

# MAD\_Lab\_Project\_Report

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# SmartFly – Airline Booking with Biometric Integration

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## Abstract

SmartFly is a React Native mobile application built using Expo Go that offers a seamless and secure digital airline ticket booking experience. The app has two components: a User Side, where travelers can register using facial recognition, book flights, and generate boarding passes; and an Admin Side, where officials verify boarding eligibility using QR codes and facial ID. The app enhances security and convenience by eliminating traditional manual verification processes and integrating facial biometrics for identity validation.

## Keywords

Biometric Verification, Facial Recognition, React Native, Expo Go, JavaScript, QR Code, Flight Booking App, Firebase, Real-time Authentication, Admin Dashboard, Boarding Pass, Mobile Application, User Identity, Secure Travel App.

## I. INTRODUCTION

### 1.1 Purpose

SmartFly is designed to modernize the air travel process by digitizing booking and entry workflows through facial recognition. Built using React Native and Expo Go, the application minimizes physical contact and

paperwork. Users can book flights, receive a digital boarding pass, and pass through verification gates using facial identity. Administrators can scan boarding passes and verify travelers using a connected facial database.

### 1.2 Intended Audience and Reading Suggestions

This document targets mobile app developers, security architects, UI/UX designers, and airport tech solution providers. Technical readers can dive into the Implementation and Architecture sections, while functional readers may focus on Features and Results.

### 1.3 Project Scope

The app consists of two sides:

- User Side: Allows sign-up with basic details and facial ID, flight booking, and boarding pass generation with embedded QR code and user/flight data.

- Admin Side: Enables scanning of QR codes to validate ticket time, followed by live facial verification against a database.

This ensures real-time verification and streamlined boarding.

## II. OBJECTIVE

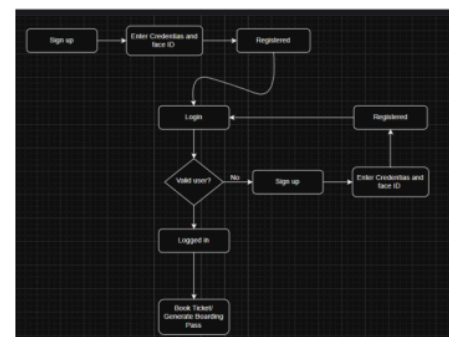
- Develop a dual-interface mobile application for users and airport admins.
- Implement face-based user registration and identity verification.

- Enable QR-based boarding pass validation with timing checks.
- Connect facial scans to a backend database for secure authentication.

## III. FEATURES

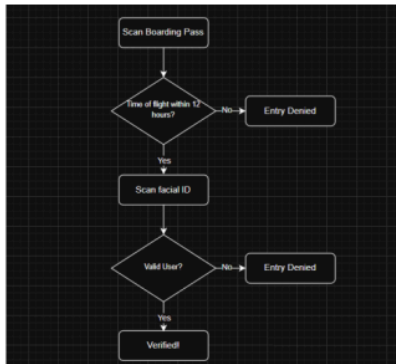
### User Side

- User Sign-Up/Login – Register with basic information and facial ID.
- Flight Booking Portal – Browse and book available flights.
- Boarding Pass Generation – Creates a QR with flight & user info.
- Booking History – Track previously booked flights.



### Admin Side

- QR Code Scanner – Reads boarding pass to fetch associated data.
- Flight Timing Validation – Allows entry only if within 12 hours of flight.
- Facial ID Verification – Verifies face from live scan with stored database.
- Conditional Display – Shows "Verified!" or "Entry Denied" messages accordingly.



#### IV. TECH STACK USED

##### Frontend (Mobile App)

- Language: JavaScript
- Framework: React Native
- Toolchain: Expo Go
- UI Design: React Native Components & Tailwind-like styling

##### Backend

- Server & Auth: Firebase
- Database: Firebase Firestore
- Storage: Firebase Storage (for face data/images)

##### APIs & Libraries

- QR Code Scanner: expo-barcode-scanner
- Facial Recognition: Custom model using ML Kit / TensorFlow.js (prototype)
- Camera Access: expo-camera
- Navigation: React Navigation

#### V. ARCHITECTURE

- Based on Client-Server Model.
- User client communicates with Firebase for auth and flight data.
- Admin client scans QR and connects to Firebase to fetch user info and verify face.
- Facial recognition handled on-device with ML Kit and checked against backend database.
- HTTPS-based secure data transmission.

#### VI. IMPLEMENTATION OVERVIEW

- Designed separate UI flows for user and admin panels
- Implemented sign-up with live camera face registration
- Flight data entered manually (mocked for prototype)
- Admin module includes:
  - QR Scanner
  - Flight Date Check
  - Facial Scan Trigger
  - Identity Validation Display
- Facial scan is matched with stored facial data based on user\_id.

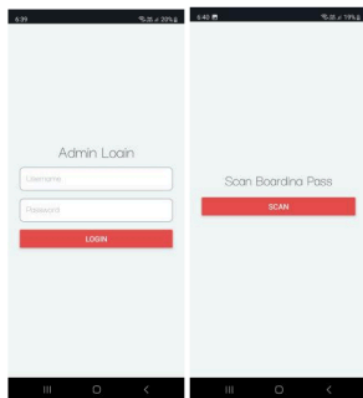
#### VII. CHALLENGES FACED

- Managing accurate facial recognition using mobile device cameras
- Ensuring real-time QR scan and timing validation logic
- Linking user IDs with biometric datasets securely
- Designing two different flows (user/admin) within the same app while maintaining UX consistency

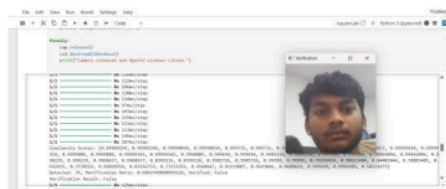
## VIII. RESULTS

- Working prototype with full user-to-admin interaction cycle completed
- Facial recognition tested with dummy dataset
- QR and flight time validation accurately blocks or allows access
- Admin dashboard successfully pulls and displays data upon scan.

Admin side:



Result: True, Verified



Result: False, Access denied

## IX. FUTURE SCOPE

- Connect to live flight booking APIs like Amadeus or Skyscanner
- Add liveness detection to prevent photo spoofing
- Allow DigiLocker integration for digital ID proof storage
- Deploy the admin dashboard on tablet kiosks at airports.

## X. CONCLUSION

SmartFly leverages biometric verification, real-time data, and QR-based access control to deliver a seamless and secure flight booking and boarding experience. Built entirely in React Native with Expo Go, it provides a dual-role platform for users and airport officials. This project reflects the future of intelligent travel systems—contactless, quick, and secure.

## XI. References

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## Links

Jupyter notebook link for Siamese neural networks:

[https://github.com/BhargavAnand333/Facial\\_Recognition\\_with\\_Siamese\\_Neural\\_Network](https://github.com/BhargavAnand333/Facial_Recognition_with_Siamese_Neural_Network)

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