

BUS E-TICKETING SYSTEM USING QR CODE

¹A. E. Kokila ²N. Naga Lakshmi ³N. Bindu Harshini
⁴N. Sai Archana ⁵N. Sai Nithya

¹Department of CSE

Narayana Engineering College, Nellore, 524004, Andhra Pradesh, India

Abstract: The Android-based smart bus ticketing system using QR code technology aim to modernize and streamline the public transportation ticketing process. This project involves developing a mobile application that allows passengers to purchase, store, and manage bus tickets digitally. By generating unique QR codes for each ticket, the system eliminates the need for physical tickets and enables quick, secure, and efficient validation by bus conductors using a dedicated scanning application. The backend infrastructure includes a robust server and database to handle user authentication, ticket management, and secure payment processing. Real-time data collection and analysis provide valuable insights for optimizing bus routes and schedules, enhancing operational efficiency. The implementation of this app addresses several critical issues found in traditional ticketing systems, such as long queues, lost or damaged tickets, and inefficient manual ticket checks. By streamlining the ticketing and boarding processes, the app significantly reduces waiting times and enhances the overall passenger experience.

Keywords: Conductor, Passenger, Ticket, Bus, QR Code, Android, Data Security

I. INTRODUCTION

In the modern era, public transportation systems are continuously evolving to enhance user convenience and operational efficiency. One such advancement is the implementation of smart ticketing systems. This project focuses on developing an Android-based smart bus ticketing system that utilizes QR codes, aiming to streamline the ticketing process for both passengers and conductors. In the contemporary urban landscape, efficient public transportation systems are integral to ensuring smooth mobility and reducing the environmental impact of private vehicle use. Traditional bus ticketing methods, which rely on paper tickets and manual validation, have become increasingly impractical due to their inherent inefficiencies and susceptibility to fraud. Recognizing the need for modernization, this project embarks on the development of an Android-based smart bus ticketing system utilizing QR code technology.

This innovative solution aims to transform the passenger experience by introducing a seamless, digital ticketing process that is both user-friendly and secure. By leveraging the widespread availability of smartphones and the convenience of QR codes, the system will streamline ticket purchases and validations, thereby reducing wait times and operational bottlenecks. As urban populations continue to grow, the demand for more reliable and efficient public transportation solutions becomes ever more pressing. This Android-based smart bus ticketing system represents a significant step forward in addressing these challenges, offering a scalable and adaptable framework that can be implemented across various transit networks. Through this project, we aim to contribute to the development of smarter, more sustainable urban transportation infrastructures.

II. EXISTING WORK

The existing systems for bus ticketing in public transportation primarily rely on traditional methods, which include physical tickets and manual validation processes. Typically, passengers purchase paper tickets from ticket counters or vending machines, often leading to long queues and waiting times, especially during peak hours. These paper tickets are then manually checked by conductors or ticket inspectors as passengers board the bus, which is time-consuming and prone to human error.

In some more advanced systems, contactless smart cards are used, allowing passengers to tap their cards on readers to validate their tickets. While this approach is more efficient than paper tickets, it still requires significant infrastructure investment for card readers and often involves issuing physical cards that passengers need to carry with them. Moreover, these systems may not provide real-time data on passenger movements and ticket usage, limiting the ability of transit authorities to optimize services effectively.

Additionally, both traditional paper tickets and smart card systems lack the flexibility and convenience that modern, mobile-based solutions can offer. These existing systems often result in operational inefficiencies, increased costs, and suboptimal user experiences.

DISADVANTAGES:

Inconvenience: Passengers must wait in long queues to purchase the tickets.

Manual Ticket Checks: Conductors have to manually validate tickets, which is time-consuming.

Physical Tickets: Risk of losing or damaging paper tickets.

Limited Payment Options: Often limited to cash, which is less convenient.

Operational Inefficiency: Difficulty in tracking and managing ticket sales and passenger data.

Higher Error Rates: Increased chance of human error in manual processes.

III. PROPOSED WORK

The proposed system for the Android-based smart bus ticketing using QR code technology aims to address the inefficiencies and limitations of traditional ticketing methods by introducing a modern, digital solution. This system consists of a comprehensive mobile application for passengers and a complementary application for bus conductors, supported by a robust backend infrastructure.

ADVANTAGES:

Convenience: Passengers can easily purchase and manage tickets from their smart phones.

Quick Boarding: QR code scanning speeds up the boarding process.

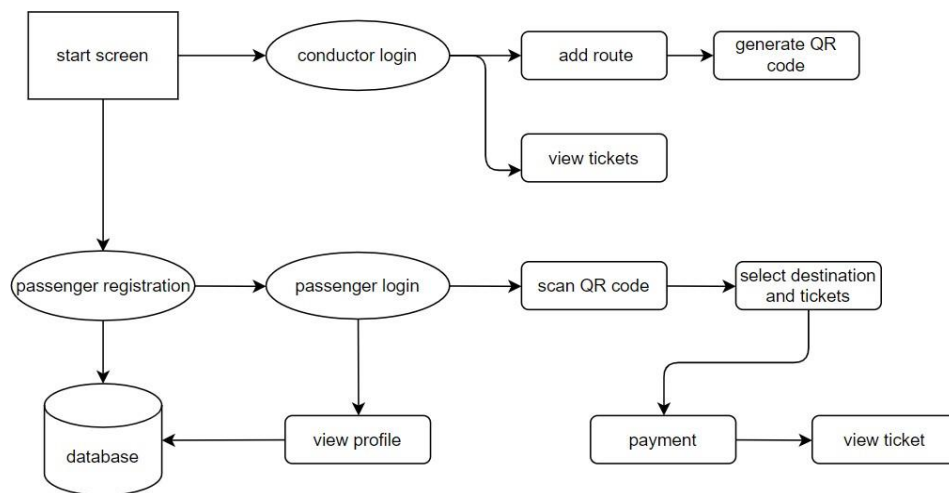
Secure Payments: Integration with multiple payment methods ensures secure transactions.

Digital Tickets: Eliminates the need for physical tickets, reducing the risk of ticket loss or damage.

Reduced Waiting Time: Streamlines the ticketing process, reducing queues and wait times.

Data-Driven Decisions: Collects valuable data to optimize bus routes and schedules.

DESIGN:



The process begins at the "start screen," where users have the option to either register as a passenger or log in as a conductor. Conductors, upon logging in, can add routes and generate QR codes for these routes. They also have the ability to view tickets that have been issued. Passengers, on the other hand, need to register first, which involves storing their information in a database. After registration, passengers can log in and access various features, such as viewing their profile. To purchase a ticket, passengers must scan a QR code, which leads them to a section where they can select their destination and choose the number of tickets required. Following this, they proceed to payment, and upon successful payment, they can view their ticket. The database stores relevant information throughout this process to facilitate the functionality of the system.

IV. EXPERIMENTAL RESULT

The implementation of the Smart Bus Ticketing Android App has yielded significant improvements in the bus ticketing process. Passengers reported increased convenience due to the ability to purchase and manage tickets directly from their smartphones. The integration of QR code technology facilitated faster boarding, reducing wait times and improving the overall travel experience. Conductors experienced a notable decrease in manual ticket validation tasks, allowing them to focus more on passenger service and safety. The app's secure payment system was well-received, providing passengers with multiple payment options and ensuring smooth transactions. Overall, the Smart Bus Ticketing Android App successfully addressed the inefficiencies of the traditional ticketing system, delivering a more efficient, convenient, and user-friendly experience for both passengers and bus operators. The project demonstrated that digital solutions could significantly enhance public transportation systems by reducing manual processes, minimizing errors, and improving overall operational efficiency.

Conductor Actions:

- After logging in, the conductor can add routes by entering details such as start and end points, stops, and timings.
- The conductor views the routes and starts a session for the journey.
- The conductor generates a QR code that contains the route and session details.
- The QR code is shown to passengers for scanning.
- The conductor can view the tickets purchased by passengers in real-time during the session.
- The conductor logs out after completing their actions.

Conductor Screens:

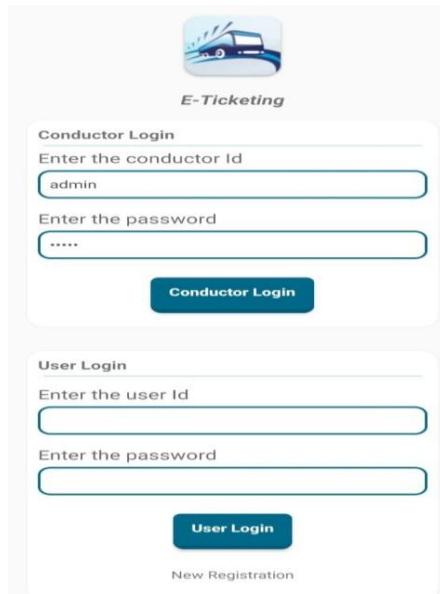


Fig 1: Conductor Login

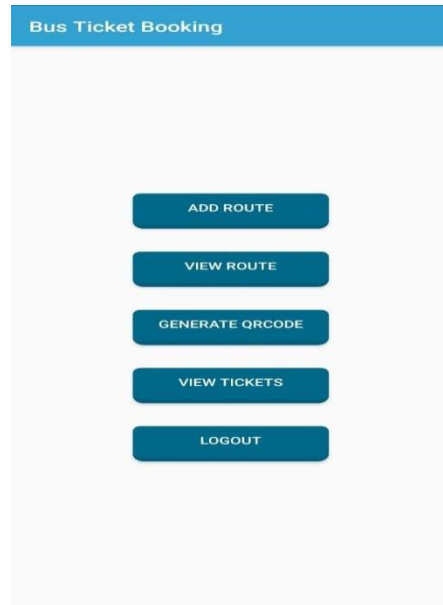


Fig 2: Conductor Page

It prominently features a section for conductor login, where conductors can enter their ID and password to access their accounts by clicking on the "Conductor Login" button. This initial screen serves as the entry point to the app, ensuring that only authorized conductors can proceed further into the system, thereby maintaining security and proper access control. Conductor Page screen is the main interface for the bus conductor after logging into the Bus Ticket Booking app. It presents several key options such as adding new routes for the bus, viewing existing routes, generating QR codes for ticketing purposes, accessing tickets purchased by passengers, and logging out of the app.

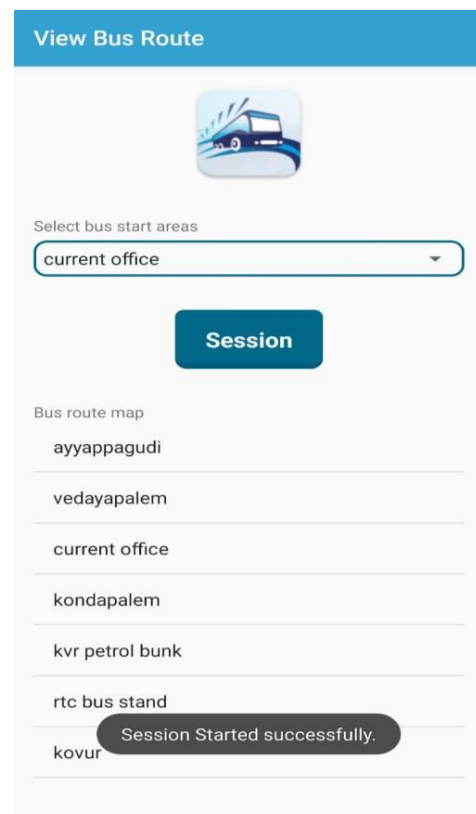


Fig 3: Add Route

Fig 4: View Route

This screen allows the bus conductor to add a new bus route. The conductor can enter the starting point, several bus stop names along the route, and the destination. There are fields to input the name of each bus stop, and an option to add more stops if needed. Once all necessary information is filled in, the conductor can finalize the new route by clicking the "ADD" button. This feature helps in efficiently managing and updating the bus routes within the system.

View Route screen from the conductor side of a bus route management app. Conductors can select the starting area of the bus route from a dropdown menu and start a session by clicking the "Session" button. The screen also displays a list of bus stops included in the selected route. A notification at the bottom confirms that the session has started successfully.

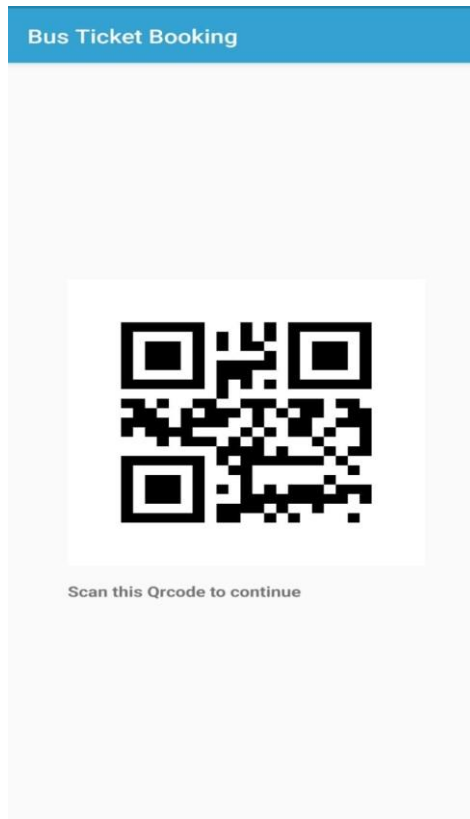


Fig 5: QR Code Generation

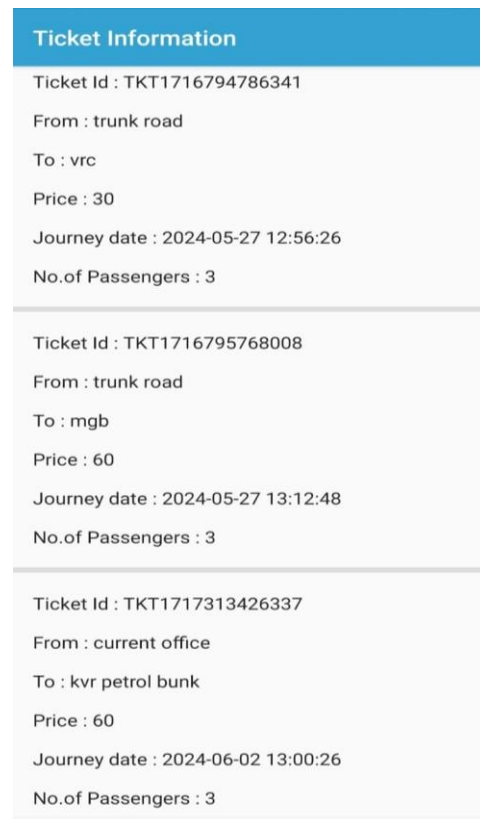


Fig 6: View Passenger Tickets

The conductor logs into the system, adds a new route, and generates a unique QR code for it. This QR code is used by passengers to access route and ticket information. Additionally, the conductor can view all tickets purchased for a specific route, including passenger details and payment status, to effectively manage and verify passenger entries.

Passenger Actions:

- After logging in, the passenger scans the QR code generated by the conductor.
- The system fetches the available routes and displays them to the passenger.
- The passenger selects the destination and enters the number of tickets required.
- The system calculates the fare and displays the payment screen.
- The passenger completes the payment through the app.
- An e-ticket is generated and displayed to the passenger.
- The passenger can view the ticket details within the app.
- The passenger logs out after completing their actions.

Passenger Screens:

Bus Ticket Booking

New Registration

Name
Sai Nithya

Mobile Number
9849710852

Password
.....

Email
sainithya.2802@gmail.com

Address
kovur road

Save

Fig 7: Passenger Registration

User Login

Enter the user Id
9652603185

Enter the password
.....

User Login

New Registration

Fig 8: Passenger login

The passenger registration and login functionality involves the following steps: Passengers first register in the system by providing necessary details, which are then stored in the database. After registration, passengers can log into their accounts to access and view their profiles and other functionalities within the system.

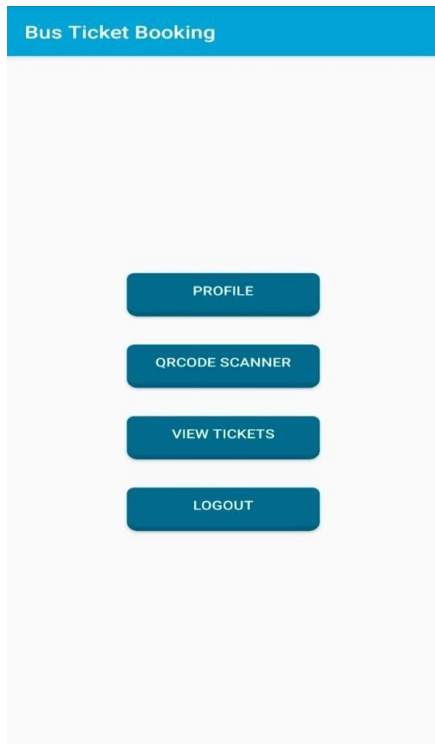


Fig 9: Passenger Page

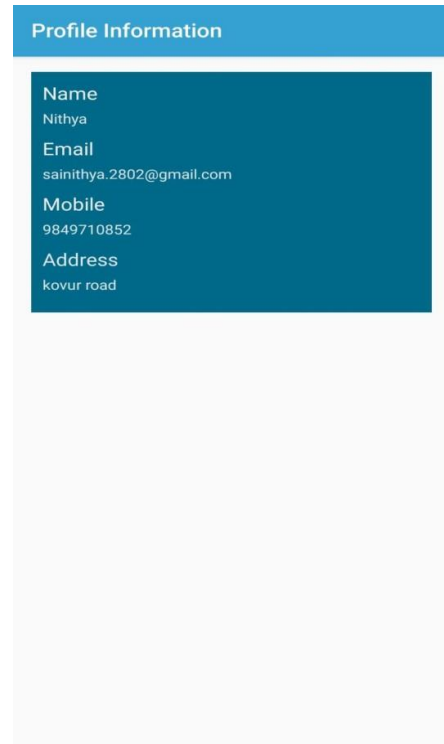


Fig 10: Passenger Profile

Registered passengers can log in to the application.

After logging in, passengers can scan QR code to initiate the process of purchasing a ticket by scanning a QRcode provided for a route.

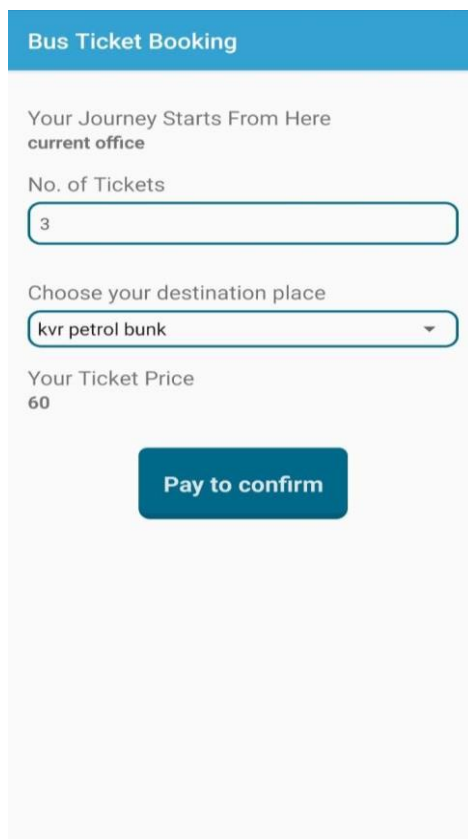


Fig 11: Ticket Payment

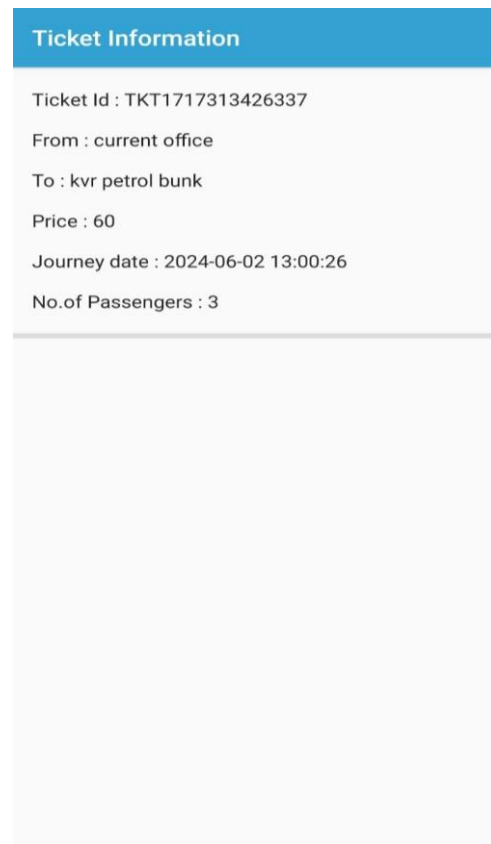


Fig 12: Passenger Ticket

After scanning the QR code, the passenger selects their desired destination and specifies the number of tickets they want to purchase. The passenger can make a payment for the selected tickets using available payment methods. This process ensures that the transaction is completed, and the tickets are booked.

Once the payment is successful, the passenger can view their e- ticket within the app. The e-ticket contains details like the source, destination, date, and time of travel, as well as a unique ticket ID.

V. CONCLUSION

The development and implementation of the Smart Bus Ticketing Android App have successfully addressed many inefficiencies associated with traditional bus ticketing systems. By providing a digital platform for purchasing and managing tickets, the app has significantly enhanced convenience and efficiency for passengers and bus operators alike. Passengers benefit from the ease of buying tickets through their smartphones, secure payment options, and the elimination of physical tickets, which reduces the risk of loss or damage. The quick QR code- based boarding process further streamlines their travel experience by reducing wait times and facilitating smooth boarding. For bus operators, the app has simplified ticket validation, reduced manual labor, and provided valuable real-time data for better management of routes and schedules. Administrators now have access to detailed analytics, enabling more informed decision-making and optimized resource allocation. Economically, the app contributes to cost savings by reducing the need for physical ticketing materials and potentially increasing revenue through more efficient ticket sales. Strategically, it supports the broader goal of modernizing public transportation systems, promoting sustainability, and improving urban mobility. While the implementation of the app comes with challenges, such as ensuring widespread user adoption and maintaining data

security, the overall benefits outweigh these issues. Continuous support, updates, and user education will be essential to sustain the app's success. In summary, the Smart Bus Ticketing Android App represents a significant advancement in public transportation technology. It has improved the efficiency, convenience, and satisfaction of both passengers and bus operators, making it a valuable tool for the future of urban transit systems. The project highlights the potential for digital solutions to transform traditional practices and drive innovation in the transportation sector.

VI. REFERENCES

- [1] <https://iopscience.iop.org/article/10.1088/1757-899X/590/1/012036/meta>
- [2] <https://www.pantechelearning.com/product/smart-bus-ticketing-system- using-qr-code-android/>
- [3] <https://www.irjet.net/archives/V5/i3/IRJET-V5I308.pdf>
- [4] https://www.ijprems.com/uploadedfiles/paper//issue_5_may_2022/128/final/ fin_ijprems1657461126.pdf
- [5] https://www.researchgate.net/publication/336567245_Bus_Ticket_System_for_Public_Transport_Using_QR_Code