RAJALAKSHMI
ENGINEERING COLLEGE
An AUTONOMOUS Institution
Affiliated to ANNA UNIVERSITY, Chennai

CS19611 - MOBILE APPLICATION DEVELOPMENT PROJECT REPORT

WEATHER FORECAST APPLICATION

Submitted by

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BONAFIDE CERTIFICATE

Certified that this project report titled **"WEATHER FORECAST"** is the bonafide work of **B KAILAASH (220701115)**, who carried out the work under my supervision. Certified further that to the best of my knowledge, the work reported herein does not form part of any other thesis or dissertation based on which a degree or award was conferred earlier.

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CHAPTER 1

ABSTRACT

In a world where weather conditions affect daily activities and long-term planning, having access to accurate and real-time weather updates is essential. **Clim8** is an intuitive weather forecasting mobile application built using **Kotlin** in **Android Studio**. The app allows users to fetch **current weather** and **five-day forecasts** for any city using data from a weather API.

The application integrates **Retrofit** for API interaction, uses the **MVVM architecture**, and follows modern development practices with **LiveData**, **ViewModel**, and **coroutines**. It provides weather metrics like temperature, humidity, pressure, wind speed, and forecast details in a user-friendly format.

With a clean Material Design-inspired UI and responsive behavior, Clim8 ensures that users get precise and timely weather information, improving their planning and decision-making

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CHAPTER 2

INTRODUCTION

2.1 GENERAL

Clim8 is a real-time weather app designed to deliver current conditions and 5-day weather forecasts. Users can search for any city to instantly view weather parameters such as temperature, humidity, wind speed, and a general description.

2.2 OBJECTIVE

- To fetch and display current weather for any city entered by the user.
- To provide a five-day forecast in a detailed yet concise format.
- To use MVVM architecture to ensure clean, modular, and testable code.
- To offer a seamless, responsive user experience using modern Android components

2.3 EXISTING SYSTEM

Current weather apps like AccuWeather, Weather.com, and Google Weather offer good functionality but:

- Often come with ads or premium features.
- May have cluttered UIs.
- Can be data-heavy and complex for quick weather checks.

Clim8 aims to solve these with a **lightweight**, **ad-free**, and **simple** interface focused on essential functionality.

CHAPTER 3

LITERATURE SURVEY

Apps such as **Google Weather**, **The Weather Channel**, and **Yahoo Weather** offer features like real-time updates, radar maps, and extended forecasts. However, these applications often face challenges such as **UI overload**, requiring users to navigate through cluttered interfaces, and **frequent permission requests** or reliance on **background services**, which can hinder user experience. Additionally, many of these platforms use **non-transparent APIs** and **closed data models**, limiting flexibility and understanding for developers or advanced users.

Studies on user experience (UX) in weather applications indicate that users prefer **minimal steps** to access essential weather information, **clear visuals with intuitive color cues**, and a process that avoids **mandatory sign-ins or continuous internet dependence**. In response to these insights, **Clim8** is designed with a **modular MVVM architecture**, uses **Retrofit** for direct and efficient API communication, and leverages **LiveData** to provide dynamic and reactive UI updates—delivering a cleaner, faster, and more user-friendly experience.

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CHAPTER 4

PROPOSED SYSTEM

4.1 SYSTEM OVERVIEW

The Clim8 Weather Forecast application enhances daily planning by offering users a simple and reliable platform to check real-time weather updates and five-day forecasts for any city. Designed with clarity and performance in mind, the app features accurate weather retrieval, city-based search, responsive data updates, and a clean, intuitive user interface. Users can effortlessly enter a city name to access essential weather details such as temperature, humidity, wind speed, and forecast summaries, ensuring quick and informed decision-making. With modular architecture and smooth interactions, the app delivers a dependable and user-friendly experience for anyone seeking fast, up-to-date weather information.

4.2 SYSTEM ARCHITECTURE

- User launches the app and is directed to the Home Screen with a search bar prompting them to enter a city name.
- Upon entering a city, the app fetches the current weather details and five-day forecast using a weather API through Retrofit.
- The ViewModel processes the data and updates the UI in real-time using LiveData, ensuring a reactive and lifecycle-aware interface.
- The current weather and forecast data are displayed clearly with essential parameters such as temperature, humidity, wind speed, and weather conditions.
- If any errors occur (e.g., city not found or network failure), user-friendly error messages are displayed to ensure graceful handling.
- The system ensures smooth and responsive navigation, allowing users to quickly search multiple cities without interruptions or sign-ins.

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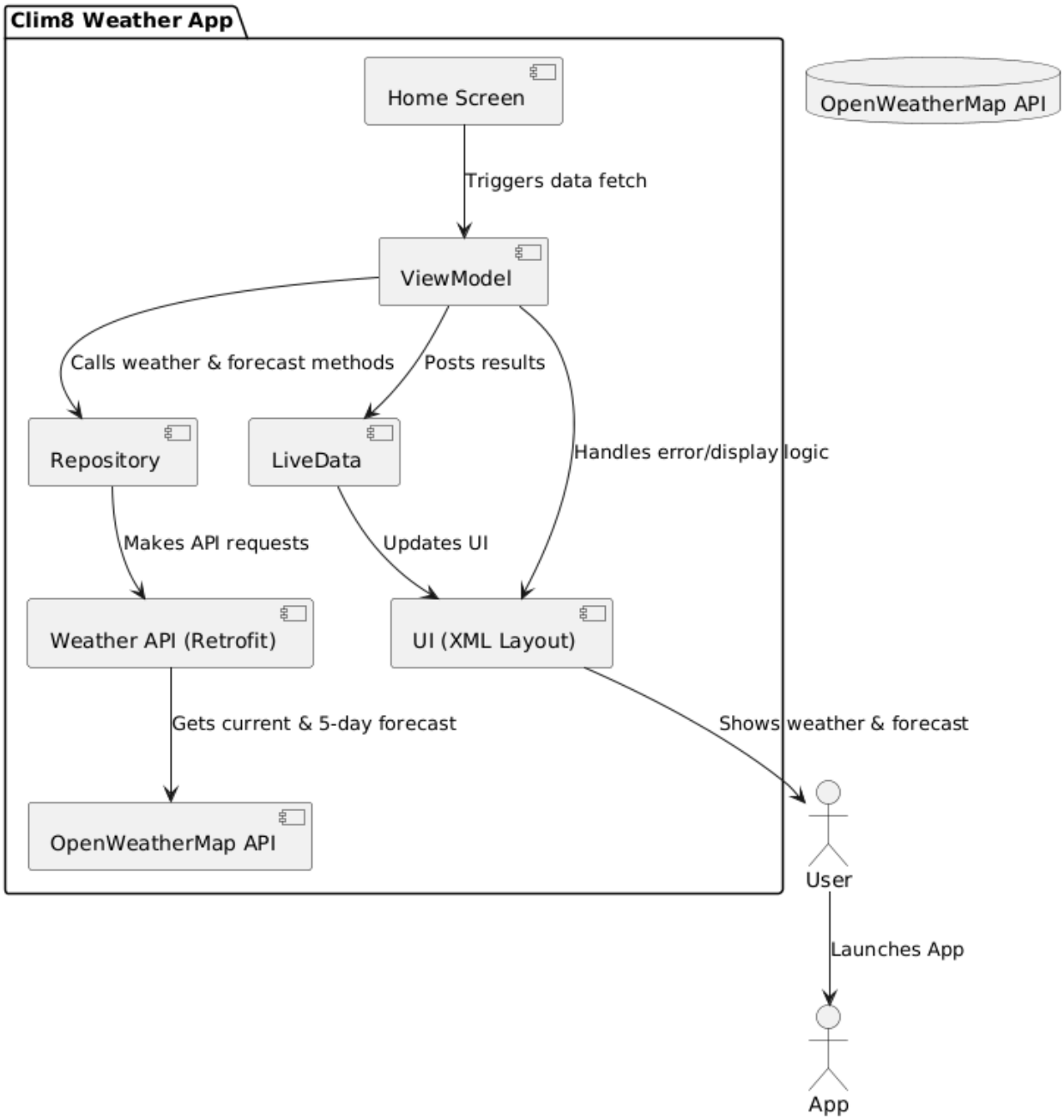

(Fig 3.1 System Architecture)

CHAPTER 5

MODULE DESCRIPTION

5.1 MODULES

- •**Weather Search Module**: Fetches current weather using API.
- **Forecast Module**: Retrieves and displays 5-day forecast data.
- **ViewModel & LiveData Module**: Handles business logic and lifecycle-safe data handling.
- **Repository Module**: Acts as a data source layer calling API services.
- **UI/UX Module**: Displays data using XML with Material Design; supports reactive updates.
- **Error Handling Module**: Captures API or network errors and displays messages to users.

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CHAPTER 6

IMPLEMENTATION AND RESULTS

6.1 TOOLS USED

 Android Studio – The primary **IDE** (Integrated Development Environment) where you designed, coded, and ran your app.

 Kotlin – The **main programming language** used for writing the app's logic, including ViewModels, repository functions, and API calls.

 XML – Used for **defining UI layouts**, including buttons, text views, and styling with **Material Design principles**.

 Retrofit – A powerful HTTP client used to **connect with the weather API**, making network requests to fetch real-time data.

 LiveData & ViewModel – Core parts of **MVVM architecture** that help manage UI-related data in a lifecycle-conscious way.

 Kotlin Coroutines – Used for **asynchronous programming**, allowing smooth background tasks like fetching API data without blocking the UI.

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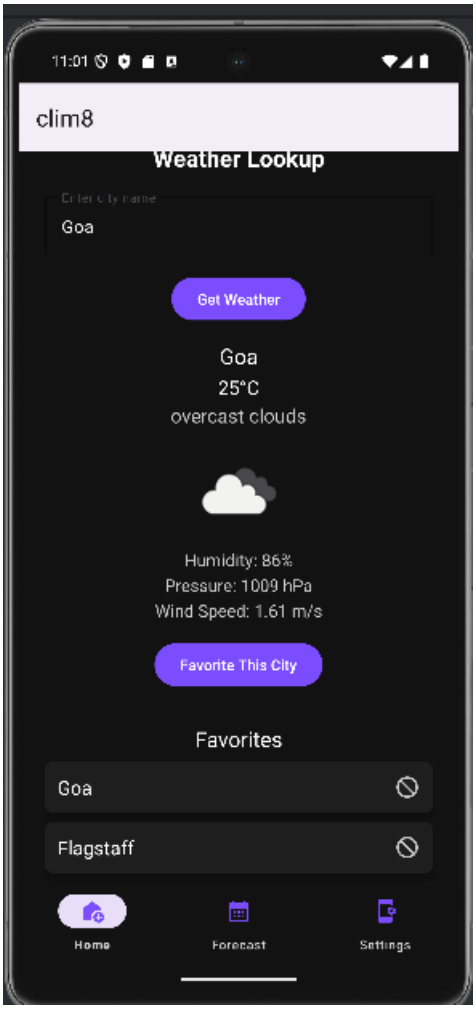
6.2 OUTPUT SCREENSHOTS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Goa
Get Weather
Goa
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Humidity: 86%
Pressure: 1009 hPa
Wind Speed: 1.61 m/s
Favorite This City
Favorites
Goa
Flagstaff
Home
Forecast
Settings

CHAPTER 7

CONCLUSION AND FUTURE ENHANCEMENT

6.1 CONCLUSION

Clim8 offers an elegant solution to quickly retrieve and display weather information. With a focus on performance, clarity, and user experience, the app achieves its goals through modular MVVM design, live data updates, and a responsive UI.

6.2 FUTURE ENHANCEMENT

 GPS-based location support to auto-fetch weather.

 Dark mode support.

 UI animations and visual forecasts (icons, graphs).

 Offline caching of recent searches.

 Multi-city comparison view.

 Unit switching (°C ↔ °F, km/h ↔ mph).

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REFERENCES

1) Android Developer Documentation
2) Kotlin Coroutines Guide
3) Retrofit Official Documentation
4) OpenWeatherMap API