

# SMART BUS: A SMARTPHONE BASED FRAMEWORK FOR PUBLIC TRANSPORT TICKET SYSTEM USING QR CODE

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## Abstract

*The bus transportation system we have in present day is affordable for almost everyone, it reduces air pollution and increases fuel efficiency also it's safe and reduces traffic but it still uses the conservative ways for ticketing and payment i.e. the fare collection. The speed of boarding in traditional system is slow-paced and time consuming. There are various technologies emerging today to make the transit simple like Quick Response (QR) Code, Cloud, E-wallet, RFID, etc. are used for making the system fast-paced.*

*Smart Bus is an application that makes bus ticket process in public transport much easier. User can do pre-booking and on moment booking which will increase the speed of transaction by making payments through Quick Response (QR) code.*

*Keywords—Android, Quick Response (QR) Code, Electronic Wallet, Flutter*

## I. INTRODUCTION

Simple and reliable public transport is an important need in modern world. [1] Bus transit is one of the most affordable and safe way of public transportation [2].

Smart Bus provides an effective proposal for public transport to provide ticket using an android application and also to pay for it online. Smart Bus is useful for the users who want to pre-book a ticket and be able to book a ticket by selecting source and destination also for users who want to do on-moment booking.

### A. Statement Of Problem

‘Smart Bus: A smartphone based framework for public transport ticket system using QR code.’

In User's module, the user will scan QR code generated on admin's app and the required credit for the ticket will be deducted from user's wallet and ticket will be sent to a user. Smart Bus is android application for QR scanning of bus tickets for online payment system.

The QR code will be scanned by user from the admin in the bus. The user should update admin about their destination address, after scanning the QR code, credit will be deducted from user's wallet. Then user will get message of travelling ticket.

The structure of QR is shown in following figure 1.



Fig 1: QR Code

The flow of this research paper will be from literature review, proposed framework, and setup requirements.

## II. LITERATURE REVIEW

The “Smart Bus - A smartphone based application for public transport ticket system using QR code implementation” is designed for booking tickets online via QR code. In the traditional methods, users have to

wait at a ticket counter and stay in the queue for seat confirmation .This gives the freedom of choice and simultaneously solves the problems with the existing classical approach. [3]

A. "Online Bus Tracking and Ticketing System" would allow the staff to enter the destination of the bus and then generate the QR code based on staff input for the user to scan. The staff has to manually add the destination. We solve this by planning all future routes for faster ticket generation and providing a better user experience. [1][3][5]

B. "Online Bus Tracking and Ticketing System", puts emphasis on the public bus transport system and shows the downfalls and limitations of the current bus transport system available for the general public. It describes the problems faced by the user while waiting for the public transport as well as the undefined clarity of schedule which is present in the current system. The time wastage while waiting and the cash problems that the users had to face is briefly mentioned. [2][6][4]

Sr. No.	Author	Title Of Paper	Limitations	Key points
1	Reddy, Et al.	Bus Ticket System for Public Transport Using QR Code	Precise results were not provided	QR code, Bus information, Easy ticket process.
2	Vinayak Nair, Et al.	Online Bus Tracking and Ticketing System	Precise results were not provided such as location and time	Android, Blue-Tooth Printer, Bus Tracking, Electronic-wallet, Global Positioning System, Quick Response Code
3	Anuradha, Et al.	Smart bus ticket system using QR code in Android App	Precise results were not provided with web application	Smart bus ticket, QR code, android bus ticket, web application
4	Balaji, Et al.	Smart Bus Ticket System Using QR Code In Mobile Application	Scanning codes from Aadhar card can be a safety issue	QR Code scanner, Web services, Location based services, Android , GPS, Smart Phones, Public Transport
5	Goden, M. N., Et al.	Smart Bus Ticket System Using QR Code In Android App	Precise results were not provided with web application	Smart bus ticket, QR code, android bus ticket, web application
6	Kushal Pal Singh, Et al.	Android Suburban Bus Ticket System	Ticket should be brought before, no option for on moment payment while being offline	Android, SQLite, Cloud Database, QR code
7	Prof. B. A. Khivsara1, Et al.	Smart Bus Ticketing System	E-payment system not present, RFID reader not in machine, thumb system, no data transfer machine to cloud, no tracking system[7]	Smart bus ticket, QR code, android bus ticket, web application
8	Miss. Mohini S. Shirsath, Et al.	A Review on Smart Bus Ticketing System using QR-Code	Use of Arduino could raise the price also precise results were not provided such as location and time	Ticketing System, QR-Code, Arduino, GPS ,GSM
9	A. Nunesa Et al.	Urban public transport service co-creation: leveraging passenger's knowledge to enhance travel experience. Antonio	Precise results were not provided such as location and time	public transport, value, mobile, crowdsourcing

C. "Bus ticket system for public transport using QR code" point towards the actual methodology from the user and administrator point of view. It iterates over how the ticket booking system and payment system will work on both sides and explains the ticket generation and ticket booking process briefly. It also explains how the implementation of QR codes is done to ensure cashless transactions and data tracking for business analysis. [3][5][8]

D. By using QR code of Aadhar for bus ticket, users can scan QR code of Aadhar card instead of ticket. [4]. QR code payment might be a contactless payment methodology where payment is performed by scanning a QR code from a mobile app. [7] [8]

E. It proposes new spatial validation features to increase the accuracy of destination results and to verify key assumptions present in previous origin-destination estimation literature. It only applies to distance based fare system. [9]

### III. PROPOSED FRAMEWORK

Quick Response (QR) code is quite popular and used in many applications for bus ticketing systems. [5] In this application, users can book a ticket through pre-booking, on moment booking i.e. they can book a ticket onsite where the admin will select source and destination for the user, a QR code will be generated. After the user scans the code, the credit will be deducted from the user's wallet and the ticket will be generated. Creating a cloud storage system to store data and files on cloud.

#### Classes And Their Characteristics

- I. User Class: Users can search for buses which are travelling through their desired routes. Users can book seats, view the bus and route fares in advance and can pre book their seats as per user convenience.
  - i. Users can book bus using pre-book and on moment book
  - ii. For pre-booking: select destination, time and available buses will be displayed
  - iii. On moment booking: by scanning the QR given by admin, scanner will be on
- II. Admin Class: Admins can add routes and fares. Admin can also add buses in the company catalog. The details of routes and fares of the buses specified by the admin
  - i. Admin can access database for saved buses or registration for a new bus(step 3)
  - ii. Edit the already saved buses if needed and send for confirmation
  - iii. If new bus then admin will enter the required information for bus and send for confirmation
  - iv. QR will be generated for every destination
  - v. Passenger information will be stored with their respective destination
- III. Bus Class: Bus class stores the information about the bus, which includes bus\_plate\_no, bus\_company\_name, total\_seats, route\_details (route locations, route timings, and fares) and payment\_methods.
- IV. Payment Class: The user must be logged on to the system, a specific credit in the wallet, internet connection available for pre-book, payment account details of users.
  - i. For pre-booking—
    1. The user clicks on desired time and destination
    2. The system retrieves the desired buses information from DB
    3. The system shows the available seats from the selected bus
    4. The system shows the details of the payment
    5. Send an mail or message for confirmation
  - ii. For on moment—
    1. Check offline user dataset for wallet information
    2. If required credit is available proceed with the booking

#### A. Functions

- I. Login and Signup Class (The user or admin must be a member of the system)-
  - i. Users enter their usernames/email-id or new registration (step 6)
  - ii. Users enter their passwords
  - iii. Users click login button
  - iv. System connects to database
  - v. Homepage for respective users is displayed
  - vi. For new registration, enter all the required information and then login
- II. Logout Class (The user or admin must be a member of the system)-
  - i. The system users click to logout button

- ii. DB connection terminated
- iii. The system logout the user successfully
- iv. The system redirect to the homepage

#### IV. SETUP REQUIREMENTS

##### A. Database Requirements

- Firebase for data storage and server instances
- Use of MySQL for local testing environment and database testing.

##### B. Software Requirements (Platform Choice)

- Android Studio as an IDE also using flutter framework for Application development (Dart)
- Service and broadcast receiver for Android Image Processing and QR generation
- MySQL

##### C. Hardware Requirements

Windows:-

- I. Microsoft Windows 7/8/10 (64-bit)
- II. 4 GB RAM minimum, 8 GB RAM recommended.
- III. 2 GB of available disk space minimum, 4 GB Recommended (500 MB for IDE + 1.5 GB for Android SDK and emulator system image)
- IV. 1280 x 800 minimum screen resolution.

#### V. FUTURE WORK

- i. We can add GPS for the navigation
- ii. Location based tracking is possible
- iii. Wake up reminder for the passenger that the passenger has reached the destination
- iv. Bus service rating, Helpline number
- v. Travelers' Insurance

#### VI. CONCLUSION

To overcome the drawbacks of manual and traditional ticketing system, we have used QR-Code for the purpose of ticket booking and payment.

In the proposed system, the user will have more effortless journey and the usage of public transport will be increased as well. By using the QR scanner in the application 'Smart Bus', user will scan the QR code and book as well as pay. People won't have to wait for a long time in the queue for tickets and without knowing when the bus would come.

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