

# **IntelliTour**

## **A Smart Tourism Companion**

### **Project Report**

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#### **Project Type**

Android Application

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# **1 Executive Summary**

IntelliTour is a modern, feature-rich Android application designed to serve as a comprehensive smart travel companion for tourists in Pakistan. The primary objective of the project was to integrate multiple modern mobile technologies into a single, cohesive user experience.

The application provides AI-powered trip recommendations, real-time weather forecasting, interactive mapping, tour package browsing, and a secure user authentication and booking system. By leveraging on-device machine learning with TensorFlow Lite, cloud services with Firebase, and various third-party APIs, IntelliTour demonstrates a robust and scalable architecture that addresses real-world travel planning challenges.

## **2 Introduction**

### **2.1 Problem Statement**

Tourists and travelers often face challenges while planning trips, such as budget constraints, uncertainty about weather conditions, lack of geographical awareness, and difficulty in discovering suitable tour packages. Traditionally, users rely on multiple separate applications for maps, weather updates, and bookings, resulting in a fragmented and inefficient experience.

There is a clear need for an integrated mobile solution that simplifies trip planning by providing all essential services within a single platform.

### **2.2 Project Objectives**

The main objectives of the IntelliTour project are:

- To create a secure and persistent user authentication system.
- To develop an AI-driven feature that provides personalized tour recommendations.
- To integrate a real-time weather forecasting service.
- To implement an interactive map with live location tracking.
- To build a seamless system for browsing and booking tour packages.
- To ensure a professional, clean, and intuitive user interface.

### **2.3 Scope**

The project is a fully functional Android application that covers the complete lifecycle of trip planning, from discovery to booking. It uses both on-device processing and cloud-based ser-

vices. Although payment processing is simulated, real booking data is created and securely stored and linked to user accounts.

## 3 System Architecture and Design

IntelliTour is a native Android application developed using the Java programming language. It follows a single-activity-per-screen architecture, where each screen is represented by a separate Activity class defined in the `AndroidManifest.xml` file.

The system uses a hybrid architecture consisting of the following components:

1. **Client-Side Logic:** Handles UI rendering and on-device processing, including machine learning inference.
2. **Cloud Backend Integration:** Uses Firebase Authentication and Cloud Firestore.
3. **Third-Party API Integration:** Uses Geoapify and OpenWeatherMap APIs via Retrofit.

## 4 Core Features and Implementation

### 4.1 User Authentication and Management

**Technology:** Firebase Authentication

- User registration using `createUserWithEmailAndPassword()`.
- Login using `signInWithEmailAndPassword()`.
- Automatic session handling by Firebase.
- User data stored in Cloud Firestore.

### 4.2 AI-Powered Trip Planner

**Technology:** TensorFlow Lite

- i. External model training.
- ii. TFLite model integration.
- iii. On-device inference with scaled inputs.
- iv. Detailed itinerary display.

### **4.3 Interactive Map**

**Technology:** MapLibre GL SDK, Geoapify

- i. Secure API key usage.
- ii. Dynamic map styling.
- iii. Live location tracking.

### **4.4 Real-Time Weather Module**

**Technology:** OpenWeatherMap API, Retrofit, Gson

- i. Retrofit API definitions.
- ii. Asynchronous network calls.
- iii. JSON parsing via Gson.
- iv. RecyclerView-based UI.

### **4.5 Tour Packages and Booking**

- i. Card-based UI.
- ii. Intent-based data transfer.
- iii. Firestore booking persistence.

## **5 Challenges and Solutions**

- **Map Not Loading:** Fixed incorrect API key and URL.
- **AI Model Inaccuracy:** Resolved through input scaling.
- **Build Errors:** Fixed by increasing minimum SDK.

## **6 Conclusion and Future Work**

IntelliTour successfully fulfills its objective of providing a unified smart tourism application. The project demonstrates strong skills in Android development, cloud services, and on-device AI.

**Future Enhancements:**

- Route directions on maps.
- Cloud-based AI recommendations.
- User reviews and ratings.
- Push notifications.