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Online Metro Railway -Ticketing with Data Analytics

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Abstract: Transportation plays a major role in our day-to-day life. This paper aims to develop a transaction process through online payment instead of manual process. We can reduce the difficulty of people; carrying a ticket during journey in metro and make traveling more easier by use of E-ticketing. Use of metro cards reduces the time consumed during manual ticket generation; but the commuters must always ensure carrying the card with them during their journey. Our system enables the commuters to manage the reservation and cancellation.

I. INTRODUCTION

As generation is growing speedily, we need to replace ourselves to being contact with new technology. The Commuter wishes get to rid of staying in long queue for buying tickets, which is time killing process. This application reduces paper artwork, time consumption and makes the affiliation of booking ticket in much less hard and quicker way and performs functionalities like getting the key records of commuters. This application allows the metro department to keep an account of the users, revenue generated and tickets purchased. As the duplication of tickets is being a problem for the department currently. It helps the department to maintain the revenue. The proposed device is an internet based software which presents data regarding timings, fares route maps. This device manages public remarks approximately offerings through its complaint section. This tool additionally includes a web fee tag recharge module wherein users can recharge their metro cards online through the website. It includes a user module where passengers can purchase their metro tickets which will be saved in the IOT based cloud database for security purpose. There is moreover an administrator module in which administrator can add stations, trains, route maps.

II. REVIEW OF LITERATURE

1) *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[1].
2) *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].
3) *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[3].
4) *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[4].

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5) *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[5].
6) *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[6].
7) *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[7].

III. EXISTING SYSTEM

Currently, in the metro railway stations, they are using tickets or tokens for traveling. To travel, the customer needs to stand in the queue, need to buy a ticket for the destination. They need to carry the ticket along with them until they reach the destination.

If in middle they miss the ticket they will be penalized by the authority. The process carried out is, they use the token system in which they use the RFID tag to give unique to each member.

While entering the train, the passenger must scan the token. The system will read the tag and validates it; then allows passenger to enter. The token is then validated. The passenger also cannot end his journey before reaching his destination. After reaching the destination, the passenger must scan the token again. If it is a valid journey, the gates will open. Else the gates will not open.

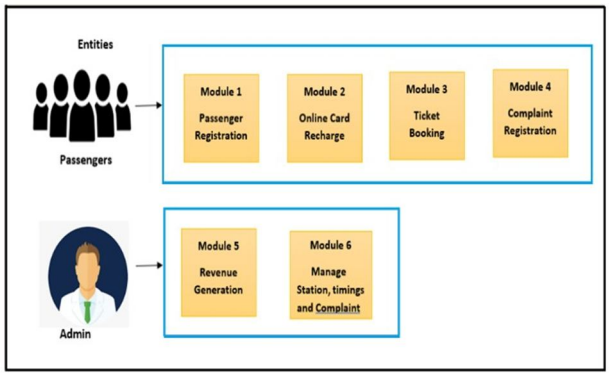
IV. PROPOSED SYSTEM

The suggested system is intended to address the shortcomings of the current system. For tracking the faults in the existing system, the proposed system is mentioned.

1) Efficiencies and dependability have improved.
2) It's a lot easier to go around.
3) Simple to use
4) Provide the user with correct information so that they may make informed judgments.
5) Accuracy - The data will be correct, precise, and without ambiguity.
6) Productivity
7) Data can be collected, processed, and disseminated more rapidly and effectively. Systems guarantee that the right information reaches the right people at the right time.
8) Reliability - Because systems are not bored or exhausted, they work continuously on data in order to create more reliable outputs.
9) Accessibility, usability, and comprehension.

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V. ARCHITECTURE



There are mainly two entities:

A. *Passengers*

Under this entity there are four modules namely:

1) Registration
2) Online card recharge
3) Online ticket booking
4) Complaint registration

B. *Admin*

1) Under this entity there are two modules
2) Revenue generation
3) Manage stations, timings and complaints.

VI. IMPLEMENTATION

Implementation is the most crucial stage in achieving a successful system and giving the users confidence that the new system is workable and effective. Implementation of a modified application to replace an existing one. This type of conversation is relatively easy to handle, provided there are no major changes in the system.

Steps in implementation:

A. *User Module*

1) *Registration:* In this module, the user will enter the details like Name, Password, Email, Phone etc to store the data into the server, which will be used by the user to enter into application. In this process there will be textboxes for the fields like username, email, phone, password etc. These fields are stored into the database by triggering an action binded to the submit button.
2) *Login:* Login is the process where the user can input his / her credentials where it will be verified from the database for the reason of access the information from the application.
3) *Ticket Booking:* Ticket Booking is the course of action where the user can input his / her data to the application to book tickets. User have to enter data like source, and destination. Once he enters all this data, he/she gets the ticket price and can proceed with their bookings.

B. *Admin Module*

1) *User Management:* In this module, the registered users will be managed by the admin. The admin can view or delete the registered users based on the requirement.
2) *View Graph:* In this module, admin can view graph to know the revenue based on dates.

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VII. SYSTEM DESIGN

A use case diagram is used to represent the dynamic behaviour of a system. It encapsulates the system's functionality by incorporating use cases, actors, and their relationships. It models the tasks, services, and functions required by a system/subsystem of an application. It depicts the high-level functionality of a system and also tells how the user handles a system.

A. User

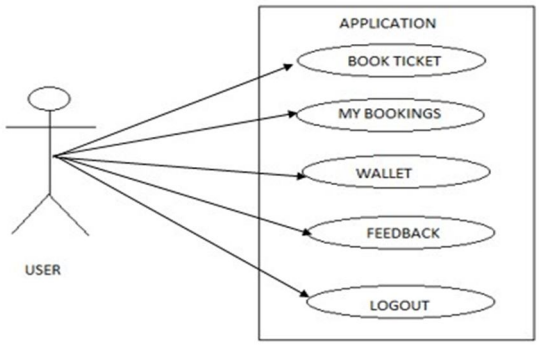


Fig-1: Use-case for user

B. Admin

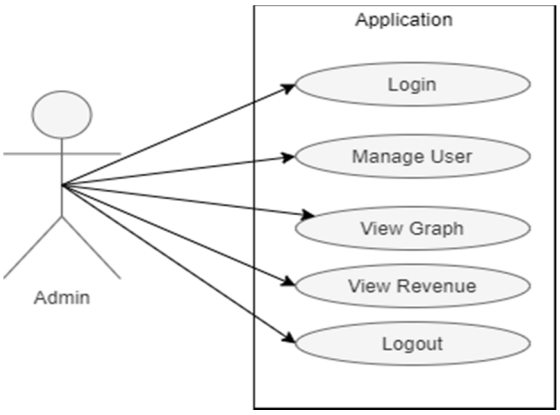


Fig-2: Use-case for admin

VIII. EXPERIMENTAL RESULTS

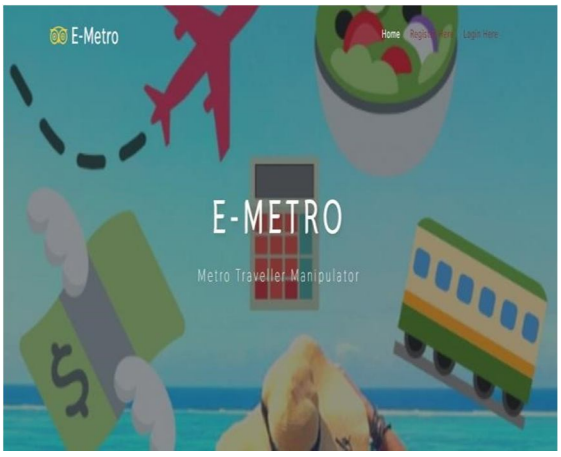


Fig-3: Home page

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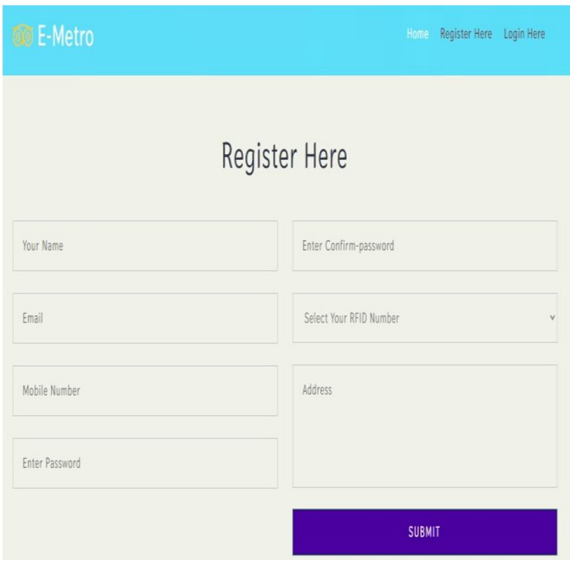


Fig-4: Register page

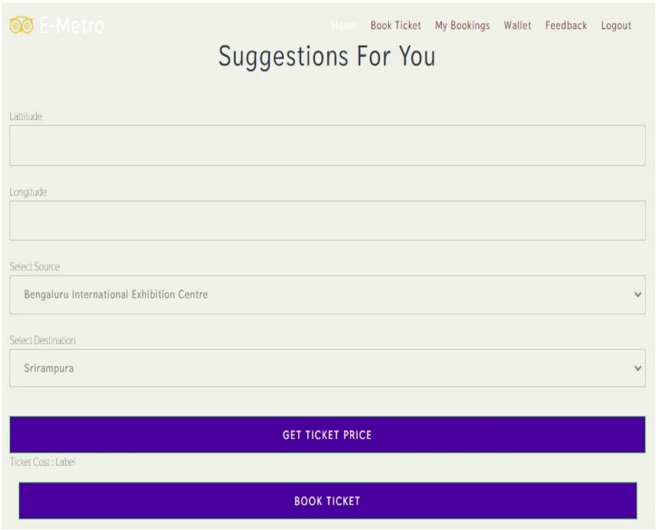


Fig-5: Bookings

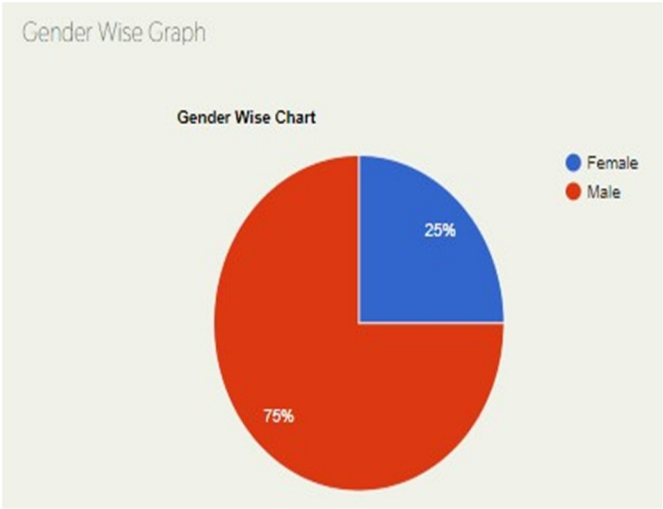


Fig-6: Gender-wise graph

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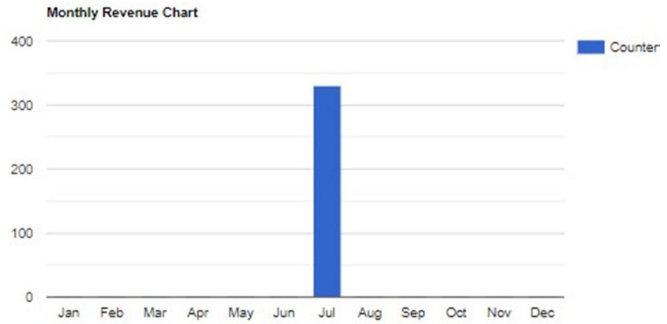


Fig-7: Monthly revenue chart

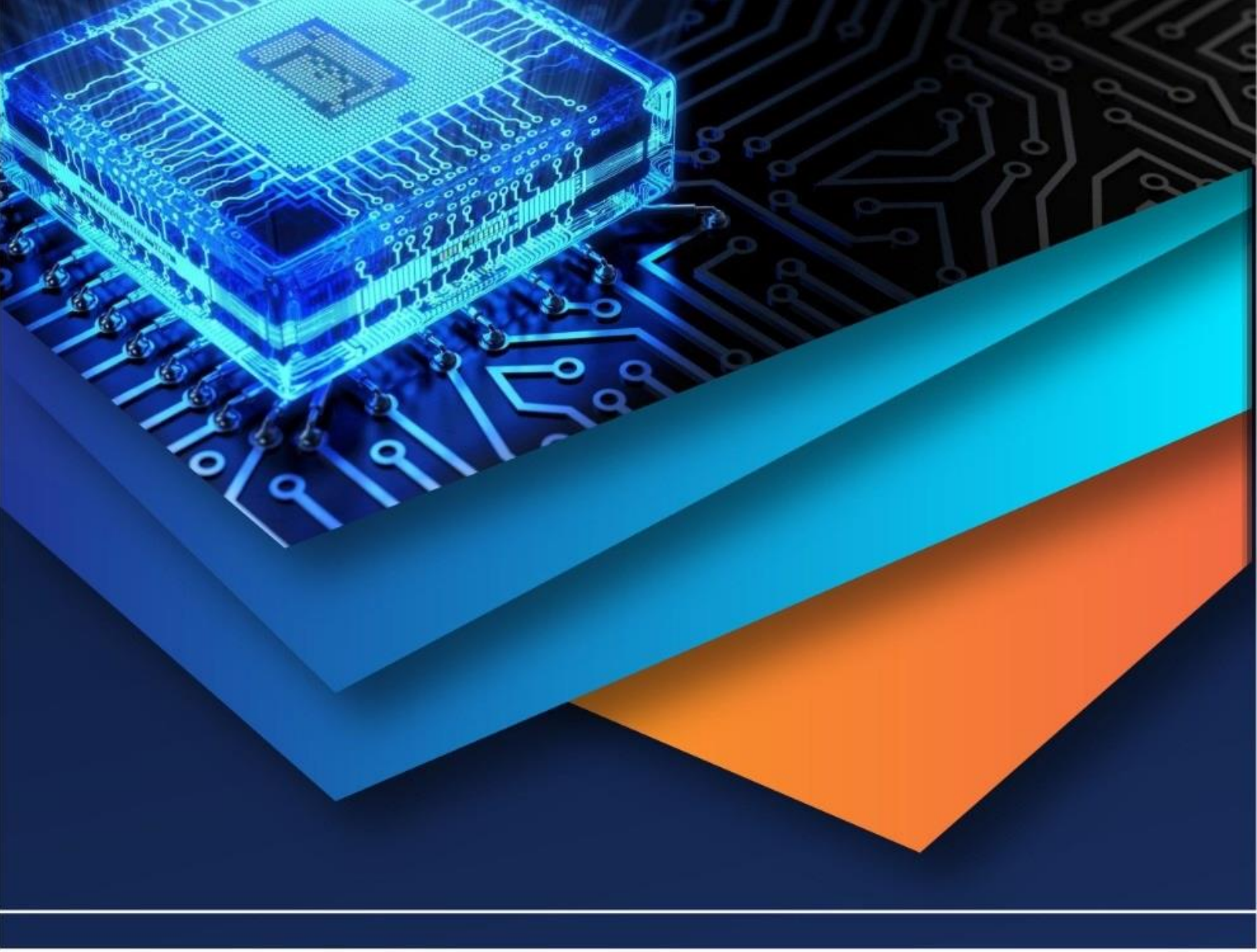
IX. CONCLUSION

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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