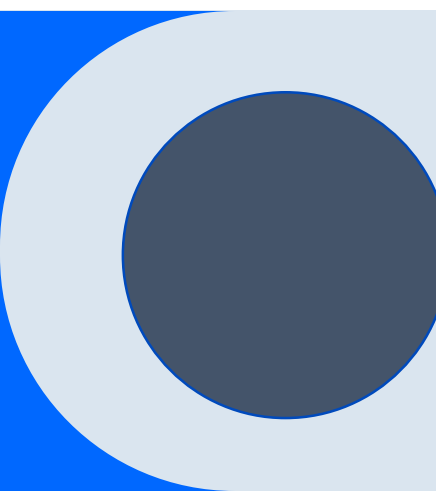





Bus Management Application



A Flutter-based Mobile Solution for Bus
Ticket Booking and Management
-by Sarath Kumar



Overview

- ✓ User and Admin Authentication
- ✓ Bus Schedule Management
- ✓ Real-time Ticket Booking
- ✓ Multi-language Support
- ✓ Bus Tracking
- ✓ Ticket Price Management

User Login workflow!

The user journey begins with a secure login process authenticated through Firebase. Upon successful authentication, users are directed to a dynamic home screen featuring a grid of interactive options. Users can search for bus routes, view real-time bus schedules, and book tickets seamlessly. The application provides a user-friendly interface with multi-language support, allowing users to switch between English, Spanish, and Tamil. When booking a ticket, users can select the number of tickets, view real-time pricing updated by administrators, and complete their booking with a single tap. The 'my tickets' section allows users to view and manage their current and past bookings. The entire process is designed to be intuitive, responsive, and provide a smooth transportation booking experience with real-time updates and comprehensive route information.

Admin Login workflow!!

Administrators enter the system through a secure Firebase authentication process, accessing a comprehensive management dashboard. The admin panel offers multiple critical functionalities: bus schedule management, route configuration, ticket price setting, and booking overview. Administrators can add, edit, or remove bus schedules, defining routes, timings, and precise ticket pricing in real-time. The ticket pricing module allows dynamic price updates that instantly reflect across the user application. The current bookings section provides a detailed overview of all ticket reservations, enabling administrators to track and manage transportation operations effectively. Admins can monitor system-wide activities, generate reports, and make instant modifications to bus schedules and pricing. The interface is designed with multilingual support and provides a powerful, user-friendly platform for comprehensive bus transportation

Navigation

- Navigation Strategies:
 - Flutter's 'navigator' class
 - Page routing between different screens
 - Dynamic navigation based on user roles
- Implementation details:
 - Navigator.push() for page transitions
 - Navigator.pushReplacement() for role-based routing
 - Seamless user experience with intuitive navigation

flow

Events Handling

➤ **Event Management:**

- User interactions (button clicks, form submissions)
- Real-time updates using 'StreamBuilder'
- State management with 'StatefulWidget'

➤ **Key Event Handlers:**

- Login authentication
- Ticket booking
- Language selection
- Price updates
- User role-based navigation

Images & Assets

- **Asset Management:**

- Custom bus icons
- Background images
- Language flag icons

- **Implementation:**

- Asset configuration in 'pubspec.yaml'
- Using 'Image.assets()' for rendering
- Responsive image scaling

- **Visual Elements:**

- App logo
- Bus tracking icons
- Feature card images

Layouts and UI/UX

- **Layout Strategies:**

- Responsive design
- Adaptive widgets
- Material Design principles

- **Key Layout Widgets**

- Gradient backgrounds
- 'Column', 'Row', 'GridView'
- 'Card' , 'ListTile'
- Elevation and shadows

- **Design Principles:**

- Consistent color schemes
- Intuitive user interfaces
- Mobile-first approach

Firestore Database Integration

- **Firestore Services Used:**

- Authentication
- Firestore Database
- Real-time updates

- **Collection**

- 'userRoles', 'busSchedules', 'tickets', 'priceHistory'

- **Key Features:**

- User authentication
- Dynamic ticket pricing
- Real-time bus schedule updates
- Booking management

Localization

Multi-language Support:

- Implemented using 'flutter_localizations'
- JSON-based translation files

Supported Languages:

- English
- Spanish
- Tamil

•Localization Process:

- Dynamic language switching
- Centralized translation management
- Easy addition of new languages

Public APIs

•Integrated APIs:

- OpenStreetMap for bus tracking
- Flutter Map for geographical visualization

Integrated this feature using 'flutter_map' library and 'OpenStreetMap' api for displaying map inside the application.

Used coordinates of 'Panimalar engineering collage' and other places to track the buses [static].