Chapter-1

INTRODUCTION

1.1 Introduction:

In an increasingly digital and fast-paced world, users often need to convert values between various units whether for travel, study, cooking, finance, or engineering purposes. Many existing unit converter apps, however, tend to be either overly complex with cluttered interfaces or too limited in the range of units they support. This gap highlights the need for a tool that is both functional and user-friendly.

The Unit Converter App, built using Flutter, aims to solve this problem by offering a clean, intuitive, and interactive user interface that allows users to effortlessly convert between a wide range of units. Supported categories include Length, Weight, Temperature, and Currency. The app ensures real-time and accurate conversions, and is designed to be accessible to users of all ages and technical backgrounds.

The app supports conversion categories such as:

- **Length** (e.g., meters to miles)
- **Weight** (e.g., kilograms to pounds)
- **Temperature** (e.g., Celsius to Fahrenheit)
- **Currency** (with real-time exchange rates using API integration)

A key feature of the app is its conversion history, which helps users keep track of their past conversions for quick reference. Users can also save their frequently used conversions for easy access. To provide a secure and personalized experience, the app integrates with Firebase Authentication and Firestore, enabling features like user registration, login, and cloud-based history storage.

By leveraging Flutter’s cross-platform capabilities, the app is optimized for both Android and iOS devices, ensuring a smooth and responsive user experience. Whether you’re a student, traveler, professional, or casual user, the Unit Converter app is designed to be your reliable everyday conversion tool.

Key Features :

- Intuitive User Interface: Designed with Google Fonts, icons, and a visually appealing layout to enhance user interaction and accessibility.

- Firebase Integration: Secure user login and registration with Firebase Auth, enabling a personalized experience.

- Conversion History: A complete log of past conversions that users can revisit, filter, or mark as favorites.

- Live Currency Conversion: Real-time exchange rate updates via API for accurate currency conversions.

- Offline Support (Hive): Stores historical data locally for users who want to access conversion history without internet connectivity.

- Quick Access: Category-based navigation and smooth transitions using Flutter’s Navigator, enhancing app usability.

- Cross-Platform Ready: Built with Flutter, ensuring compatibility across Android and iOS with a single codebase.

Chapter-2

PROBLEM STATEMENT

2.1 Need of Work:

In our daily lives, we often come across situations where we need to convert one unit of measurement to another. Whether it’s converting kilometers to miles for a road trip, Celsius to Fahrenheit for checking the weather, or rupees to dollars while shopping online, unit conversion is a common task. Although many unit converter apps already exist, they are often complicated, limited in features, or don’t offer a smooth user experience.

Many users, especially students, travelers, and professionals, look for an app that is simple, accurate, and fast. They don’t want to spend time scrolling through endless menus or dealing with cluttered designs. Most importantly, they want a reliable tool that works anytime—even offline for certain features like length or temperature conversions.

This project aims to fill that gap by developing a clean, easy-to-use Unit Converter app using Flutter. Flutter is chosen because it allows the app to run on both Android and iOS with the same codebase, saving time and effort. The app will also include helpful features like:

- Saving conversion history,
- Storing favorite conversions,
- Real-time currency conversion using internet-based APIs,
- And a modern, user-friendly interface.

2.2 Problem Statement

Many existing unit converter apps are either too complex, cluttered, or limited in functionality, making them difficult for users to navigate. There is a need for a simple, user-friendly, and efficient mobile application that provides accurate unit conversions across multiple categories along with a history feature for convenience. To ensure secure user access and personalized experiences, the app will integrate Firebase Authentication and Firestore for user data storage.

2.3 Objectives:

- **Develop a multi-unit converter**:
  Build functionality to convert between various unit types such as:

  Length (e.g., meters to feet)

  Weight (e.g., kilograms to pounds)

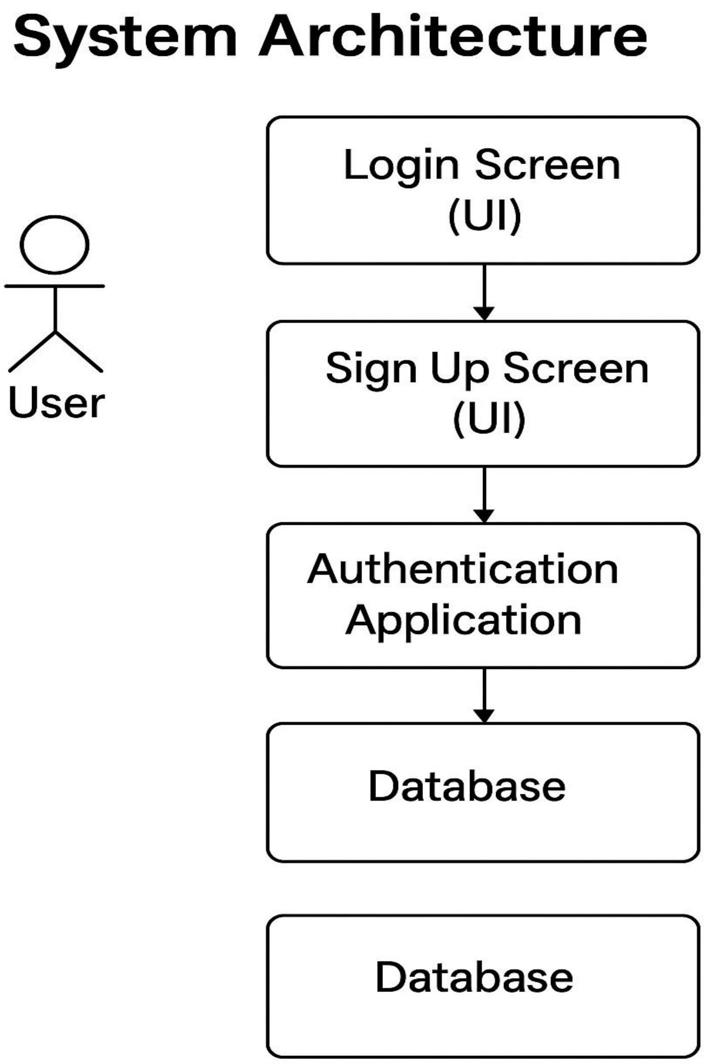
  Temperature (e.g., Celsius to Fahrenheit)

  Currency (e.g., INR to USD)
- **Create an intuitive user interface**:
  Design a clean and simple UI using Flutter that works smoothly across Android and iOS platforms.
- **Implement Firebase for user authentication**:
  Allow users to register and log in using Firebase Authentication, so they can securely store and access their data.
- **Support multiple unit types**:
  Allow conversions for length, weight, temperature, and currency.
- **User-friendly design**:
  Create an intuitive interface that is easy for anyone to use..
- **Cross-platform app**:
  Ensure the app works smoothly on both Android and iOS devices using Flutter.
- **Fast and efficient**:
  Make sure the app runs quickly and without any delays.

Chapter-3

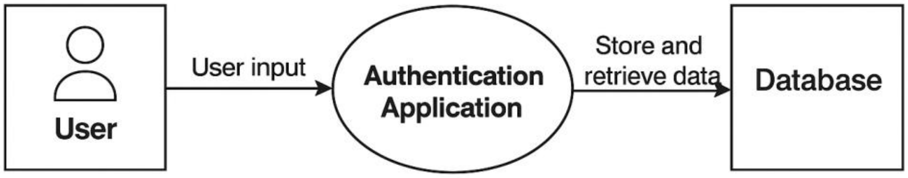
DESIGN DETAILS

3.1 System Architecture:

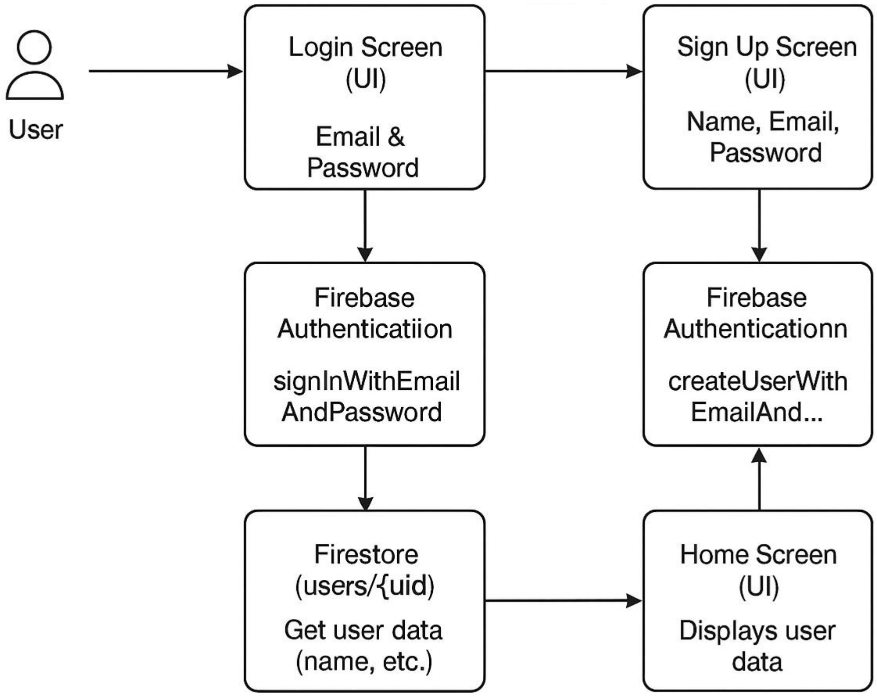


3.2 System Design Diagrams (Any three Diagrams)

3.2.1 Data Flow Diagram

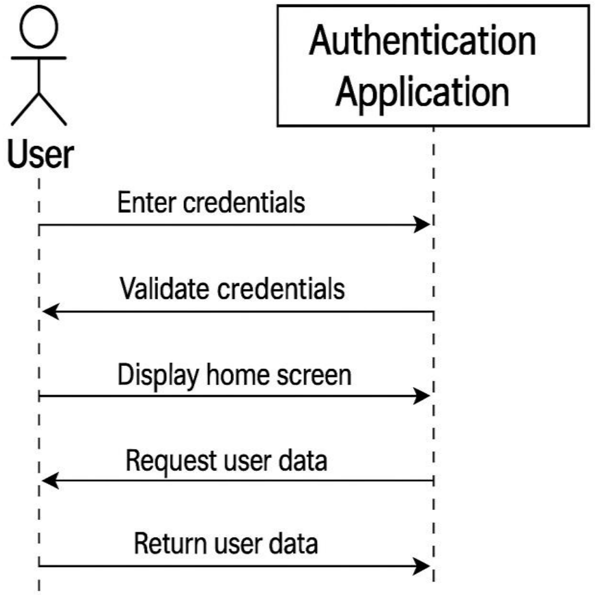


Data Flow Diagram (Level 0)

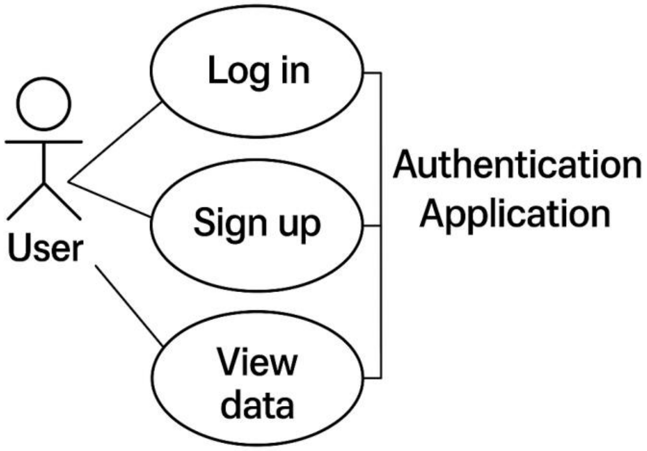


Data Flow Diagram (Level 1)

3.2.2 Sequence Diagram



3.2.3 Use Case Diagram:



Chapter – 4

IMPLEMENTATION

4.1 Module Description In detail

1. Authentication Module

Handles user sign-up, login, and session management using Firebase Authentication.

a. Sign-Up (sign_up.dart)

- Allows new users to register.
- Collects name, email, and password.
- Stores user data in Firebase Authentication and Firestore (users/{uid}).
- Navigates user to home screen upon successful registration.

b. Login (login.dart)

- Validates existing user credentials.
- Fetches user data from Firestore (users/{uid}) after successful login.
- Displays a welcome message and navigates to the home screen with user data.

2. User Interface Module

Provides a modern, animated, and interactive UI for login, registration, and the home screen using:

- GoogleFonts
- Stack, TextFormField, Scaffold, etc.

UI Screens:

- LoginScreen
- SignUpScreen
- HomeScreen

3. Firestore Database Module

Manages persistent storage of user data.

Purpose:

- Store and retrieve user-specific metadata.
- Used for personalized UI and session continuity.

5. Home Screen Module (home_screen.dart)

Displays a greeting and optional user data fetched from Firestore.

Features:

- Welcomes the logged-in user by name.
- Placeholder for additional app features (e.g., conversions, profile).

6. Firebase Configuration

Includes Firebase initialization via firebase_core, with project-level setup in main.dart.

4.2 System Requirement (In detail software and hardware requirement like testing, waterfall model etc.)

Hardware Requirements

- **Processor**: Minimum Intel i3 / Recommended i5 or higher.
- **RAM**: Minimum 4 GB / Recommended 8 GB+.
- **Storage**: 10 GB free (SSD preferred).
- **Device**: Android 6.0+ or iOS 11+ for testing.
- **Internet**: Stable broadband for Firebase access.

Software Requirements

- **Flutter SDK (3.0+)** and **Dart SDK**.
- **Android Studio** or **VS Code** with Flutter/Dart plugins.
- **Firebase Console** for Auth & Firestore.
- **Emulators/Real Devices** for testing.
- **Git** and **Google Chrome**.

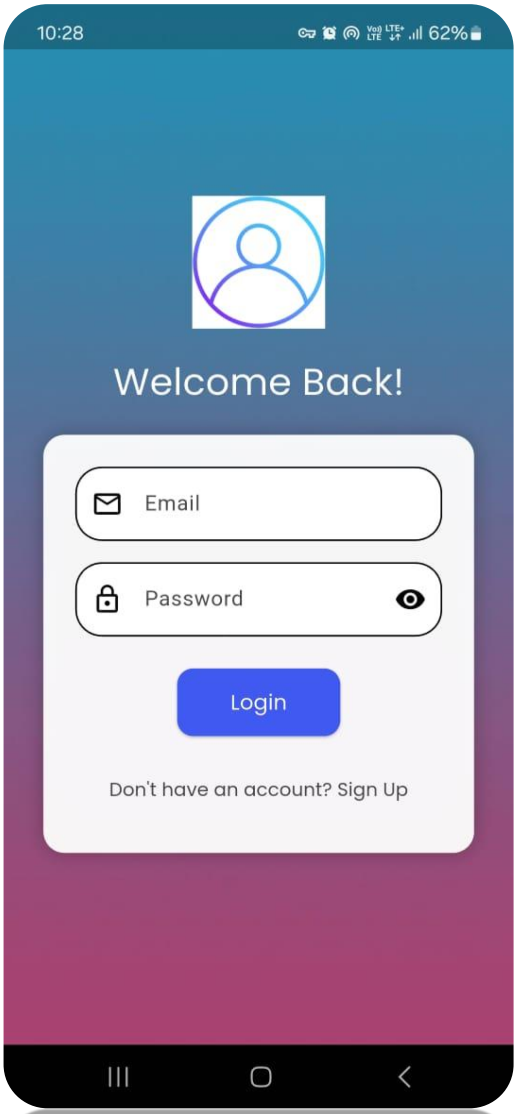
Development Methodology

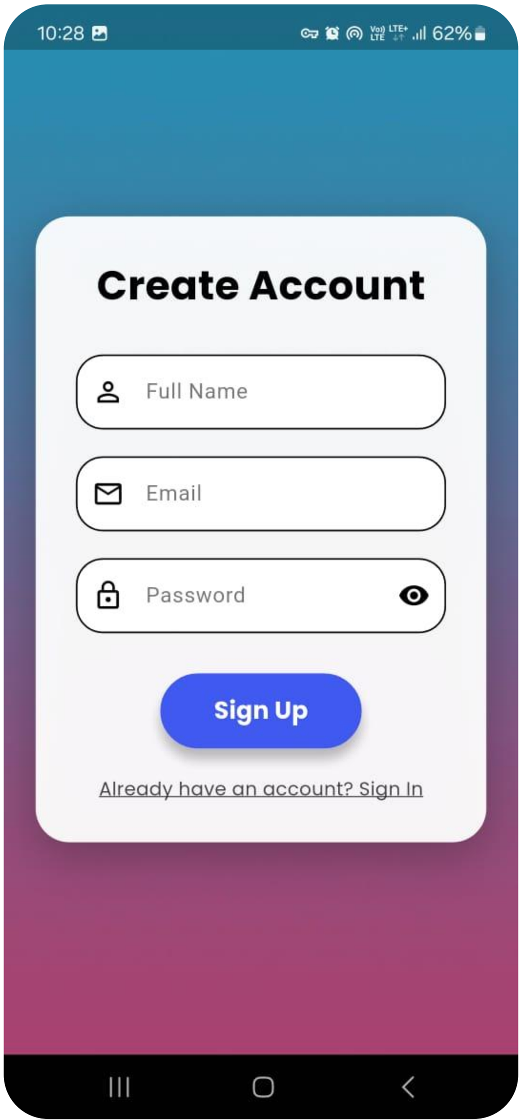
- **Waterfall Model**: Requirement → Design → Coding → Testing → Deployment → Maintenance.

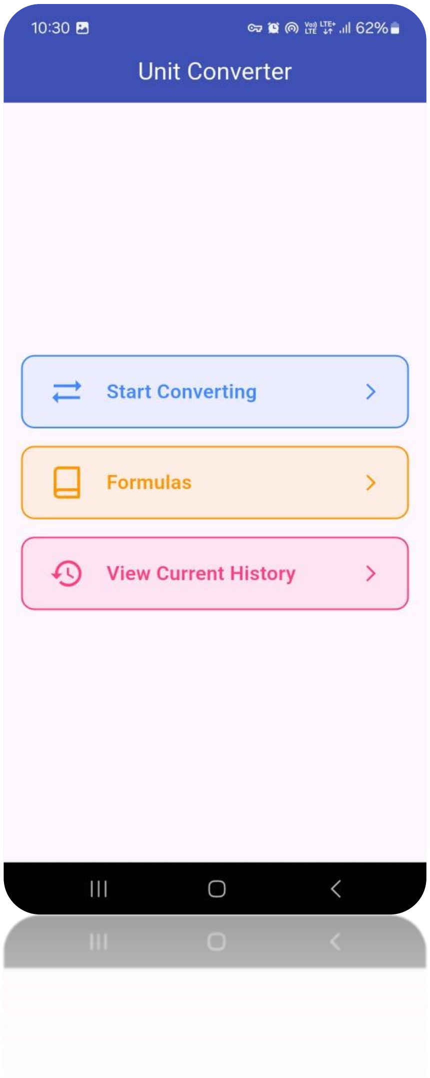
Chapter -5

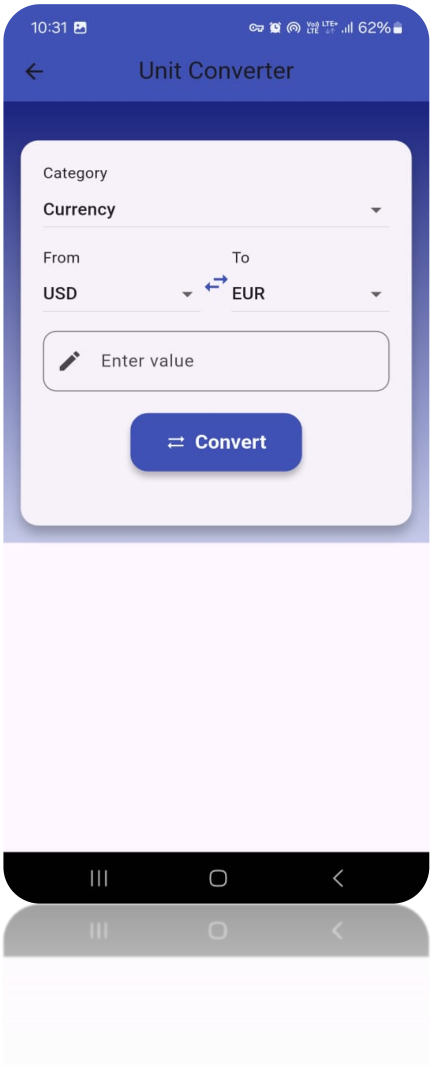
EXPERIMENTAL RESULTS

5.1Experimentation:(Output Screenshots)







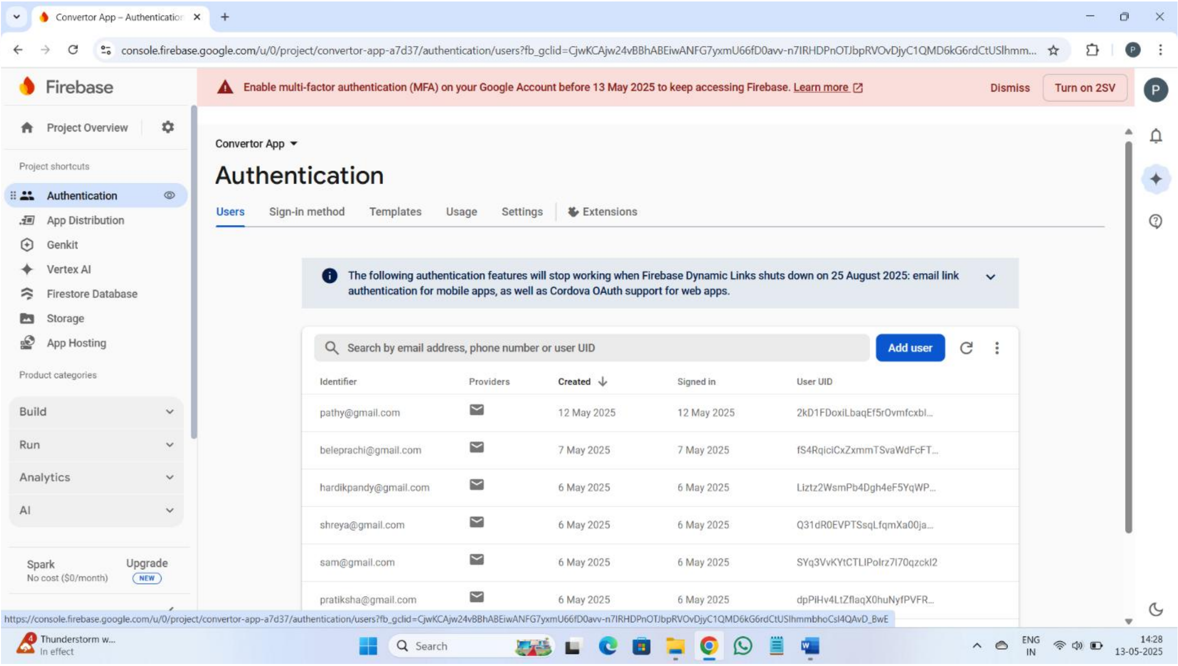


Category
Currency

From
USD

To
EUR

Enter value



console.firebase.google.com/u/0/project/convertor-app-a7d37/authentication/users?fb_gclid=CjwKCAjw24vBBhABEiwANFG7yxmU66fD0avv-n7IRHDPnOTJbpRVOvDjyC1QMD6kG6rdCtUSlhmm...

Enable multi-factor authentication (MFA) on your Google Account before 13 May 2025 to keep accessing Firebase. Learn more

Convertor App

Authentication

The following authentication features will stop working when Firebase Dynamic Links shuts down on 25 August 2025: email link authentication for mobile apps, as well as Cordova OAuth support for web apps.

Search by email address, phone number or user UID

Identifier	Providers	Created	Signed in	User UID
pathy@gmail.com	✉	12 May 2025	12 May 2025	2kD1FDoxiLbaqEf5rOvmfcxbl...
beleprachi@gmail.com	✉	7 May 2025	7 May 2025	fS4RqiciCxZxmmTSvaWdFcFT...
hardikpandy@gmail.com	✉	6 May 2025	6 May 2025	Liztz2WsmPb4Dgh4eF5YqWP...
shreya@gmail.com	✉	6 May 2025	6 May 2025	Q31dR0EVPTSsqLfqmXa00ja...
sam@gmail.com	✉	6 May 2025	6 May 2025	SYq3VvKYtCTLIPolrz7l70qzckl2
pratiksha@gmail.com	✉	6 May 2025	6 May 2025	dpPiHv4LtZflaqX0huNyfPVFR...

https://console.firebase.google.com/u/0/project/convertor-app-a7d37/authentication/users?fb_gclid=CjwKCAjw24vBBhABEiwANFG7yxmU66fD0avv-n7IRHDPnOTJbpRVOvDjyC1QMD6kG6rdCtUSlhmmbhoCsl4QAvD_BwE

Chapter – 6

CONCLUSION

6.1 Conclusion:

The Unit Converter app successfully addresses the need for a simple, accurate, and user-friendly tool to perform various unit conversions including length, weight, temperature, and currency. By integrating essential features like conversion history and Firebase-based user management, the app ensures both functionality and accessibility, making it a practical solution for everyday use.

6.2 Future scope:

- More unit categories : Adding more unit categories to increase versatility
- History feature : Tracking previous conversions
- Custom unit conversions : Allowing users to define their own units
- Voice Integration : Hands-free conversions using Google Assistant or Siri
- Improve UI with better design patterns and animations

Chapter-7

REFERENCES

7.1 References:.

- **https://youtu.be/jqxz7QvdWk8?si=nXdvPIpjaW4KJlEe**
- **https://youtu.be/w4FZh3hmvj0?si=bzrCylr0wGAzlIlQ**
- **https://flutterawesome.com/tag/converter/**
- **https://youtu.be/3PX-o-iFHMQ?si=VJufaO4i_4YJ7vTD**
- **https://chatgpt.com/**