

# Wayshield: Smart Cab System Using Barcode Scan

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## ABSTRACT

The smart cab system using barcode scanning is an advanced and secure cab booking application design to simplify and improve the interaction between customer and cab owner through transparent, reliable, and efficient platform. In this proposed system, cab owner registers by providing complete vehicle and travel details, while customer enters their source, destination, and travel type (within city or outstation) to search for nearby available cabs using GPS-based location services. Once a ride request is accepted, the system generates a unique barcode/QR code containing complete trip information such as trip ID, route details, cab details, and customer data. The customer scans this barcode to authenticate and initiate the trip, completely eliminating the dependency on OTP-based verification. Barcode-based authentication ensures faster validation, prevents fake or duplicate bookings, avoids OTP sharing and network-related issues, and functions effectively even in low or unstable internet conditions. At the end of a journey, the cab owner calculates the fare based on the distance and trip category, and the customer completes the payment securely. Compared to traditional cab booking systems, the proposed smart cab system offers enhanced security, reduced reliance on SMS services, flexible fare management, and improved operational reliability, making it highly suitable for real-world application, especially in semi-urban and rural environments.

**Keywords:** QR-code authentication, Smart Cab System, GPS-Based Location Services, Real-Time Ride Matching, Secure Trip Validation, OTP-Free Authentication Mobile, Application Platform, Trip ID Generation, Digital Fare Calculation

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## INTRODUCTION

In recent years, the rapid growth of smartphone usage, GPS technology, and digital payment systems has transformed the transportation industry, especially cab booking services. Traditional cab booking applications mainly rely on internet connectivity and OTP-based verification for ride authentication, which often leads to issues such as delayed SMS delivery, OTP sharing, fake bookings, and security vulnerabilities. These problems become more prominent in semi-urban and rural areas where network connectivity is unstable. To address these limitations, the Smart Cab System Using Barcode (QR) Scan is proposed as a secure, efficient, and user-friendly alternative for cab booking and trip authentication. The proposed system aims to create a transparent digital platform that effectively connects customers and cab owners while minimizing manual intervention and dependency on SMS services.

In this system, cab owners register themselves by providing complete vehicle and driver details, ensuring authenticity and accountability. Customers can easily book a cab by entering their source, destination, and travel type such as within-city or outstation travel. Using GPS-based location services, the application displays nearby available cabs, enabling faster ride matching and reducing customer waiting time. Once a ride request is sent by the customer and accepted by the cab owner, the system generates a unique QR code containing complete trip-related information including trip ID, vehicle details, route data, and fare parameters. This QR code acts as a digital key for trip authentication. At the start of the journey, the customer scans the QR code generated by the cab owner to authenticate and initiate the trip. This QR-based verification eliminates the need for OTP confirmation, making the process faster, more reliable, and secure. Since QR codes can be scanned even in low network conditions, the system is highly suitable for real-world deployment in areas with limited connectivity. The use of barcode scanning also prevents unauthorized trips, reduces fake ride requests, and avoids problems related to OTP misuse or sharing. At the end of the trip, the cab owner calculates the fare based on distance traveled and trip type, after which the customer completes the payment through the application.

## **2. RELATED WORK**

The proposed smart cab system using barcode scanning is a secure and efficient cab booking application that aims to enhance transparency and reliability in customer-cab owner interactions. In this system, cab owners register by providing complete vehicle and driver details, while customers enter their source, destination, and travel type (within city or outstation) to view nearby available cabs using GPS-based location services.

After a customer places a ride request and the cab owner accept it, a unique barcode / QR code is generated containing essential trip information such as trip, ID, route details, and vehicle data. The customer scans this barcode to authenticate and initiate the trip, eliminating the need for OTP-based verification. This approach ensure quick validation, reduces fraudulent bookings, and avoids issues related to OTP sharing and network dependency, especially in low-connectivity areas.

At the end of the trip, the fare is calculated based on distance and trip type, and payment is completed securely, making the system suitable for real-world and semi-urban deployment.

Several existing cab booking systems rely heavily on mobile application with OTP-based authentication and continuous internet connectivity to confirm rides and start trips. While these systems offer convenience, they often face challenges such as OTP delay, network failures, fake ride requests, and security concerns due to OTP sharing or interception. GPS-based tracking and digital payment are commonly used features, but dependency on SMS services increases operational costs and reduces reliability in rural or semi-urban region with poor network coverage.

Recent research and applications have explored the used pf QR codes and barcode-based authentication in transportation system, including ticking and ride verification, to improve security and reduce manual intervention. Barcode-based system have proven effective in minimizing fraud, speeding up authentication, and enabling offline or low-network operations. However, their integration into cab booking platforms is still limited. The proposed smart cab system builds upon these concepts by combining GPS-based cab discovery with barcode scanning for trip authentication, offering a more secure, cost-efficient, and reliable alternative to traditional cab booking applications.

## **3. PROPOSED METHODOLOGY**

The proposed smart cab system using barcode (QR)scan follows a structured and module approach to ensure secure, reliable, and efficient cab booking and trip management. Initially, the system supports two main user roles: cab owner and customers.cab owners register on the platform by providing verified personal details along with complete vehicle information such as vehicle number, type, capacity, and service category (city or outstation). This data securely stored in a centralized database to ensure transparency and authenticity. Customers register using basic credentials and can access the application to enter their source location, destination, and travel type. Using GPS-based location services, the system identifies and display nearby available cabs in real time, allowing customers to select suitable rides with minimise waiting time.

Once a customer sends a ride request, the request is forwarded to nearby cab owners based on proximity and availability. After a cab owner accepts the request, the system generates a unique QR code associated with that specific trip. This QR code embeds essential trip details such as trip ID, route information, customer and vehicle identifier, and fare parameters. The QR code is displayed on the cab owner's application and acts as a secure digital token for trip authentication. At the start of the journey. The customer scans the QR code using the mobile application to verify the ride. Successfully scanning validates the trip and officially starts the ride without relying on OTP-based confirmation, thereby reducing delays, network dependency, and risks related to OTP misuse or fake bookings.

During and after the trip, the system continuously manages trip data including distance travel and travel type. On trip completion, the cab owner finalizes the fare based on predefined pricing rules, distance covered, and whether the journey is within city limits or outstation. The calculated fare is displayed to the customer for confirmation, followed by payment completion through supported payment modes. All trip details, including fare, route, and timestamps, are stored in the database for future reference, billing, and dispute resolution. By integrating QR-based authentication, GPS tracking. And automated fare calculation, the proposed methodology ensure improved security, reduced operational complexity, and enhanced reliability. This makes the system well-suited for real-world deployment, especially in semi-urban areas where network connectivity and SMS-based services may be inconsistent.

## **4. LITERATURE REVIEW**

Smart transportation system have evolved significantly with the integration of mobile application, GPS, and digital payment solution. Most existing cab booking platform operate using real-time internet connectivity and OTP-based ride authentication.

These systems allow user to search for nearby vehicles, request rides, track drivers using GPS, and complete digital payment. While such system improves convenience and transparency, several limitations have been identified in prior studies.

Research on mobile-based ride-hailing system highlights issues such as OTP delays, dependency on SMS services, network failures in low-connectivity areas, and security vulnerabilities caused by OTP sharing or interception.

In semi-urban and rural regions, unstable internet connections often interrupt ride verification and trip initiation processes. Additionally, fake ride request and fraudulent booking activity increase operational inefficiencies for cab owners.

#### 4. PROPOSED SYSTEM ARCHITECTURE



#### 5. Algorithm Working

The working of the proposed smart cab system begins with the registration and login process for both cab owner and customers. Cab owner and customer. Cab owner first register by providing complete vehicle and driver details such as cab number, vehicle type, license information, and availability status, which are securely stored in the system database. Customer log in to the application and enter their source location, destination, and travel type (within city or outstation). The system uses GPS-based location services to identify and display nearby available cabs in real time. After selecting a suitable cab, the customer sends a ride request to the cab owner. Once the request is accepted, the system generates a unique barcode (QR code) that contains complete trip-related information include trip ID, route details, vehicle data, driver details, and timestamp. This barcode is securely generated by the system and shared with the customer through the application interface.

In the next phase of the algorithm, the customer scans the generated barcode using the smart cab application to authenticate and initiate the trip. The system verifies the scanned barcode against the stored trip details to ensure valid booking and authorized access, thereby removing the dependency on OTP-based verification. After successfully validation, trip status is updated to “started” and the system continuously tracks the journey to calculate distance travel. At the end of trip, the cab owner ends the ride and the system automatically computes the final fare based on distance covered and selected trip type. The calculated fare is displayed to the customer, who complete the payment through the application. This barcode-based algorithm improves security prevent fake bookings, works reliably in low network condition, and provides an efficient and practical smart cab booking solution suitable for real-world deployment.

#### 6. RESULT AND DISCUSSION

The implementation of the proposed QR-based smart cab system produced reliable efficient result in real-time cab booking and trip authentication. The system successfully allowed customers to search and book nearby cabs using GPS-based location services, while cab owner could easily manage ride request and vehicle details. The use of barcode scanning for trip authentication proved to be fast and accurate, as the trip could only start after successfully QR code

verification. The eliminated common issues related to OTP delays, network failure, and unauthorized ride initiation. The system also ensured accurate fare calculation based on distance traveled and selected trip type, which increased transparency and trust between customers and cab owners. Overall system performance showed reduced booking errors, improved security, and smoother ride execution.

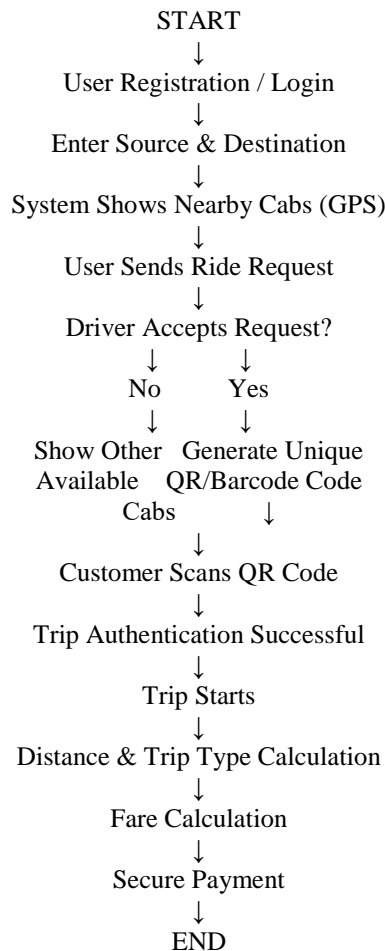
Form the discussion point of view, the barcode-based smart cab system offers a more dependable alternative to existing cab booking application, especially in semi-urban and low-connectivity areas. By removing dependency on SMS services, the system reduces operational costs and enhances reliability. The inclusion of complete trip details within the QR code improves accountability and minimizes fake or duplicate bookings. Flexible fare control benefits cab owners, while customers gain a secure and user-friendly booking experience. The system is scalable and practical for real-world deployment, and the result clearly indicate that barcode scan-based authentication significantly improve the effectiveness, security, and usability of smart cab booking system.

### 7. Proposed Working

The proposed system works by first allowing cab owners to register on the application and upload complete vehicle and driver details, ensuring authentically and transparency. Customer log in and enter their source, destination, and travel type (within city or outstation). Using GPS-based location services, the system displays nearby available cabs, enabling customers to send ride requests. Once a cab owner accepts the request, the system generates a unique QR code that contains complete trip information such as trip ID, route details, and vehicle data. This QR code acts as a secure digital authorization for the ride.

To start the trip, the customer scans the QR code provide by the cab owner, which instantly authenticates the ride without the need for OTP verification. This QR-based validation reduces delays, avoids OTP-sharing issues, and functions reliably even in low network conditions. During the trip, all details remain securely linked to the trip ID. At the end of the journey, the cab owner calculates the fare based on distance traveled and trip type, and the customer completes the payment through the application. Overall, the proposed working ensures secure ride authentication, faster trip initiation, reduced network dependency, and improved reliability compared cab booking systems.

### 8. Flow Diagram





## **9. CONCLUSION**

The proposed QR-based smart cab system using barcode scanning provides a secure, reliable, and efficient solution for modern cab booking requirements. By replacing OTP-based verification with QR code authentication, the system ensures faster trip validation, prevents fake bookings, and works effectively even in low network conditions. GPS-based cab identification, transparent fare calculation, and flexible fare control enhance trust and improve system reliability, making the solution well suited for real-world application, especially in semi-urban areas. Overall, the system successfully addresses the limitations of existing cab booking platforms and offers a practical, scalable, and user-friendly transportation solution.

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