency, convenience, and customer satisfaction. As we embark on this journey of exploration and analysis, we are poised to unravel the complexities of the CMRL ticketing ecosystem and pave the way for a more seamless and rewarding commuter experience.

Given the rapid growth of the next generation, we must adapt and stay up to date with emerging technologies. The commuter

wants to avoid the time-consuming practice of standing in large lines to purchase tickets. This app completes tasks like retrieving commuters' vital details while cutting down on paper artwork and time usage. It also facilitates ticket booking in a more easier and faster manner. The metro department can maintain track of users, income, and tickets purchased with this application. Since the department is currently having issues with duplicate tickets. It supports the department's efforts to keep revenue steady. The suggested gadget is an internet-based program that shows information on schedules, prices, and route maps. This apparatus controls public.

Objective

- To evaluate the effectiveness of the current CMRL ticketing system to identify areas for improvement and optimization.
- To assess customer satisfaction levels with the CMRL ticketing system and propose enhancements to improve user experience.
- To analyse ticket sales data to optimize revenue generation strategies and ensure the financial sustainability of the CMRL ticketing system.
- To explore technological innovations that could enhance the efficiency and convenience of the CMRL ticketing system, such as mobile ticketing and contactless payment options.
- To identify operational challenges within the CMRL ticketing process and propose solutions to streamline operations and improve overall system performance.

Review of Literature

Paula Fraga-Lamas (2017): The role of enabling technologies in revolutionizing the railway industry was investigated in this study. LTE and other broadband technologies have the capacity required to develop new services. To better understand potential customer needs, a systematic review of GSM-R specifications and services was presented. Further more, For services, like smart infrastructure, railway operations, Passenger Information Systems train control systems, safety assurance, advanced monitoring of assets, the latest technologies and the main academic and commercial developments were thoroughly examined in order to expose the IoT capabilities to reinforce competitive advantages.

Nora Alsubaie (2018): This study presented the design and implementation of an Riyadh Metro Reservation System to allow and assist passengers in handling reservations, making changes and cancellations, and requesting refunds, as well as eliminating the significant human interference in the current process of ticket issuance, efficiently managing ticketing transactions, and resolving the delays associated with issuance[2].

Prof. Dr S.B.Sonkamble (2018) This paper describes a smart metro payment system that uses biometric authentication, such as fingerprint authentication, to make the rail ticketing process simple. This system allows people to pay for their tickets without having to wait in a line. This device will reduce the amount of time spent in line for rail tickets. The system would use cutting-edge technology to streamline the rail ticketing process. This system has the potential to assist India in becoming a digital country.

M Abhishek Nair (2019): The aim of this paper is to create a system that eliminates the hassles of everyday travel. Physical tickets/tokens, as well as any other UID card/documents, are no longer needed for travel. The consumer would have a more relaxed and easy travel experience with this suggested approach. Another possibility for this project is to incorporate the same technology as a smartphone application, allowing users to book tickets directly from their phones, eliminating the need for a separate storage.

Arun Francis G (2019): This paper aims to introduce the use of RFID in ticketing process. Using RFID in a real-time method makes it easier to obtain data from passengers via a database, and these types of RFID are inexpensive and reusable. When compared to other technologies, scanner technology is much simpler and makes it much easier. If the project is applied to railways, the embedded systems can be even more complex, and they are very close to scanner technologies. With the aid of an RFID scanner and an RFID tag, the Fast Ticketing method can be implemented. As compared to other ticketing methods, this type of quick and dependable method is much simpler to implement.

Bhargav Dave (2020): The aim of this paper is to create a cloud-based, integrated internet of things (IoT) platform for asset management of elevated metro rail projects. This platform would provide real-time information about the project's different assets and their locations, allowing for better asset management. Furthermore, a platform prototype is being built in which sensors are installed on assets for traceability, and stakeholders can access this information directly via this web-based application. This platform would aid in the reduction of information management errors.

Prof. Ravindra Jogekar (2020): This paper states that QR-Code technology could be more easily integrated into current open vehicle platform foundations. QR-Code has all of the characteristics that make it a viable innovation for mass open vehicle ticketing: rapid contactless exchanges, security, and ease of use. The proposed arrangements are based on a combination of gauges and technologies, and they make use of existing contactless foundations. Our proposed application would be useful for both novice and experienced users. The proposed application will be used to book a ticket without having to wait in lines for nearby trains, and it will be easy for a ticket checker to determine if the ticket is valid or invalid. Both ticket bookers and ticket checkers can save time by using this Android application.

Existing System

Implementation: This is the most crucial phase in creating a successful system and earning users' confidence that the new system works well. Swapping out an existing application for a modified one. If there are no significant changes made to the system, and handling this kind of communication is fairly easy.

Steps Involved in Execution

The Chennai metro system provides commuters with a range of ticketing options tailored to their specific needs, offering convenience, flexibility, and affordability. These options cater to diverse travel preferences, whether it's for occasional trips, daily commuting, or tourist exploration.

Single Journey Tokens

Single journey tokens are the most straightforward ticketing option available for Chennai metro passengers. These tokens are purchased individually at ticket counters or ticket vending machines located at all metro stations. Ideal for occasional travelers or those who prefer not to carry reusable cards, single journey tokens offer a hassle-free way to pay for a one-time metro ride. Passengers simply purchase a token for their desired journey, insert it into the fare gate, and proceed to their destination.

Stored Value Cards (SVC)

Stored value cards, or SVCs, provide commuters with a convenient and cost-effective way to pay for metro rides. These prepaid, rechargeable travel cards can be purchased at any metro station ticket counter against a refundable deposit. SVCs offer the flexibility of recharging their balance

at ticket counters or automated vending machines located at stations. Additionally, SVC holders enjoy discounted fares compared to single journey tokens, making them an attractive option for frequent metro travelers. With the ability to top up their card balance as needed, passengers can easily manage their metro expenses while enjoying the convenience of cashless transactions.

Trip Cards

Trip cards are designed for passengers traveling between specific stations on the Chennai metro system. Available in various combinations and validity periods, trip cards offer discounted fares for commuters making regular journeys along specific routes. These cards are particularly popular among daily commuters who travel between the same two stations for work or other routine activities. By purchasing a trip card with the appropriate validity, passengers can enjoy savings on their metro fares while streamlining their daily commute.

Tourist Cards

For visitors exploring Chennai's attractions, the metro system offers tourist cards that provide unlimited rides for a single day. Tourist cards are ideal for travelers looking to experience the city's sights and landmarks while enjoying the convenience of metro transportation. With unlimited access to the metro network for a full day, tourists can hop on and off at various stations to explore Chennai's vibrant culture, heritage, and cuisine. Whether visiting popular tourist destinations or discovering hidden gems, the tourist card offers an affordable and hassle-free way to navigate the city.

QR Tickets

In an era of digital convenience, the Chennai metro system offers QR tickets as a modern alternative to traditional paper tickets. Passengers can purchase single or return journey tickets directly through the CMRL mobile app, which features integrated QR code ticket scanners at metro stations. This innovative ticketing solution allows commuters to skip the lines at ticket counters and vending machines, enabling quick and seamless access to metro rides. Additionally, QR tickets can be conveniently booked via popular messaging platforms like WhatsApp, further enhancing the accessibility and user experience of the metro system.

Singara Chennai Card

Launched in 2023 in collaboration with the State Bank of India, the Singara Chennai card is a versatile travel card that provides access to not only the Chennai metro system but also other major metro and select bus transport systems across India. This co-branded card offers commuters a unified payment solution for seamless travel across different urban transport networks. With the convenience of a single card, travelers can navigate various cities with ease, enjoying the benefits of integrated fare systems and discounted travel options. The Singara Chennai card represents a step towards interoperable transit solutions, enhancing connectivity and mobility for passengers across India.

In summary, the Chennai metro system offers a diverse range of ticketing options to suit the needs of different commuters, whether they're occasional travelers, daily commuters, or tourists exploring the city. From single journey tokens to stored value cards, trip cards, tourist cards, QR tickets, and the Singara Chennai card, passengers have access to convenient, flexible, and affordable ways to pay for metro rides. With these ticketing options, the Chennai metro system continues to provide efficient and accessible transportation solutions for residents and visitors alike, contributing to the city's mobility and connectivity.

Proposed System

The proposed system aims to rectify the deficiencies present in the existing system. The suggested system is given as a means of monitoring the shortcomings in the current system.
Reliability and efficiency have increased.

- It's much simpler to navigate.
- Easy to operate
- Give the user accurate information so they may decide based on knowledge.
- Accuracy: The information provided will be clear, accurate, and correct.
- Productivity: Information can be gathered, analyzed and shared more quickly and efficiently.
- Systems make sure that the appropriate information reaches the appropriate parties at the appropriate times.
- Reliability – Because systems never get tired or bored, they continuously process data to produce outputs that are more dependable.
- Usability, understanding, and accessibility.

Architecture

There are Mainly Two Entities

a. Passengers

Under this entity there are four modules namely:

- Registration
- Online card recharge
- Online ticket booking
- Complaint registration

b. Admin

- Under this entity there are two modules
- Revenue generation
- Manage stations, timings and complaints.

System Design

A use case diagram is a visual representation of a system's dynamic behaviour. It incorporates use cases, actors, and their interactions to encapsulate the system's functionality. It represents the activities, services, and functionalities that an application's system/subsystem requires. It represents a system's high-level functionality as well as how the user interacts with it.

User

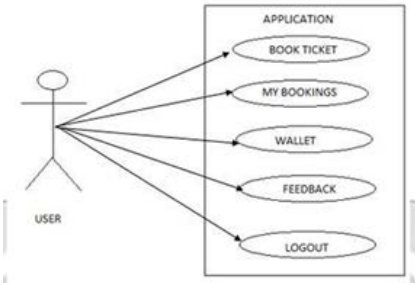

Figure 1 Use-Case for User

Admin

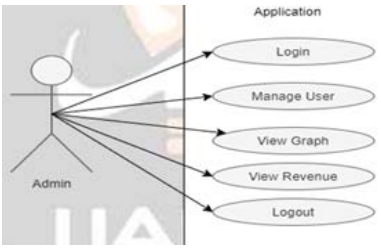

Figure 2 Use-Case for Admin

Experimental Results

Figure 3 Home Page

Figure 4 Register Page

Figure 5 Bookings

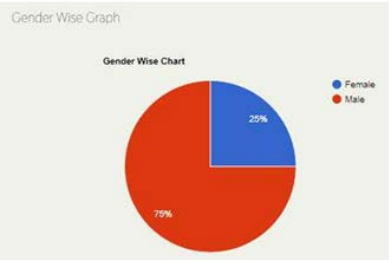

Figure 6 Gender-Wise Graph

Figure 7 Monthly Revenue Chart

Conclusion

The goal of this system's development is to create an Android application for metro train management. The entire system is more secure, efficient, and time efficient. This project is highly useful in everyday life and can be implemented or worked on quickly. The operation would be totally automated, efficient, upgraded, and cost-effective in the planned online metro ticketing system. The proposed method can be used in a variety of settings, including tollgates, bus ticketing, and so on.

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