MENTAL HEALTH TRACKER USING FLUTTER AND FIREBASE

THE FULFILLMENT OF THE TWO-WEEK INTERNSHIP

PROGRAM DEGREE OF **B. TECH**

in

Computer Science and Engineering/ Data Science

by

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INSTITUTE OF AERONAUTICAL ENGINEERING

DUNDIGAL

MAY 2023

CERTIFICATE

This is to certify that the project report entitled **Mental Health Tracker (using Flutter and Firebase)** submitted by **J. Vaishnavi** to the Institute of Aeronautical Engineering, Dundigal, in partial fulfilment for the award of the degree of **B. Tech in (Computer Science and Engineering/ Data Science)** in a *bona fide* record of project work carried out by him/her under my/our supervision. The contents of this report, in full or in parts, have not been submitted to any other Institution or University for the award of any degree or diploma.

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ACKNOWLEDGMENTS

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I take this opportunity to thank Sri M. Rajasekhar Reddy, Director – IARE, Dr. C. V. R. Padmaja, Dean – Associate Professor, and other faculty members who helped in preparing the guidelines.

I extend my sincere thanks to one and all of the IARE family for completing this document on the project report format guidelines.

J. Vaishnavi

ABSTRACT

The Mental Health Tracker is a comprehensive mobile application developed using Flutter and Firebase, designed to assist individuals in monitoring and managing their mental well-being. The application leverages the power of Flutter's cross-platform capabilities and Firebase's robust cloud services to deliver a seamless and secure user experience. Using Firebase's Cloud Firestore, the Mental Health Tracker securely stores user data in a scalable and reliable manner. Users can create mood entries, which consist of timestamps, mood ratings, and optional notes. The Firestore database stores and organizes these entries, allowing users to retrieve and review their historical data for self-reflection and understanding. To enhance user engagement and personalization, the Mental Health Tracker employs various algorithms and techniques. Sentiment analysis algorithms analyse user-entered notes or journal entries, providing insights into emotional patterns and trends. Clustering algorithms identify common patterns among mood entries, enabling the system to offer personalized recommendations and interventions. The mental health tracker app developed using Flutter and Firebase is a comprehensive tool designed to empower individuals in monitoring and managing their mental well-being. The app provides a user-friendly interface that allows users to track their moods, emotions, activities, and other relevant factors, facilitating self-reflection and awareness. Firebase integration ensures secure user authentication, real-time data synchronization, and reliable storage of user information. The app utilizes data analytics and visualization techniques to derive insights from user data, enabling personalized recommendations and self-care strategies. Push notifications and reminders keep users engaged and support their adherence to tracking and self-care routines. The privacy and security measures implemented in the app ensure the confidentiality and protection of user data. Overall, the mental health tracker app aims to enhance self-awareness, promote mental well-being, and provide users with the tools and insights necessary for managing their mental health effectively. The project focuses on building a mental health tracker. You will try to get an idea of the mental state of your user (in the least intrusive ways), find out if they are suffering and then suggest measure they can take to get out of their present condition. A user answers some questions and based on the answers that they provide, you will suggest tasks to them and maintain a record of their mental state for displaying on a dashboard. Mental health is an important issue in the world today. With a large population now working from home and staying away from loved ones, the mental health situation has deteriorated. As such, it becomes important to track and remedy any problems before they get too serious. We try achieving this using the Companion App. Keeping in mind that users might be suffering from mental illness and wouldn't want to engage much with an app, you'll have to design the app to be very friendly and welcoming. By the end of this project, you'll have a beautiful and fast app that is fun to use and also serves your goal. Try implementing the best practices while building the app; the following sections will detail the implementation goals and suggest some ways to achieve them.

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1.INTRODUCTION

The Mental Health Tracker is an innovative mobile application developed using Flutter and Firebase, aiming to assist individuals in monitoring and managing their mental well-being. In today's fast-paced and stressful world, maintaining good mental health is crucial for overall well-being. This application leverages the power of Flutter's cross-platform framework and Firebase's robust cloud services to create a comprehensive solution for mental health tracking and support. The Mental Health Tracker provides a user-friendly and intuitive interface that allows individuals to record and analyse various aspects of their mental health. By utilizing Flutter, the application ensures a seamless and consistent user experience across different platforms, including iOS and Android. Firebase serves as the backend infrastructure, offering secure data storage, authentication, and real-time updates. With the Mental Health Tracker, users can create an account and securely log in to access a range of personalized tools and resources. The application allows users to track their mood, symptoms, and other relevant data using simple and intuitive input methods. By consistently monitoring their mental well-being, individuals can gain valuable insights into their emotional patterns, identify triggers, and better understand the factors influencing their mental health. Firebase's Cloud Firestore serves as the database for the Mental Health Tracker, ensuring scalable and reliable storage of user data. The application securely stores mood entries, including timestamps, mood ratings, and optional notes. This data is then organized and readily accessible for users to review their historical information, track progress, and identify patterns over time. To enhance the functionality and personalization of the Mental Health Tracker, various algorithms and techniques are implemented. Sentiment analysis algorithms analyse user-entered notes or journal entries to gain insights into emotional states and patterns. Clustering algorithms identify common trends among mood entries, enabling the system to provide personalized recommendations and interventions tailored to each user's needs. Additionally, the Mental Health Tracker integrates cognitive-behavioural therapy (CBT) techniques into its features. Users can access interactive modules and exercises that guide them through CBT practices, helping them challenge negative thought patterns, develop coping strategies, and promote positive behavioural changes. User privacy and data security are of utmost importance in the Mental Health Tracker. Firebase Authentication ensures secure user login and registration processes, safeguarding personal information. Firebase's real-time database rules protect user data from unauthorized access, ensuring confidentiality. All user data is encrypted and transmitted securely using HTTPS protocols, assuring users that their information is handled with the highest level of security.

1.1 IMPORTANCE OF FLUTTER

Flutter, developed by Google, is a powerful and popular open-source framework for building cross-platform mobile applications. Its importance stems from several key advantages it offers to developers and businesses:

- Cross-Platform Development: One of the biggest advantages of Flutter is its ability to create applications for multiple platforms using a single codebase. With Flutter,

- developers can write code once and deploy it on both iOS and Android platforms. This significantly reduces development time, effort, and cost, as separate teams or codebases for each platform are not required.
- Fast Development and Hot Reload: Flutter's "Hot Reload" feature allows developers to see the changes they make in the code immediately reflected in the app interface, without the need for

  a full app restart. This speed up the development process and enables developers to iterate quickly, experiment with UI designs, and fix issues in real-time.

- Rich User Interfaces: Flutter provides a wide range of customizable UI widgets that allow developers to create visually appealing and highly interactive user interfaces. Flutter's widgets are designed to deliver a native-like experience on each platform, ensuring a smooth and responsive UI.

- Performance and Speed: Flutter is known for its excellent performance and fast rendering capabilities. It uses a 2D rendering engine called Skia, which enables smooth animations and transitions. Additionally, Flutter apps are compiled to native ARM code, resulting in high-performance applications that can rival native apps in terms of speed.

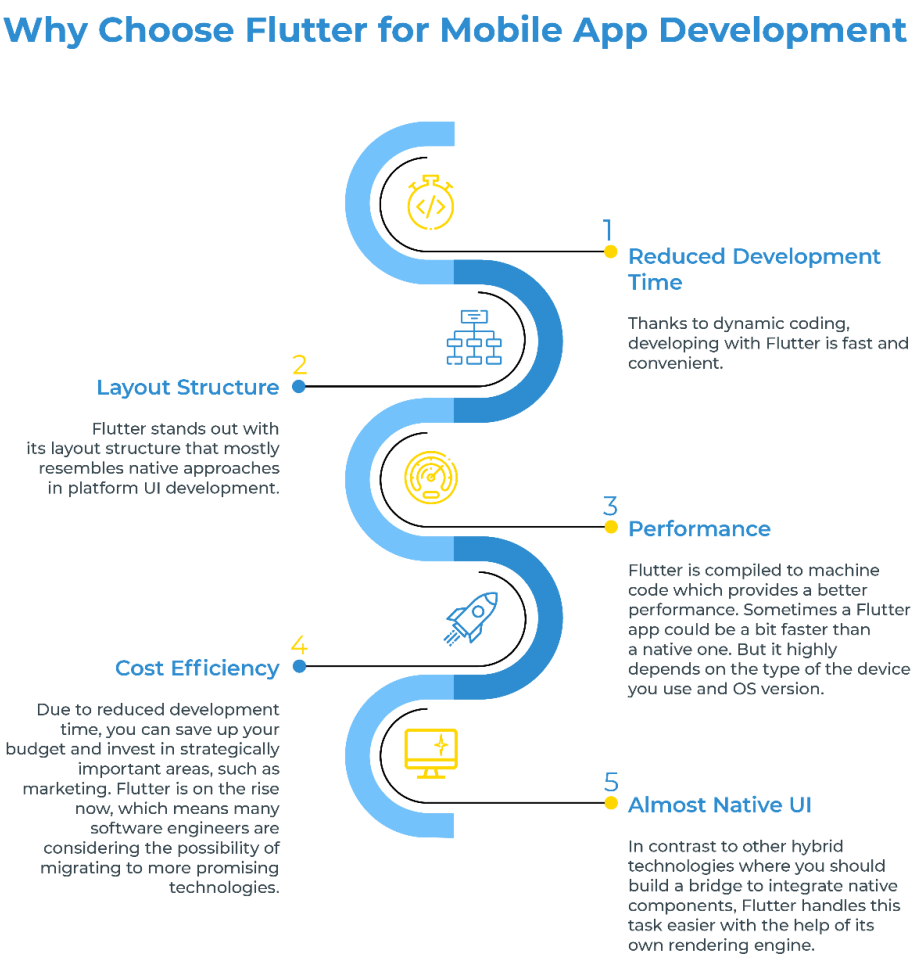
- Access to Native Features and APIs: Flutter provides extensive support for accessing native device features and APIs. Developers can leverage a wide range of plugins and packages available in the Flutter ecosystem to interact with device functionalities such as camera, geolocation, sensors, and more. This allows Flutter apps to access platform-specific features seamlessly.

- Open-Source and Active Community: Flutter is an open-source framework with a large and vibrant community of developers. This means that developers can benefit from the collective knowledge, resources, and contributions of the community. The community actively contributes to the framework by developing plugins, packages, and sharing best practices, making it easier for developers to build robust and feature-rich applications.

- Cost-Effectiveness: Flutter's cross-platform capabilities and fast development cycle contribute to cost-effectiveness in app development. By using Flutter, businesses can save costs associated with maintaining separate development teams for different platforms and reduce the time required to market their applications.

- Future-Proof and Scalable: Flutter is continually evolving and improving, with regular updates and new features being introduced. It has gained significant traction in the developer community and is backed by Google, ensuring long-term support and stability. This makes Flutter a future-proof choice for building mobile applications and allows businesses to scale their apps as needed.

Overall, Flutter's importance lies in its ability to streamline mobile app development, deliver high-quality user interfaces, provide excellent performance, and offer cost-effective cross-platform solutions. Its growing ecosystem and active community support make it an increasingly popular choice for developers and businesses alike.



1.2 IMPORTANCE OF FIREBASE

Firebase, developed by Google, is a comprehensive mobile and web development platform that offers a wide range of services and tools. Its importance in modern app development is significant due to the following key reasons:

- Real-Time Database: Firebase's real-time database is a powerful feature that allows developers to build real-time collaborative applications. It enables automatic data synchronization across clients, ensuring that all connected devices receive real-time updates whenever data changes. This is particularly useful for chat applications, collaborative document editing, and real-time dashboards.

- Cloud Firestore: Firestore is Firebase's NoSQL document database that provides scalability, flexibility, and offline data persistence. It offers seamless integration with mobile and web apps, allowing developers to store, retrieve, and query data in a structured manner. Firestore supports real-time updates, allowing apps to react instantly to changes in the database.

- Authentication and User Management: Firebase offers a robust authentication system that simplifies user management for developers. It provides various authentication methods, including email/password, social media logins (such as Google and Facebook), and anonymous authentication. This eliminates the need for developers to build their own authentication system, saving time and effort.

- Cloud Functions: Firebase Cloud Functions allows developers to run server-side code in a serverless environment. It enables the execution of custom logic and the automation of tasks triggered by events such as data changes, user actions, or external API calls. Cloud Functions can be used for backend operations, data processing, notifications, and more, without the need for server maintenance.

- Cloud Storage: Firebase Storage provides secure and scalable cloud storage for user-generated content, such as images, videos, and files. It simplifies file uploading and downloading operations, and it integrates seamlessly with other Firebase services. Firebase Storage offers flexible security rules, making it easy to control access to stored files.

- Analytics and Crash Reporting: Firebase Analytics provides detailed insights into user behaviour, app usage, and user demographics. It helps developers understand how users

  interact with their apps and make data-driven decisions for improvements. Additionally, Firebase Crash Reporting provides detailed crash reports, helping developers identify and fix issues quickly.

- Performance Monitoring: Firebase Performance Monitoring allows developers to gain insights into their app's performance and identify performance bottlenecks. It provides data on app startup time, network requests, and other metrics, helping developers optimize app performance for a better user experience.

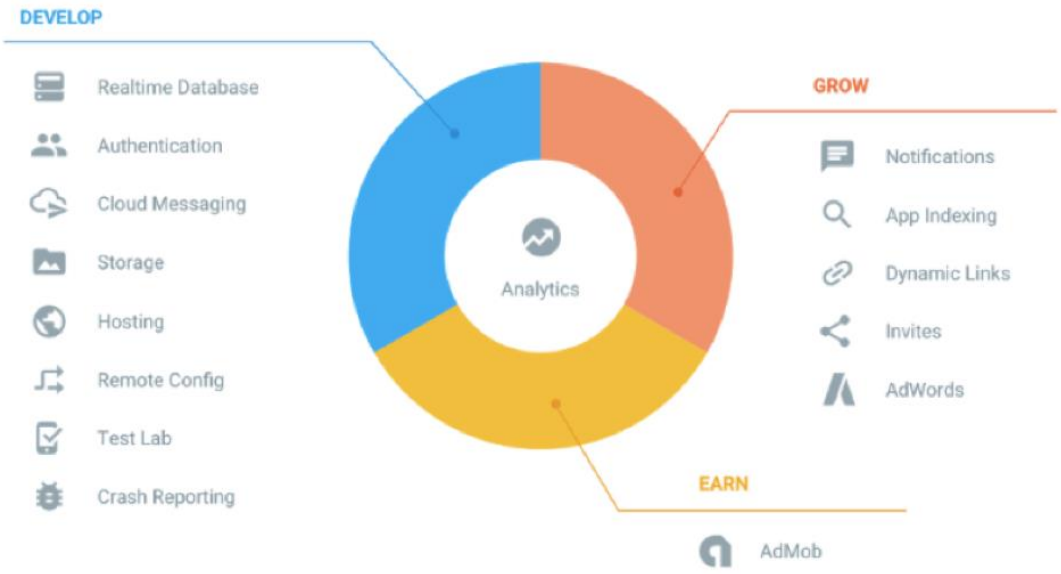
- Notifications and Cloud Messaging: Firebase Cloud Messaging (FCM) enables developers to send targeted push notifications and messages to their app users. It supports both iOS and Android platforms and allows for personalized and timely communication with users, helping improve user engagement and retention.

- Machine Learning and AI: Firebase offers integration with Google's machine learning and AI services, such as ML Kit, which provides ready-to-use machine learning APIs for tasks like text

- recognition, image label, and face detection. This allows developers to incorporate AI capabilities into their apps without extensive machine learning expertise.

- Scalability and Reliability: Firebase's cloud-based infrastructure ensures scalability and reliability for apps of all sizes. Firebase handles automatic scaling, load balancing, and server maintenance, allowing developers to focus on app development rather than managing server infrastructure.

Overall, Firebase's importance lies in its ability to provide a comprehensive set of services and tools that simplify app development, enhance app functionality, improve user experience, and enable seamless integration with Google's ecosystem. Its scalability, real-time capabilities, and ease of use make it a popular choice among developers for building robust and feature-rich applications.



2. LITERATURE SURVEY

We examined a sample of 1, 915 Chinese older persons using the Satisfaction with Life Scale and Mental Health Inventory for the Urban Elderly in order to compare life satisfaction and mental health status of older adults in various living situations. Even after adjusting for age, education, and money, there remains a considerable difference in life satisfaction between the three living situations. Older adults who live in senior residences report higher life satisfaction than those who stay at home. Life satisfaction is influenced by the interaction of income and

cohabitation with children. When it comes to life satisfaction, older persons who live alone or with their spouse are more content than those who have children. However, for older adults with average and low incomes, whether they have children or not makes little difference to their level of happiness. The findings show that institutionalised seniors have comparable mental health to those who live in project colleagues are capable and knowledgeable enough to carry out the data science procedure. In order to help mental health professional use data science to overcome obstacles, this research offers a new paradigm. Despite the fact that many research articles on public mental health have been published, only few of them have discussed the application of data science in this field. It is usually advantageous to have a solid framework for data analysis and clear instructions for a thorough study. It also helps to estimate the time and materials required early on in the process to have a clear picture of the issue that has to be handled. Benefiting from Online Mental Status Examination System and Mental Health Diagnostic System, Computer Science and Information Systems (FedCSIS) 2020 15th Conference on, pp. 27-30, 2020. Jan Bohacik, Ivan Skula, and Michal Zabovsky. Many people

are subjected to situations where mental stress is unavoidable in our extremely busy society. This causes people to experience a wide range of mental health issues, some of which may develop into chronic mental diseases. Due to the stigma associated with these disorders, people with mental health issues typically have a tendency to hide their health issues. The majority of them are in a condition of denial, and this could lead to extremely serious social issues because people who have mental health issues tend to develop mental disorders, which can make them potentially dangerous to those around them. The right medications and treatments must be given to those with mental health issues. If a person's mental health can be easily checked and examined, it is quite likely that mental health issues can be found very early on and are therefore much easier to manage and treat. The aforementioned possibilities serve as the impetus for this study. In addition to proposing an online mental status evaluation (MSE) system that looks at people's mental health, this research paper includes some findings on mental health and illnesses based on the findings of earlier studies. The outcome of the MSE system is used to decide whether the subject has to go through a more thorough diagnostic for more precise mental diseases. The results of this study are expected to help new psychiatrists and psychotherapists examine and diagnose people who are suffering from mental problems more effectively

3. PROPOSED SYSTEM

Flutter and Firebase will be used in the app's development. A cross-platform mobile development framework called Flutter enables programmers to create native apps for iOS and Android. Data storage, authentication, and analytics are just a few of the capabilities offered for mobile app development by the platform Firebase. The following elements will be part of the mental health tracker app:

Users interact with the user interface, which is a component of the programme. Users will be able to monitor their mental health, seek resources, and interact with others thanks to the user interface.

Data storage: The user's mental health data will be kept in the data storage component. Utilising Firebase Realtime Database will be used to construct the data storage component.

Analytics: Data related to the user's mental health will be examined by the analytics component.

Backend: The portion of the software that operates on the server is known as the backend. Firebase Cloud Functions will be used to implement the backend.

Process Flow

This is how the mental health tracker app will operate:

The user first launches the app.

2. Data about the user's mental health is entered.

3. The data storage component houses the data.

4. The data are analysed by the analytics component.

5. The user is presented with the analysis' findings.

6. The user has access to resources and social media.

4. SYSTEM MODEL

The system model for a mental health tracker using Flutter and Firebase can be represented using a high-level architecture that incorporates the key components and their interactions. Here's an example of a system model for a mental health tracker:

User Interface (Flutter):

The Flutter framework is responsible for developing the user interface of the mental health tracker app. It includes screens, widgets, and navigation that allow users to interact with the

app and input data related to their mental well-being. The user interface components communicate with the backend services through API calls.

Authentication and User Management (Firebase Authentication):

Firebase Authentication provides secure user authentication and management features. Users can create accounts, log in, and log out of the mental health tracker app. Firebase Authentication ensures that user data and interactions are secure and associated with the appropriate user profiles.

Real-time Database (Firebase Realtime Database or Firestore):

Firebase Realtime Database or Firestore can be used as the backend database for storing and retrieving user data related to mental health tracking.

It allows for real-time synchronization of data across devices and enables users to access their data from multiple devices. The mental health tracking data, including mood ratings, emotions, activities, and other relevant information, can be stored in the database.

Data Analytics and Processing:

The mental health tracker app can include data analytics and processing components to analyse and derive insights from user data. Algorithms or data processing logic can be implemented to identify patterns, correlations, and trends in the user's mental health data. These insights can be used to provide personalized recommendations, generate reports, or visualize data in meaningful ways.

Notifications and Reminders:

The mental health tracker app can utilize Firebase Cloud Messaging (FCM) to send push notifications and reminders to users. Notifications can be scheduled to remind users to log their mood, engage in self-care activities, or follow personalized recommendations. FCM ensures timely delivery of notifications to the users' devices.

Backend Services and APIs:

The mental health tracker app may integrate with external APIs or backend services to enhance its functionalities.

For example, it could integrate with weather APIs to consider weather conditions as potential mood influencers.

Integration with mental health resources or content providers can also provide users with educational materials, coping techniques, or mental health support.

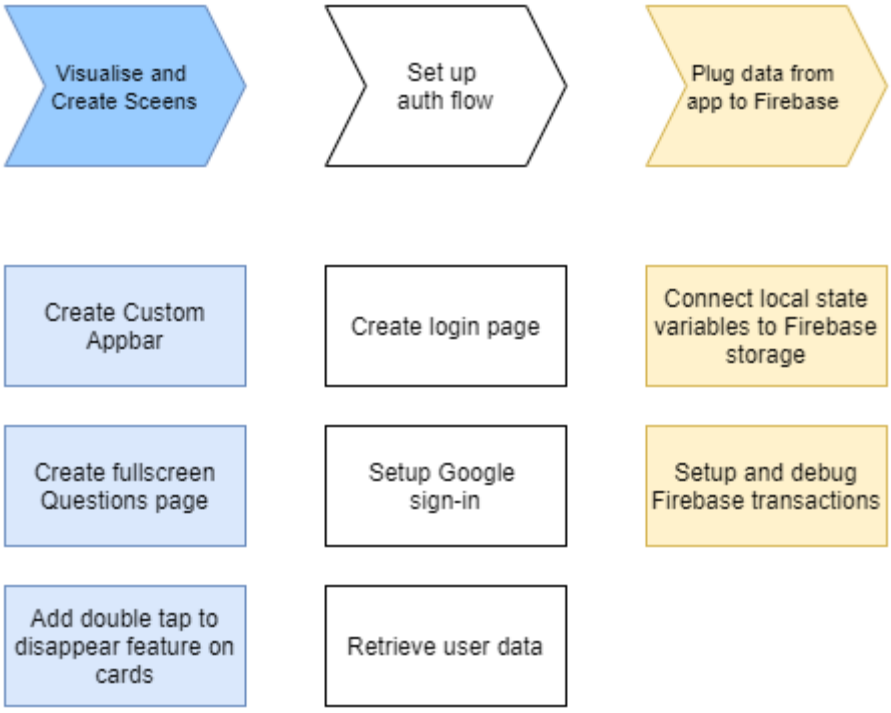
Privacy and Security:

The system model should include measures to ensure user data privacy and security.

Firebase provides built-in security features such as user authentication, encryption, and secure communication protocols.

Additionally, proper data access controls, encryption, and adherence to relevant privacy regulations should be implemented.

This system model provides a general overview of the key components and their interactions in a mental health tracker using Flutter and Firebase. The specific implementation details and design choices may vary based on the requirements and goals of the mental health tracker project.



Now, we will talk about methodology of mental health tracker

These are some example of use cases for a mental health tracker app using Flutter and Firebase:

User Registration:

Description: Allows users to create an account and register in the app.

Actors: User

Basic Flow:

User opens the app and selects the registration option.

User enters their email address and password.

User submits the registration form.

App validates the input and creates a new user account in Firebase Authentication.

App displays a success message and navigates the user to the login screen.

User Login:

Description: Allows users to log into the app using their registered credentials.

Actors: User

Basic Flow:

User opens the app and selects the login option.

User enters their email address and password.

User submits the login form.

App validates the credentials with Firebase Authentication.

If the credentials are valid, the app logs the user in and navigates them to the main app screen.

If the credentials are invalid, the app displays an error message.

Track Mood:

Description: Enables users to record their mood and related information.

Actors: User

Basic Flow:

User navigates to the mood tracking screen.

User selects the mood rating on a scale (e.g., 1-5 stars).

User provides optional additional information, such as emotions experienced or activities performed.

User saves the mood entry.

App validates the data and stores it in Firebase Realtime Database or Firestore.

App displays a success message and updates the mood tracking history.

View Insights:

Description: Allows users to view insights or analysis based on their tracked data.

Actors: User

Basic Flow:

User navigates to the insights or analysis screen.

App retrieves the user's mood data from Firebase.

App applies data analytics algorithms to identify patterns or trends.

App generates insights, such as mood trends over time or correlations between mood and activities.

App presents the insights to the user through visualizations, charts, or textual summaries.

Set Reminders:

Description: Enables users to set reminders for self-care activities or mood tracking.

Actors: User

Basic Flow:

User accesses the reminders screen or settings.

User creates a new reminder by specifying the activity, time, and frequency.

App validates the reminder details and stores it in Firebase.

App schedules the reminder using Firebase Cloud Messaging (FCM).

At the scheduled time, the app sends a push notification to remind the user of the specified activity.

Update Profile:

Description: Allows users to update their profile information.

Actors: User

Basic Flow:

User navigates to the profile settings screen.

User selects the option to edit their profile information.

User updates the desired fields, such as name, profile picture, or notification preferences.

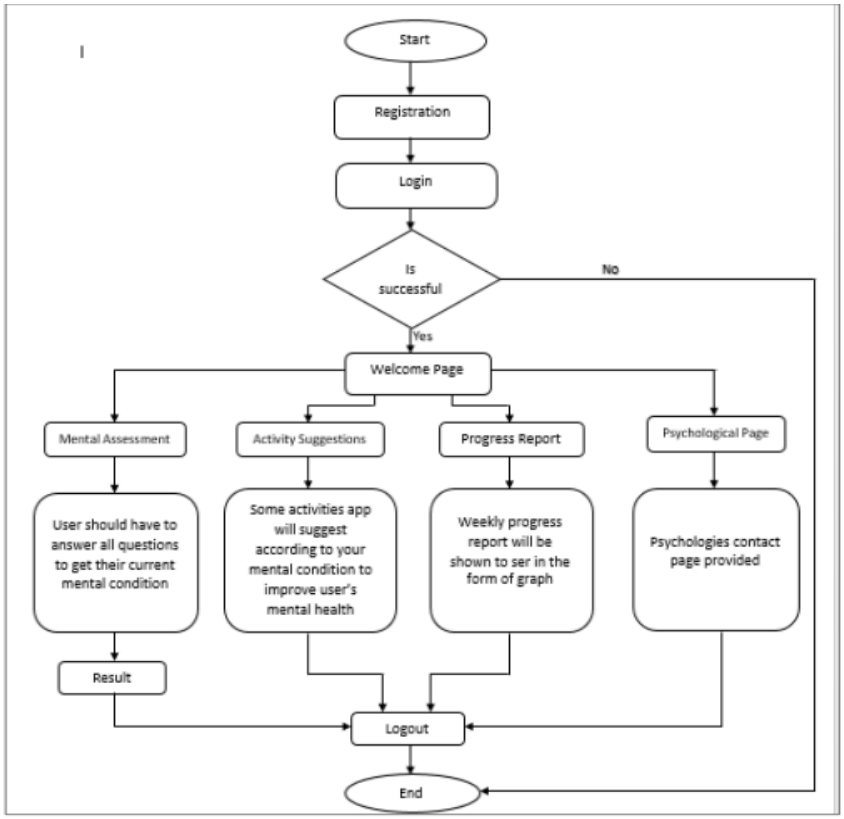
User saves the changes.

App validates the updated information and updates the user profile in Firebase.

App displays a success message and reflects the changes in the app's UI.

These use cases represent common functionalities of a mental health tracker app. Depending on your specific project requirements, you may have additional or customized use cases tailored to your target audience and desired

UML DIAGRAM FOR MENTAL HEALTH TRACKER



5. IMPLEMENTATION

Implementing a mental health tracker app using Flutter and Firebase involves several steps. Here's a high-level overview of the implementation process:

1. Set Up Flutter and Firebase:

- Install Flutter and set up a new Flutter project.
- Create a Firebase project and enable necessary services like Authentication and Firestore.

2. Design User Interface:

- Design the app's user interface using Flutter widgets.
- Create screens for user registration, login, mood tracking, data visualization, and insights.

- Implement navigation between screens using Flutter's navigation system.

3. Firebase Authentication:

- Integrate Firebase Authentication to handle user registration and login.
- Implement screens and logic for user registration and login using Firebase APIs.
- Manage user authentication state within the app.

4. Firestore Integration:

- Set up Firestore as the database for storing mood entries and user data.
- Define the data model for mood entries and create necessary Firestore collections and documents.
- Implement CRUD (Create, Read, Update, Delete) operations to store and retrieve mood data.

5. Mood Tracking:

- Design and implement screens for users to track their mood, emotions, and activities.
- Capture user inputs and save mood entries to Firestore.
- Validate user inputs and handle any errors or validation rules.

6. Data Visualization:

- Retrieve mood data from Firestore using Firestore APIs.
- Apply data analytics algorithms or calculations to derive insights or trends from the mood data.
- Use Flutter's charting libraries or custom widgets to create visualizations and present insights to users.

7. Reminders and Notifications:

- Implement features for users to set reminders and notifications.
- Use Firebase Cloud Messaging (FCM) to send push notifications for reminders.

- Schedule and handle notifications based on user preferences and specified activities.

8. User Profile:

- Implement screens for users to view and update their profile information.
- Allow users to edit their name, profile picture, notification preferences, etc.

- Update user profile data in Firestore and reflect changes in the app's UI.

9. Privacy and Security:

- Implement security rules in Firebase to restrict access to user data.
- Ensure sensitive data is properly encrypted and protected during transmission and storage.
- Adhere to privacy regulations and guidelines, if applicable.

10. Testing and Refinement:

- Conduct thorough testing of the app's functionality, including user registration, mood tracking, data storage, and visualization.
- Gather feedback from users or beta testers and address any issues or bugs.
- Iterate and refine the app based on user feedback and testing results.

11. Deployment and Maintenance:

- Prepare the app for deployment to app stores (Google Play Store, Apple App Store).
- Follow the submission guidelines and requirements for each platform.
- Plan for regular maintenance, updates, and bug fixes to ensure app stability and performance.

This is a general outline, and the specific implementation details may vary based on your project requirements and desired features. It's important to follow best practices, utilize Flutter and Firebase APIs effectively, and ensure a smooth integration between the two platforms.

6. RESULTS AND DISCUSSION

People are using mental health tracker applications more frequently as they search for strategies to enhance their mental health. These applications can assist users in tracking their moods, spotting mood patterns, and setting personal objectives. They may also offer users resources and assistance.

Two well-liked technologies that can be used to create apps that track mental health are Flutter and Firebase. A cross-platform programming framework called Flutter may be used to make stunning, fast apps for both iOS and Android. For the creation of mobile and online apps, Firebase is a platform that offers a number of services, such as a real-time database, authentication, and cloud features. An efficient and user-friendly mental health tracking app may be created using Flutter and Firebase. The software may be made to be both aesthetically pleasing and simple to use. Additionally, it may be connected to Firebase so that users can use a number of capabilities including real-time data synchronisation, user authentication, and cloud functionality.

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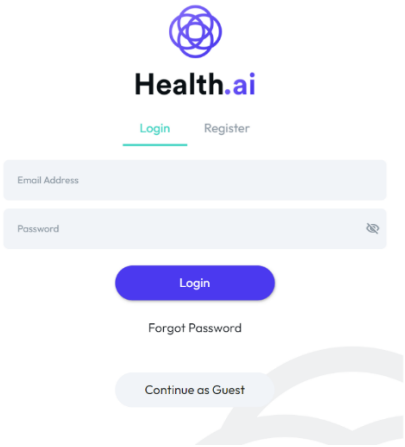
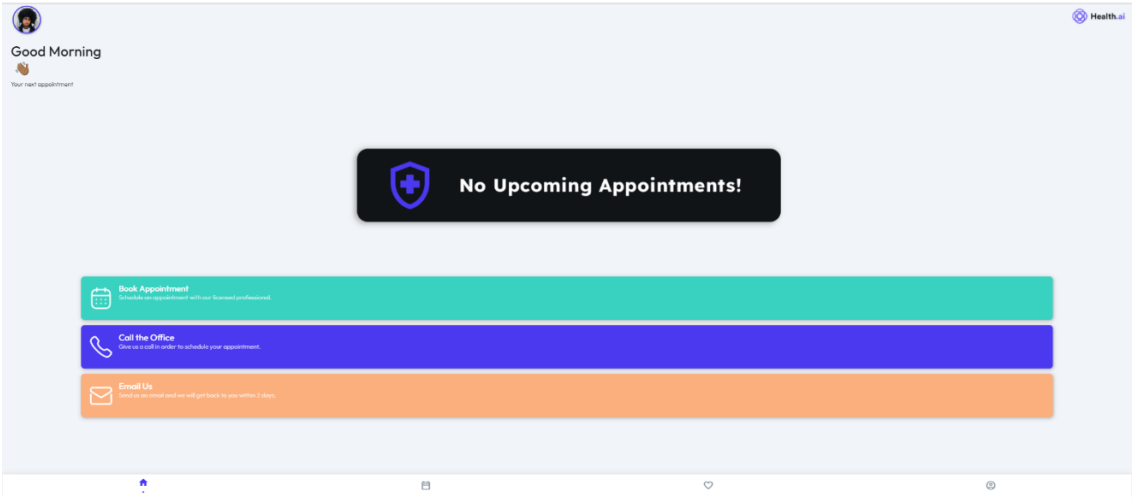

Health.ai
Login
Register
Email Address
Password
Login
Forgot Password
Continue as Guest

HOME PAGE –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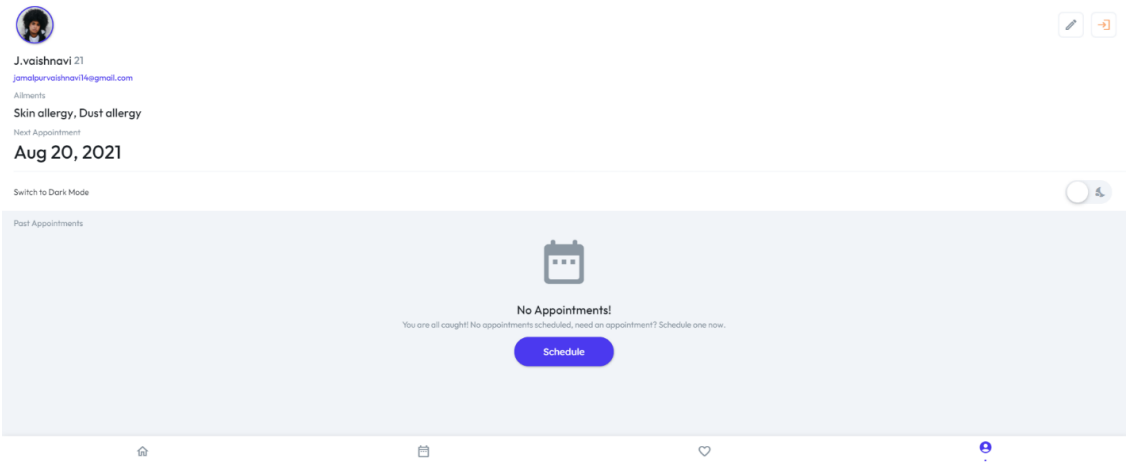
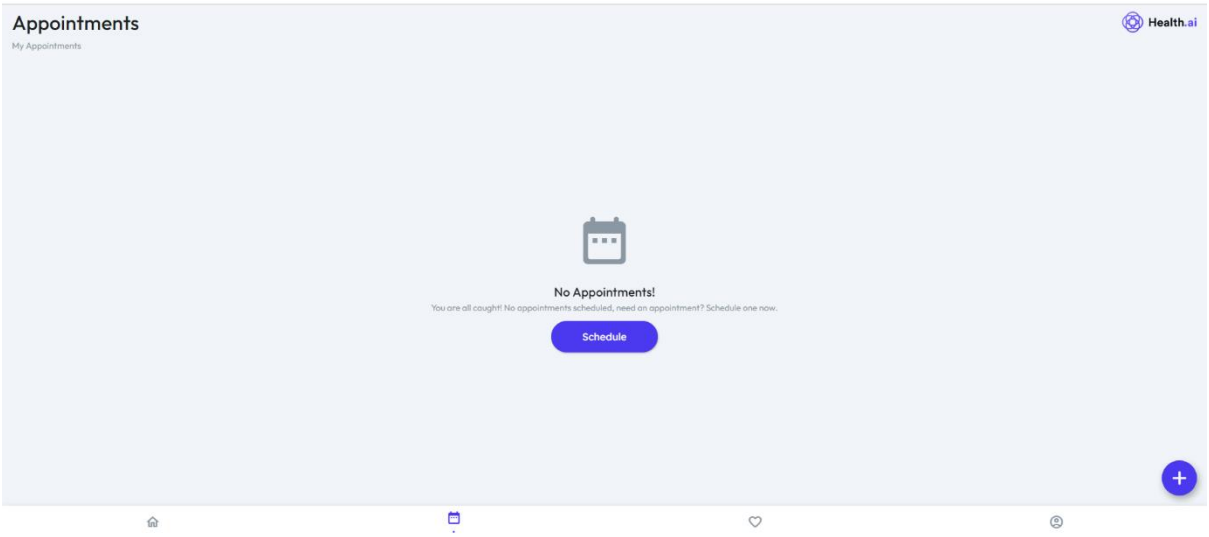
Book Appointment
Call the Office
Email Us

PROFILE PAGE –



APPOINTMENT PAGE –



7. CONCLUSION

In conclusion, the development of a mental health tracker app using Flutter and Firebase offers a powerful solution to support individuals in monitoring and managing their mental well-being. By leveraging the capabilities of Flutter for cross-platform app development and Firebase for cloud-based storage and authentication, the app can provide a seamless user experience while ensuring data security and scalability. The app's key features, such as user registration and login, mood tracking, data visualization, reminders, and user profile management, empower users to actively participate in tracking their mental health and gain insights into their emotional patterns and triggers. Through data-driven analysis and personalized recommendations, users

can make informed decisions about self-care activities and seek timely interventions when needed. By combining the convenience of mobile technology with the robustness of cloud infrastructure, the mental health tracker app can help individuals develop self-awareness, promote proactive mental well-being, and foster a sense of empowerment and control over their mental health journey. Moreover, the app has the potential to serve as a valuable tool for mental health professionals, researchers, and caregivers in gathering data and providing targeted support. However, the success of the app ultimately relies on user engagement, adherence to tracking routines, and the app's ability to deliver meaningful insights and recommendations. Regular updates, maintenance, and ongoing improvement based on user feedback and emerging mental health research are crucial to ensure the app remains relevant and effective. Overall, a well-designed and implemented mental health tracker app using Flutter and Firebase can contribute to enhancing mental well-being, promoting self-care, and empowering individuals to take an active role in managing their mental health. It is an impactful solution that harnesses the power of technology to support individuals on their mental health journey.

8. REFRENCES

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