Android Application Development

A Personalized Travel Planning and Tracking App

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Wanderlust: A Personalized Travel Planning and Tracking App

Introduction

The travel industry is increasingly leaning towards mobile platforms to provide users with a more personalized and convenient experience. This project aims to develop a simple travel app using Android's Jetpack Compose UI toolkit to showcase recommended accommodations based on user-selected locations. With Compose, the project explores declarative UI principles to build a seamless, dynamic, and visually appealing user interface that adapts to user preferences.

Abstract

This project is a prototype travel app developed in Android Studio using Kotlin and Jetpack Compose. It demonstrates how Compose can simplify the creation of Android UIs by allowing developers to write declarative code for building flexible layouts and handling UI states more intuitively. The app's main feature is a personalized feed of recommended accommodations tailored to user-selected destinations. With Jetpack Compose Navigation, the app provides smooth transitions between screens, creating a user-friendly experience. This project also

incorporates Material Design elements to maintain a cohesive and modern aesthetic.

Tools Used

1. **Android Studio**: The primary IDE used for developing Android applications, providing a comprehensive environment with support for Kotlin, Jetpack Compose, and various Android SDK tools.
2. **Kotlin**: The programming language used for the entire project, known for its expressive syntax and modern features that streamline Android development.
3. **Jetpack Compose**: Android’s modern UI toolkit for creating native interfaces in a declarative way, enabling the creation of reusable UI components.
4. **Jetpack Compose Navigation**: A navigation component designed for Compose, allowing seamless transitions between different screens within the app.
5. **Material Design Components**: Compose’s Material Design library provides pre-built UI components, such as buttons, cards, and text fields, ensuring that the app adheres to Android’s design guidelines.
6. **Android Architecture Components**: Used for managing data and lifecycle, including ViewModel for handling UI-related data and LiveData or State for observing data changes.

7. **Coroutines**: Kotlin’s asynchronous programming tool used for managing background tasks like data fetching, ensuring smooth and responsive UI interactions.

Key Features

1. **Compose UI for Declarative Interface**:
   - The app’s UI is built using Composable functions that define sections, such as the home screen, location selector, and accommodation recommendations.
   - UI state is managed directly in the code, simplifying UI updates as data changes.
2. **Personalized Feed**:
   - A dynamic feed presents accommodation recommendations based on the user’s location preferences, making the app more engaging and relevant to users.
3. **Location-Based Recommendations**:
   - The app fetches recommendations for locations chosen by the user, providing a personalized experience tailored to travel interests.
4. **Material Design Integration**:
   - Compose’s Material Design components (e.g., Button, Card, Text, LazyColumn) ensure a cohesive, user-friendly design following Android’s design guidelines.

5. **Responsive Layouts**:
   - The app supports various screen sizes and orientations, providing a responsive experience on both phones and tablets.

Challenges

1. **Learning Curve with Jetpack Compose**:
   - Jetpack Compose is relatively new, and its declarative paradigm requires a shift from the traditional XML-based layouts. Understanding how to manage UI state effectively within Composable functions presented an initial learning challenge.
2. **State Management**:
   - Compose's State and remember functions simplify state management, but keeping track of different states across multiple screens can be challenging, especially for beginners. Proper usage of ViewModel with Compose was essential to maintain separation of concerns and ensure data consistency across recompositions.
3. **Navigation and Passing Data**:
   - Compose Navigation differs from the traditional navigation component, requiring a different approach for managing navigation routes and passing data between screens. This

    required adjustments to handle arguments and retain data states between different composables.

4. **Performance Optimization**:
    - Ensuring smooth performance, especially with dynamic lists and images, required optimization. Lazy-loading lists with LazyColumn and proper use of remember were necessary to prevent unnecessary recompositions and improve app responsiveness.
5. **Handling UI Responsiveness**:
    - Developing a responsive design that adapts well to different screen sizes was a challenge, as Compose layouts are structured differently than XML-based layouts. Testing the UI on various devices and configurations helped ensure a consistent experience.

Potential Extensions

- **Map Integration**: Adding maps using Google Maps or Mapbox would enable users to view accommodation locations visually, enhancing the user experience.
- **User Profiles and Authentication**: Implementing user accounts to save preferences, track past bookings, and improve recommendations.

- **Real-Time Location Tracking**: Incorporating GPS data to suggest nearby accommodations and attractions based on the user’s current location.
- **Backend Integration**: Connecting to a backend API for real-time data on accommodations, user preferences, and recommendations.

Program

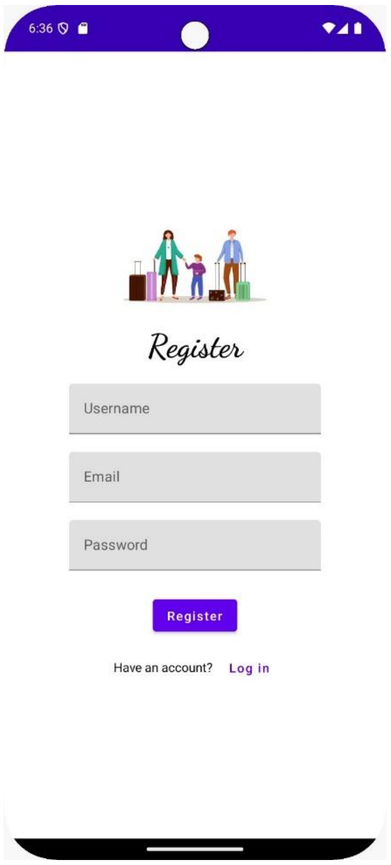
```
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:tools="http://schemas.android.com/tools">

    <application
        android:allowBackup="true"
        android:dataExtractionRules="@xml/data_extraction_rules"
        android:fullBackupContent="@xml/backup_rules"
        android:icon="@mipmap/ic_launcher"
        android:label="@string/app_name"
        android:supportsRtl="true"
        android:theme="@style/Theme.TravelApp"
        tools:targetApi="31">
```

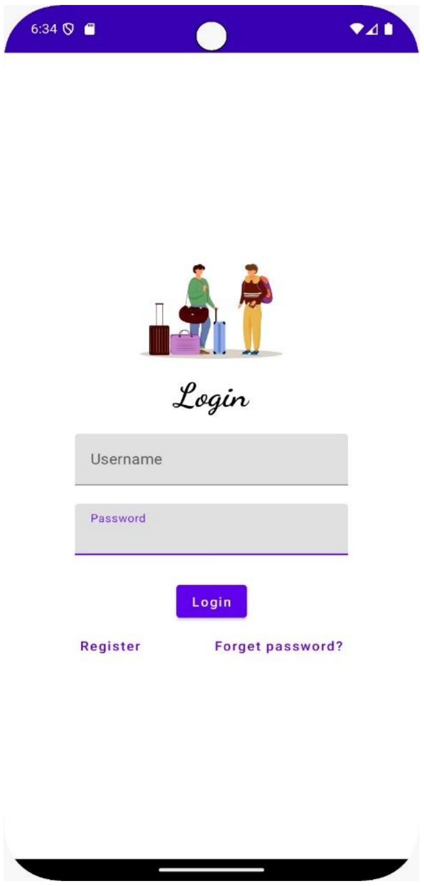
```
<activity
    android:name=".MainActivity"
    android:exported="true"
    android:label="@string/app_name"
    android:theme="@style/Theme.TravelApp">
    <!-- Main Activity can be opened by an explicit intent -->
    <intent-filter>
        <action android:name="android.intent.action.VIEW" />
        <category android:name="android.intent.category.DEFAULT" />
    </intent-filter>
</activity>

<!-- Login Activity -->
<activity
    android:name=".LoginActivity"
    android:exported="true"
    android:label="@string/app_name"
    android:theme="@style/Theme.TravelApp">
    <intent-filter>
        <action android:name="android.intent.action.MAIN" />
        <category android:name="android.intent.category.LAUNCHER" />
    </intent-filter>
</activity>
```

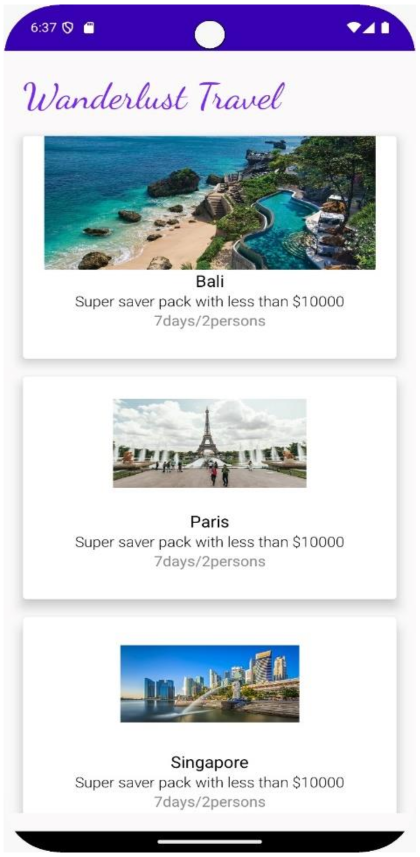
```
<!-- Other Activities -->
<activity
   android:name=".RegisterActivity"
   android:exported="false"
   android:label="RegisterActivity"
   android:theme="@style/Theme.TravelApp" />

<activity
   android:name=".SingaporeActivity"
   android:exported="false"
   android:label="@string/title_activity_singapore"
   android:theme="@style/Theme.TravelApp" />

<activity
   android:name=".ParisActivity"
   android:exported="false"
   android:label="@string/title_activity_paris"
   android:theme="@style/Theme.TravelApp" />

<activity
   android:name=".BaliActivity"
   android:exported="false"
```

```
            android:label="@string/title_activity_bali"
            android:theme="@style/Theme.TravelApp" />

    </application>

</manifest>
```

Output



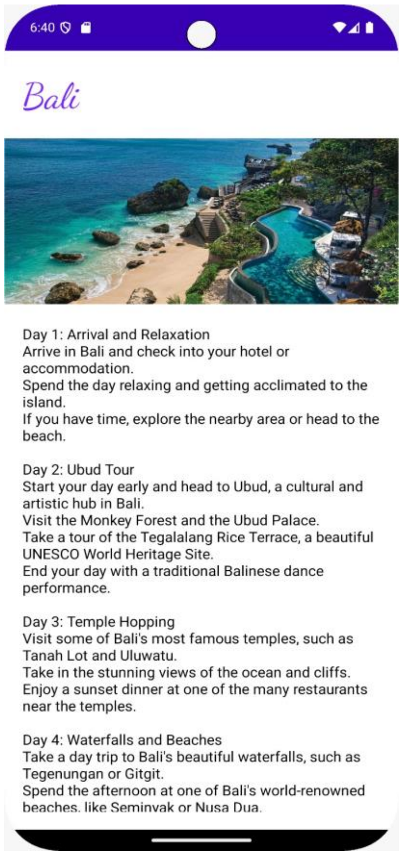




Bali
Super saver pack with less than $10000
7days/2persons

Paris
Super saver pack with less than $10000
7days/2persons

Singapore
Super saver pack with less than $10000
7days/2persons



Day 1: Arrival and Relaxation
Arrive in Bali and check into your hotel or accommodation.
Spend the day relaxing and getting acclimated to the island.
If you have time, explore the nearby area or head to the beach.

Day 2: Ubud Tour
Start your day early and head to Ubud, a cultural and artistic hub in Bali.
Visit the Monkey Forest and the Ubud Palace.
Take a tour of the Tegalalang Rice Terrace, a beautiful UNESCO World Heritage Site.
End your day with a traditional Balinese dance performance.

Day 3: Temple Hopping
Visit some of Bali's most famous temples, such as Tanah Lot and Uluwatu.
Take in the stunning views of the ocean and cliffs.
Enjoy a sunset dinner at one of the many restaurants near the temples.

Day 4: Waterfalls and Beaches
Take a day trip to Bali's beautiful waterfalls, such as Tegenungan or Gitgit.
Spend the afternoon at one of Bali's world-renowned beaches, like Seminyak or Nusa Dua.

Conclusion

This project highlights the advantages of using Jetpack Compose and Kotlin for developing Android apps with a modern, responsive UI. By leveraging Compose's declarative approach, the app provides a dynamic user experience that personalizes travel recommendations based on user preferences. Despite some learning challenges with Compose, the toolkit ultimately streamlined UI development, resulting in a scalable and maintainable codebase. This travel app serves as a valuable prototype for further expansion into a fully-featured travel assistant with real-time recommendations and user personalization.