SmartTimeline Android Application

Project Report

Technology: Android (Java)

Architecture: MVVM

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Abstract

SmartTimeline is an Android-based personal journaling and timeline management application. The application allows users to create and manage posts containing text, mood, location, tags, and images. It provides analytical insights through charts and generates AI-powered summaries using the Groq API. The project follows modern Android development practices such as MVVM architecture, Room database for persistence, and Material Design for UI consistency. This report presents the system architecture, implementation details, technologies used, and key features of the application.

Contents

Chapter 1

Introduction

Personal journaling applications have gained popularity due to their ability to help users reflect on daily experiences and emotional patterns. SmartTimeline is designed to enhance this experience by combining traditional journaling with analytics and AI-powered insights.

The application enables users to log daily posts, visualize mood trends, analyze posting habits, and generate summaries over selected time periods. All user data is stored locally using Room Database, ensuring privacy and offline availability.

1.1   Objectives

- Provide a structured personal journaling platform.

- Enable timeline-based visualization of posts.

- Analyze user behavior through charts and statistics.

- Generate AI-powered summaries using the Groq API.

- Follow clean architecture and best Android development practices.

Chapter 2

Project Structure

The project follows the standard Android Gradle project structure with clear modular separation.

2.1 Root Level

- `build.gradle` – Project-level build configuration

- `settings.gradle` – Module settings

- `gradle.properties` – Gradle configuration

- `local.properties` – Local SDK paths

- `.idea/` – IDE configuration files

2.2 App Module Structure

Package	Description
ai	AI-related logic and API integration
data	Repository and Room database classes
notification	Notification scheduling and helpers
ui	Fragments, adapters, and UI logic
util	Utility and helper classes
viewmodel	ViewModels implementing MVVM

2.3 Resources

- XML layouts for UI

- Drawable resources and icons

- Values (colors, styles, themes)

Chapter 3

Key Features

3.1   Timeline Management

The timeline displays all user posts using a `RecyclerView`. Users can search posts, filter them by mood, and view detailed post content.

3.2   Post Management

Users can add, edit, and delete posts. Each post can include:

- Text content

- Mood selection

- Location data

- Tags

- Images

3.3   Analytics

Analytics are presented using interactive charts:

- Mood distribution using Pie Charts

- Posts per day using Bar Charts

- Tag usage statistics

3.4   AI Summaries

The application integrates with the Groq API to generate:

- Weekly summaries

- Monthly summaries

- Yearly summaries

3.5   Settings and Data Management

- API key configuration

- Export and import of journal data using JSON

3.6   Notifications and Permissions

- Daily journaling reminders

- Runtime permission handling for storage, camera, and location

Chapter 4

Architecture

SmartTimeline follows the MVVM (Model-View-ViewModel) architecture pattern.

4.1 Model

- `Post.java` – Data entity
- Room Database for local persistence

4.2 View

- Fragments
- XML layout files

4.3 ViewModel

- Handles business logic
- Exposes data via LiveData

4.4 Repository

- Acts as a single source of truth
- Abstracts database access

4.5 Navigation

- MainActivity acts as the navigation hub

Chapter 5

Technologies Used

Technology	Usage
Java	Application logic
XML	UI layouts
Room ORM	Local database
LiveData & ViewModel	Lifecycle-aware components
WorkManager	Background AI summary generation
MPAndroidChart	Data visualization
Gson	JSON serialization
HttpURLConnection	API networking
Gradle	Build automation

Chapter 6

Implementation Details

6.1 Data Flow

User data flows through the system as follows:

$$\text{Room Database} \rightarrow \text{Repository} \rightarrow \text{ViewModel} \rightarrow \text{Fragment}$$

6.2 AI Integration

- Prompts generated in `AIUtils.java`

- API communication handled by `AIService.java`

6.3 Charts Implementation

- PieChart for mood analytics

- BarChart for post frequency and tag usage

6.4 Export and Import

- Data serialized into JSON format

- Managed by `ExportImportManager.java`

Chapter 7

Conclusion and Future Scope

SmartTimeline is a comprehensive Android journaling application that successfully combines data persistence, analytics, and AI-powered insights. The project demonstrates the effective use of MVVM architecture, Room database, and modern Android libraries.

7.1 Future Enhancements

- Offline AI summary generation

- Cloud synchronization

- Enhanced UI animations

- Multi-device support