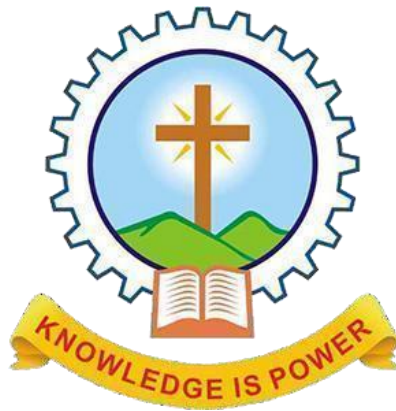


**MAR ATHANASIOUS COLLEGE OF ENGINEERING,  
(Affiliated to APJ Abdul Kalam Technological University, TVM)  
KOTHAMANGALAM**



**Department of Computer Applications**

Initial Project Report

**Chatbot Integrated Mental Health Support System**

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MAC23MCA-2035

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# 1. INTRODUCTION

Mental health has become an increasingly important topic in the global dialogue, as mental health conditions have been rising across various age groups and demographics. In an era marked by rapid technological advancements, societal shifts, and heightened stress levels, individuals face an ever-growing need for reliable mental health support. Yet, a significant number of people still struggle with seeking help due to the stigma surrounding mental health, lack of accessible resources, or a lack of awareness about available support systems. This project aims to bridge this gap by providing a digital mental health assistant to assess, guide, and provide relevant resources for users.

The Mental Health Support System is an innovative Chatbot Integrated web application designed to provide a comprehensive, effective mental health solution for users. This system offers a unique approach by integrating a chatbot powered by OpenAI's advanced language model, which is capable of offering personalized responses and guidance to users. With features include a mental health quiz for initial assessments, a chatbot that provides tailored support, self-care activity suggestions, reminders, a progress tracker, and recommendations for professional help if necessary , the system aims to empower users by giving them the tools to assess and manage their mental well-being effectively. Additionally, the platform allows users to access a library of helpful exercises and YouTube videos to improve their mental well-being.

The backend of the system is developed using Django and Django templates, with a user-friendly frontend interface. The chatbot's integration utilizes OpenAI's powerful model to provide real-time responses to user queries. The system also supports personalized suggestions based on individual user profiles.

Through this project, the goal is to provide users with a scalable, user-friendly, and accessible platform that can serve as a first step toward improving their mental health. By promoting mental wellness through personalized suggestions, constant engagement, and access to professional help, the Mental Health Support System aims to make mental health care more accessible to a larger audience, thereby contributing to a society that values and prioritizes emotional well-being.

# EXISTING SYSTEM

Several web applications are available today that aim to provide mental health support to users worldwide. These platforms primarily focus on offering self-help resources, therapy sessions, and mental well-being tracking tools. Despite their widespread use, existing web applications often have limitations that impact their effectiveness. Many platforms provide generic solutions that may not be tailored to an individual's unique mental health condition. The lack of personalized assessment mechanisms often results in users receiving broad recommendations that do not fully address their concerns. Additionally, while some applications offer AI chatbots for basic emotional support, these systems are usually rule-based and may not provide deep, meaningful conversations or accurate responses based on a user's mental state.

Another challenge with existing applications is their limited focus on preventive mental health care. Most platforms are designed to assist individuals who are already experiencing mental health issues rather than helping users identify potential concerns early. Moreover, features such as tracking mental health progress, setting reminders for self-care activities, and suggesting lifestyle improvements are often underdeveloped or entirely absent in some applications. This lack of proactive support can hinder users from maintaining long-term mental well-being.

Furthermore, privacy concerns and the cost of premium services remain significant barriers for many users. While free resources are available, comprehensive mental health support, including professional consultations and advanced features, often come with a hefty subscription fee. This financial constraint can prevent individuals, especially those from economically disadvantaged backgrounds, from accessing the support they need. Overall, while existing web applications provide a valuable starting point for mental health support, they still lack the personalization, accessibility, and proactive features required for comprehensive mental health management.

# PROPOSED SYSTEM

The proposed mental health support system is designed to provide a holistic approach to mental well-being by leveraging the power of artificial intelligence and user-centric features. At the heart of this system lies an advanced AI-powered chatbot, integrated with OpenAI's API, which offers users personalized, responsive, and empathetic support tailored to their mental health needs. The chatbot's ability to understand and respond to a variety of emotional states ensures that users can engage in meaningful conversations that guide them toward the appropriate self-care measures or professional help. By utilizing state-of-the-art natural language processing, the chatbot offers a seamless, human-like interaction experience, which promotes comfort and openness for users seeking assistance.

A key feature of the system is the comprehensive mental health assessment quiz, which plays a critical role in identifying early signs of potential mental health issues. The quiz has been carefully designed to cover a wide range of psychological and emotional factors, allowing users to gain insights into their mental well-being without the need to explicitly identify problems themselves. This approach ensures that the users receive targeted support even if they aren't aware of underlying issues, removing the barriers to seeking help and opening the door to more proactive mental health management.

Beyond the initial assessment, the system offers a variety of self-care suggestions, such as exercises, activities, and educational videos, which are tailored to the individual's specific mental health profile. These self-care activities are designed not only to alleviate symptoms but to promote long-term mental well-being through sustainable practices. The system also empowers users to set reminders to ensure that they stay consistent in their self-care routines. By facilitating daily check-ins, activities, and routines, the system fosters the development of healthy habits that support the users' mental health over time.

One of the most innovative aspects of the system is its ability to identify when users may need professional intervention and offer personalized therapist suggestions. By analyzing the results of the mental health assessments and the interactions with the chatbot, the system can recommend therapists with the appropriate expertise based on the user's unique challenges. This feature bridges the gap between self-care and professional support, providing users with a smooth transition from self-help to therapeutic intervention when necessary.

Additionally, the system includes a progress tracking feature, which allows users to monitor their mental health journey over time. Through this feature, users can track improvements or setbacks, providing valuable insight into the effectiveness of their self-care strategies. Through a user-friendly interface and thoughtful user experience design, the system makes it easy for users to navigate through various features while feeling supported and cared for.

Ultimately, this mental health support system offers a comprehensive, empathetic, and accessible solution to mental health care. The system is poised to make a significant impact on the way mental health care is delivered, ensuring that individuals have the resources and support they need to lead healthier, more balanced lives.

# ACTORS AND THEIR ROLES

## 1. User:

The primary participant who uses the platform to assess and manage their mental health.

- Takes the mental health assessment quiz to evaluate their well-being.
- Interacts with the chatbot for personalized mental health support.
- Receives self-care suggestions, reminders, and resources to improve their mental health.
- Tracks their progress and emotional trends over time.

## 2. User Caretaker:

An individual who assists the user in managing their mental health journey and ensuring engagement with the platform.

- Supports the user in managing their mental health progress.
- Helps the user set reminders for activities and appointments.
- Ensures the user engages with self-care suggestions and activities.

## 3. System Admin:

Responsible for maintaining the platform's functionality, ensuring secure access, and managing the data flow.

- Manages user accounts, ensuring secure access to personalized data and services.
- Maintains and updates the mental health quiz, chatbot responses, and system functionalities.
- Monitors the platform's performance and resolves any user-related issues.
- Ensures data protection and compliance with privacy regulations.

## 4. Mental Health Professional:

A professional who provides further support and guidance to users needing specialized care.

- Offers insights and suggestions based on user data (with consent).
- Provides professional support or referral options for users needing further assistance.

# DESCRIPTION OF MODULES

## User Management Module

This module handles user authentication, registration, and profile management, ensuring secure access to the platform. It allows users to manage their accounts and personalize their experience.

### Features:

- User registration and login.
- Password recovery and management.
- Profile management and personalization.

## Mental Health Assessment Module

This module conducts an initial mental health assessment through a quiz, helping users evaluate their mental well-being. The results guide the chatbot in providing personalized support.

### Features:

- Mental health quiz with customizable questions.
- Real-time analysis of user responses.
- Personalized follow-up actions based on quiz results.

## Chatbot Support Module

This module integrates OpenAI's API to offer a virtual assistant that provides personalized mental health support. It engages users in conversations and gives suggestions based on their responses and progress.

### Features:

- AI-powered chatbot for mental health assistance.
- Real-time, personalized conversation based on user inputs.
- Continuous support and tailored guidance.

## **Self-Care and Resource Module**

This module offers self-care activities and helpful resources like YouTube videos to support users in improving their mental health. It also provides suggestions based on the user's emotional trends and needs.

### **Features:**

- Curated self-care exercises and activities.
- Video recommendations for emotional well-being.
- Personalized suggestions based on progress.

## **Mental health tracking and Reminder Module**

This unified module helps users track their mental health progress and stay consistent with self-care through personalized reminders and timely notifications.

### **Features:**

- The module shows graphs of emotional changes over time.
- Users can customize schedules for their self-care activities.
- It sends alerts for important events and upcoming appointments.

## **Therapist Referral Module**

This module recommends professional help if the system identifies the need for more specialized care. It connects users with therapists or other resources for additional assistance.

### **Features:**

- Therapist recommendations based on user data.
- Secure communication channels for referrals.
- Option for direct contact with professionals.

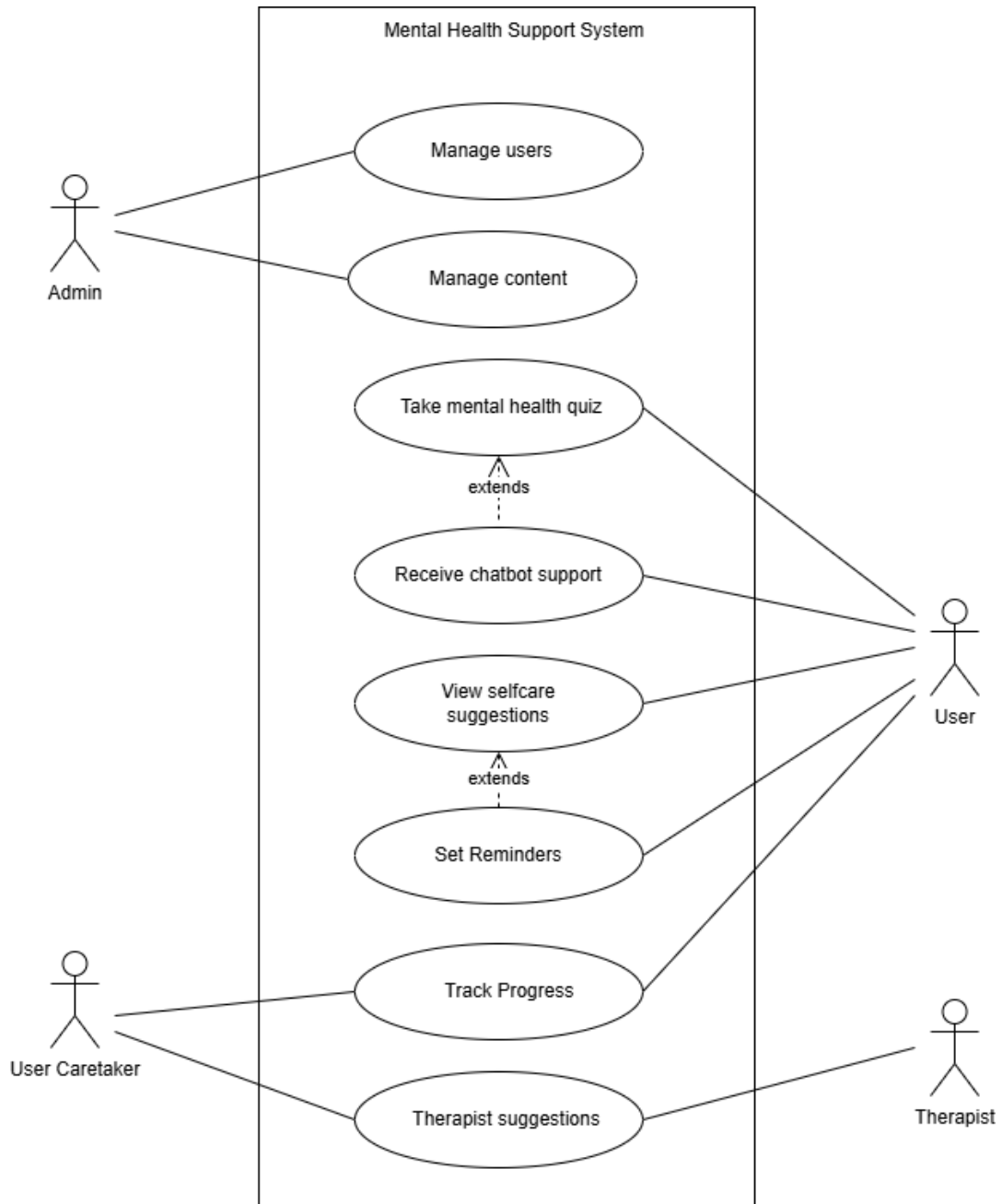
## **BUSINESS RULES**

- Users need to register and log in to take the mental health quiz and interact with the chatbot.
- Only verified mental health professionals can offer insights or recommendations to users.
- User data must be kept secure and private.
- Self-care suggestions, reminders, and chatbot responses must be personalized based on the user's profile.
- Users must receive notifications for progress updates and reminders.
- Users can request therapist suggestions based on their mental health needs.
- Only system administrators can update quiz questions and platform features.
- Data security and privacy must be maintained for all user interactions and information.

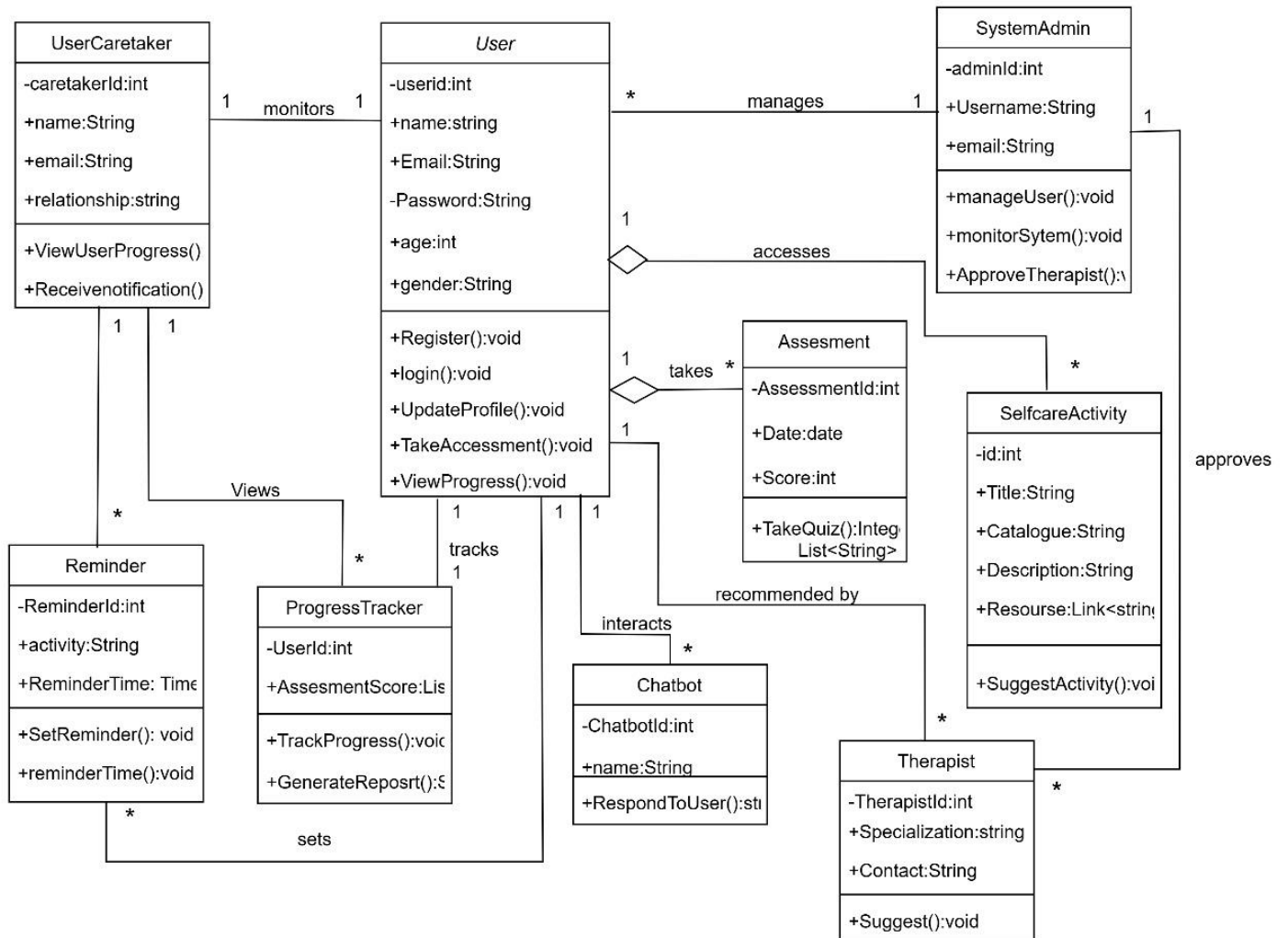


# UML DIAGRAMS

## 1. USE CASE DIAGRAM

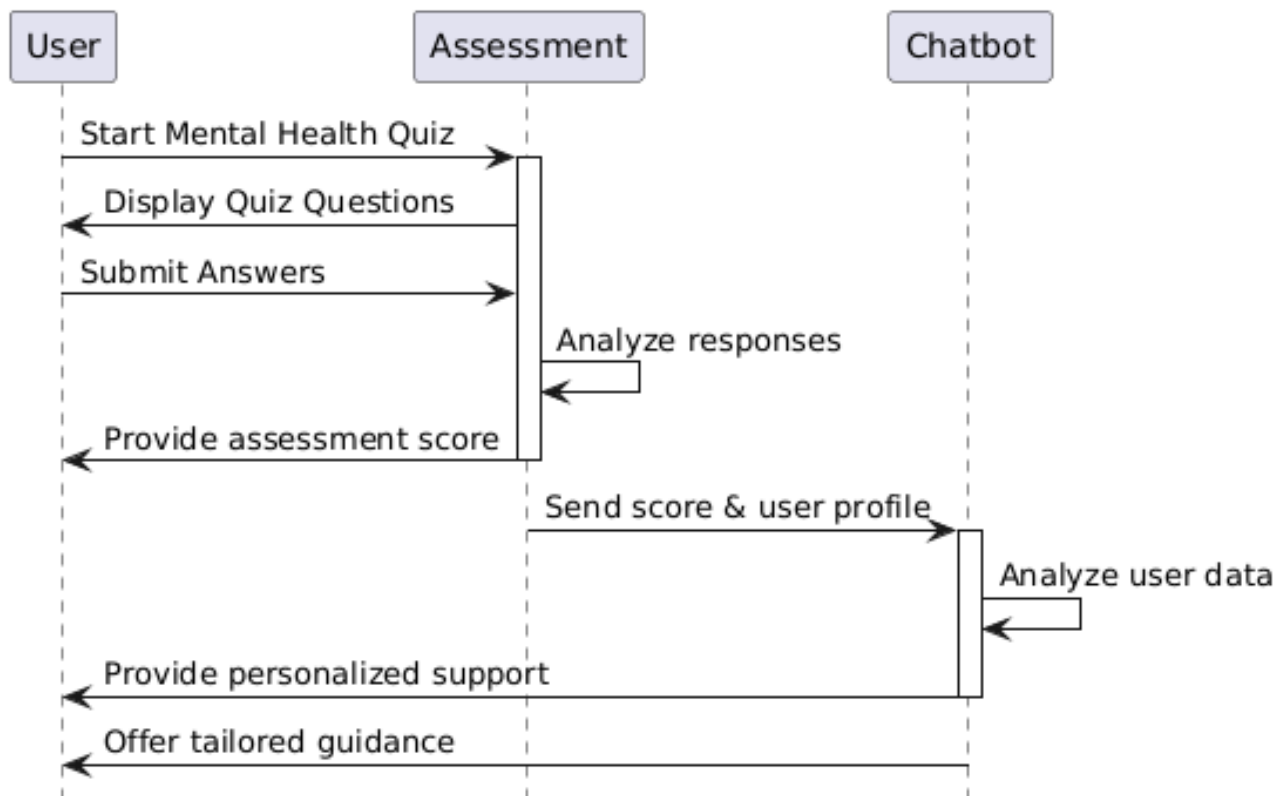


## 2. CLASS DIAGRAM

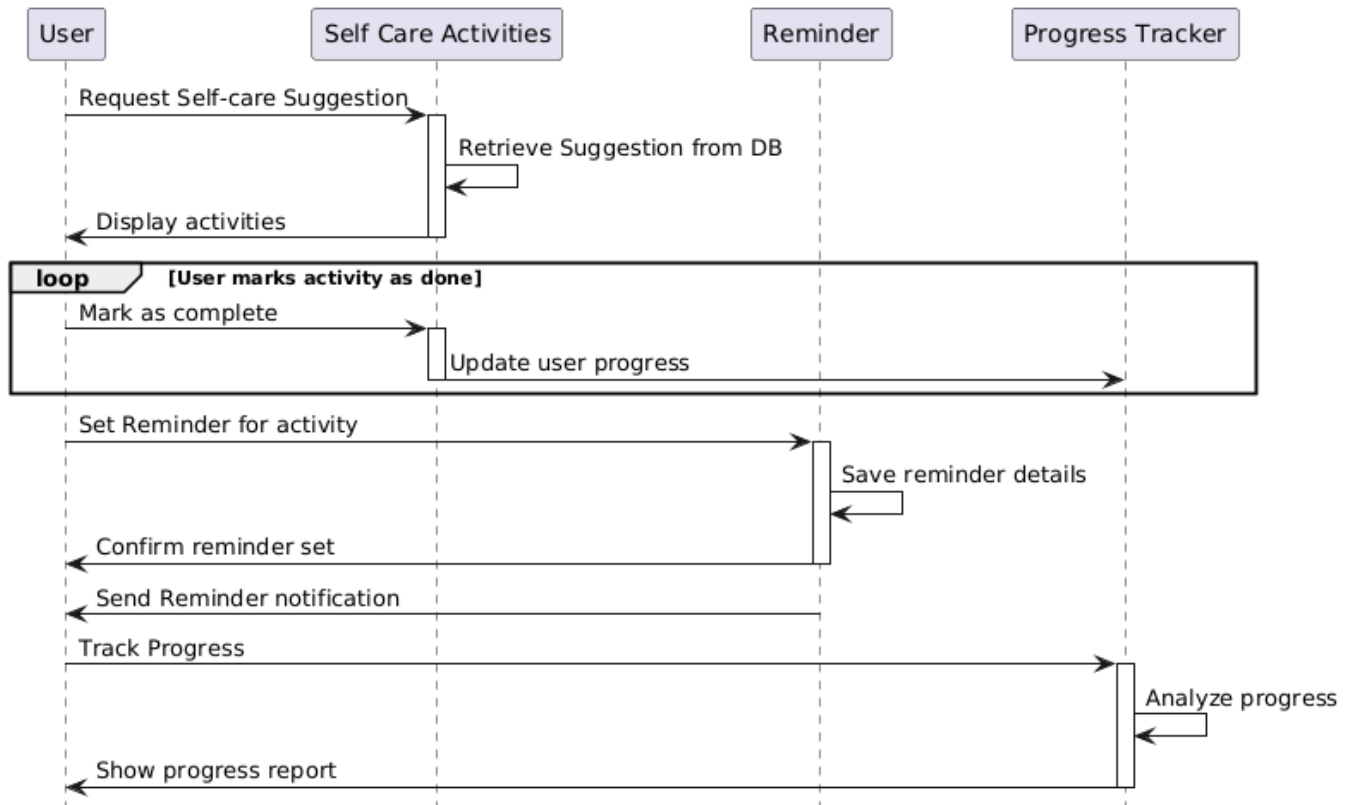


### 3. SEQUENCE DIAGRAM

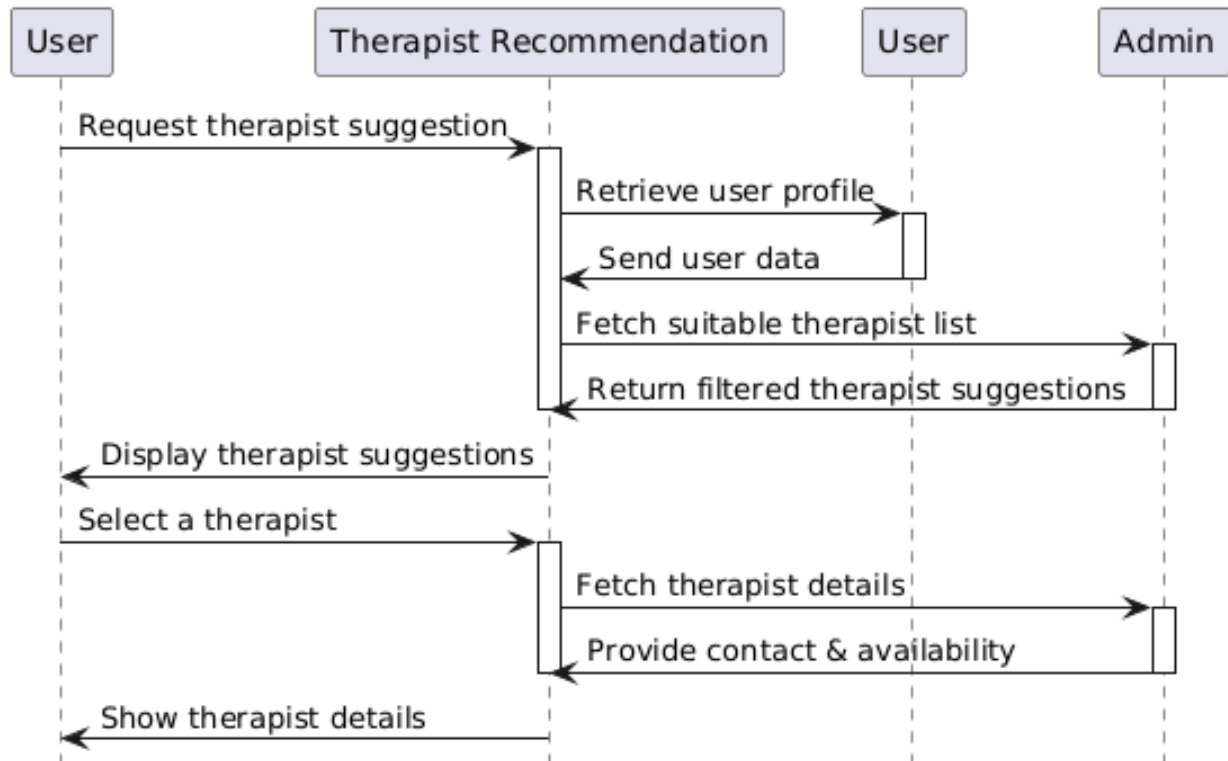
#### 3.1 Mental Health Assessment and Chatbot Support



### 3.2 Selfcare Management and Progress Tracking

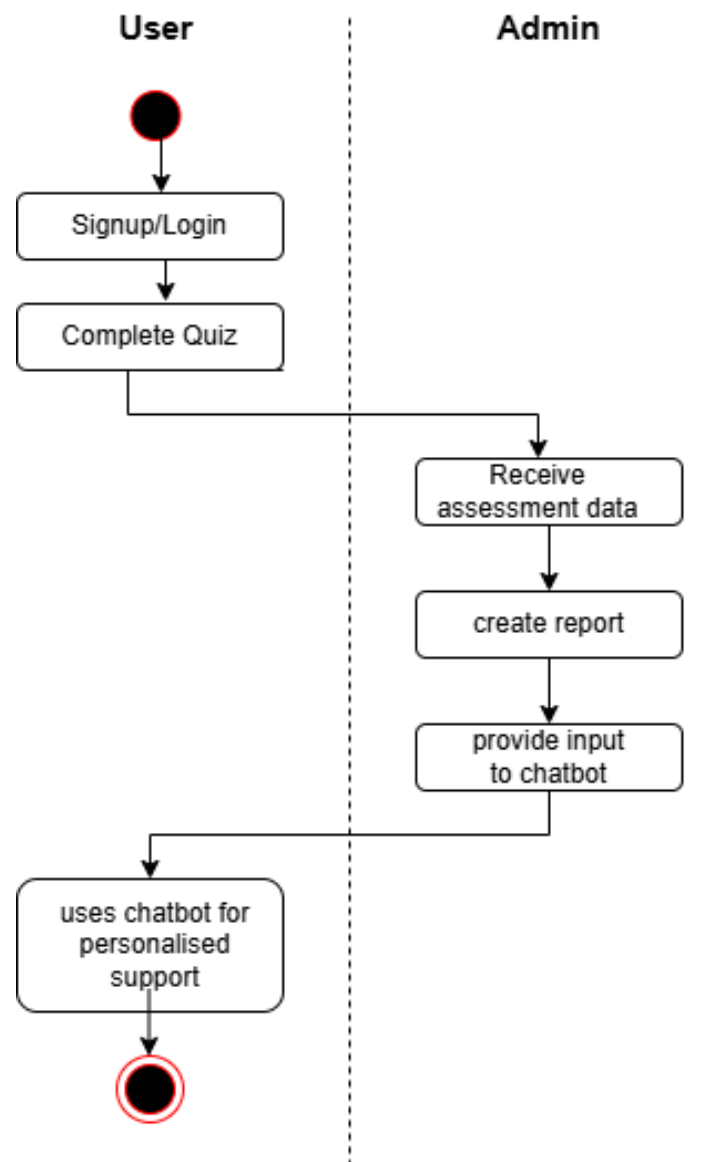


### 3.3 Therapist Suggestions

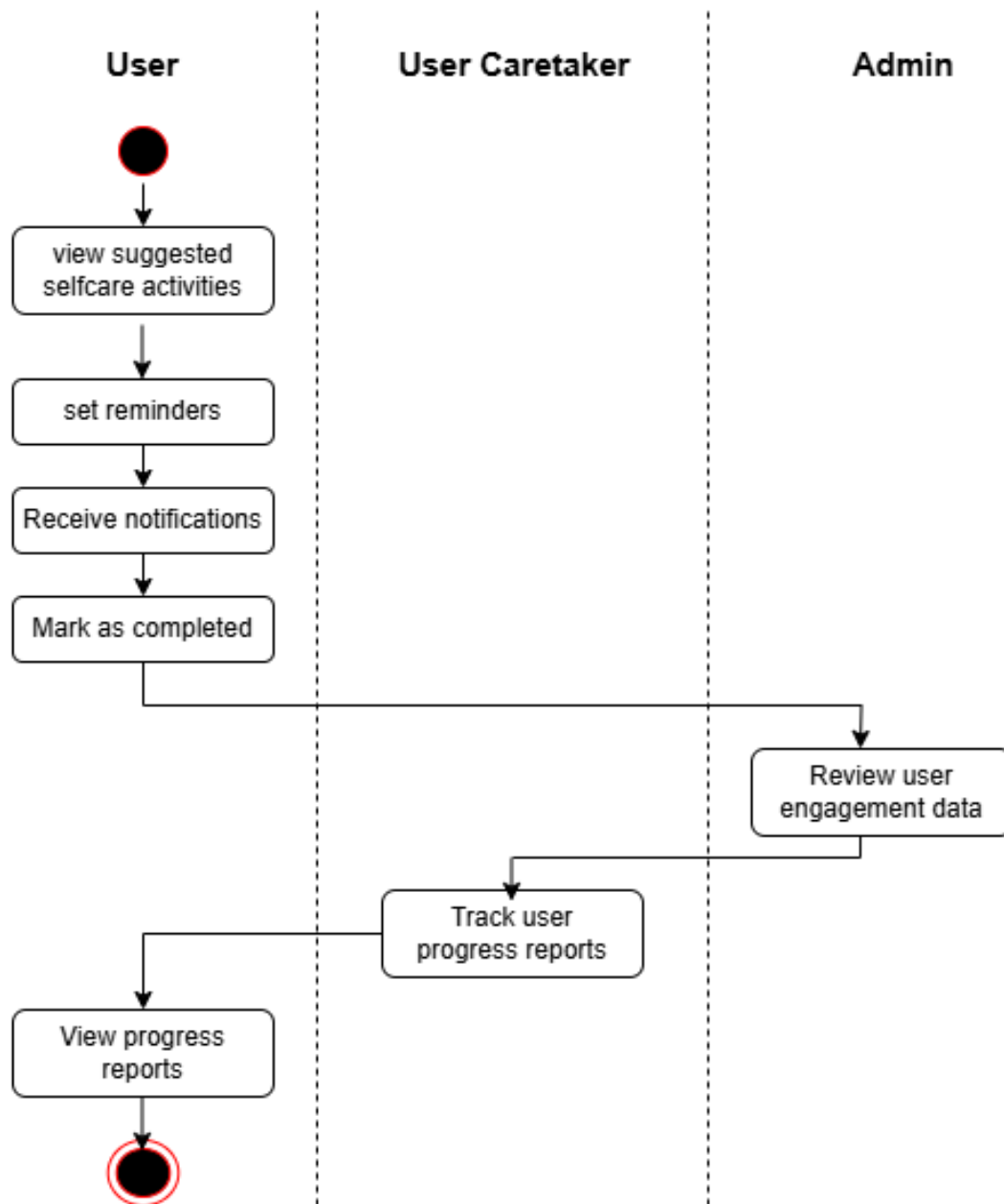


## 4. ACTIVITY DIAGRAM

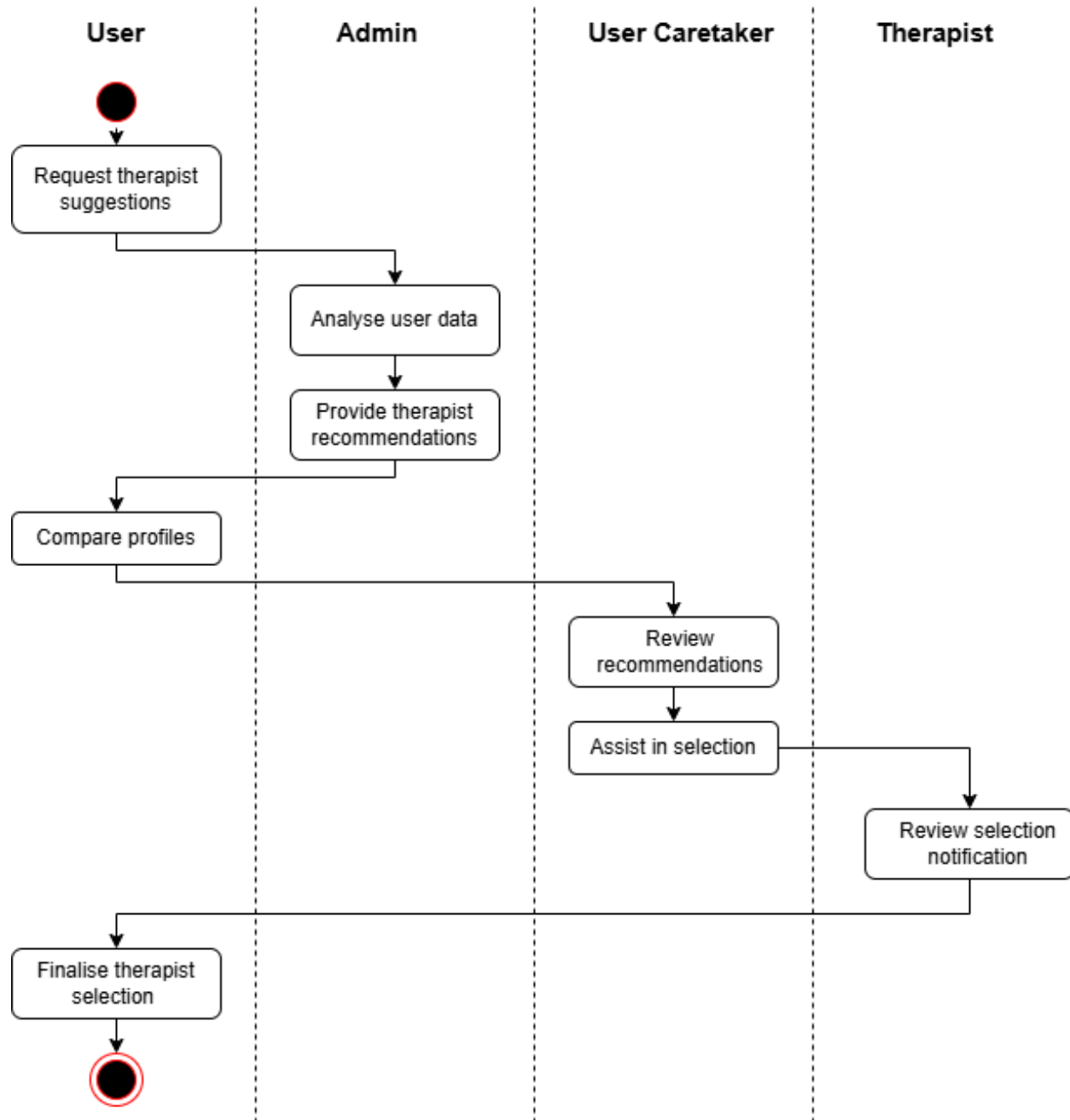
### 4.1 Mental Health Assessment and Chatbot Support



## 4.2 Selfcare Management and Progress Tracking



### 4.3 Therapist Suggestions





## 5. TECHNOLOGY/FRAMEWORK

### FRONTEND

- **HTML, CSS, JavaScript:** The frontend of the system is built using standard HTML, CSS, and JavaScript, ensuring a responsive and visually appealing user interface. HTML structures the content, CSS enhances the design, and JavaScript enables dynamic interactions such as form validation, chatbot responses, and real-time updates. Flask's Jinja2 templating system is used to render dynamic content efficiently.

### BACKEND

- **Python (Flask):** The backend is developed using Flask, a lightweight web framework in Python. Flask handles user authentication, processes mental health assessments, and manages chatbot interactions. It ensures smooth API integration, database management, and secure communication between the client and server while maintaining scalability and performance.

### DATABASE

- **MongoDB:** MongoDB is a NoSQL database that stores data in a flexible, document-oriented format, making it ideal for handling large volumes of unstructured or semi-structured data. It will be used to store user profiles, mental health assessments, chatbot conversations, self-care activities, and user progress data, supporting scalability and performance as the system grows.

### CHATBOT

- **OpenAI API:** The OpenAI API powers the chatbot feature, utilizing state-of-the-art natural language processing models to engage with users in real-time. It allows the chatbot to understand user queries, provide mental health support, and offer personalized recommendations based on user inputs. The integration with OpenAI's API ensures that the chatbot can offer context-aware and insightful responses.

# PROJECT FEASIBILITY

The mental health support system project is highly feasible from a technical, economic, and operational perspective. With the increasing awareness and need for mental health solutions, the system provides a timely solution for users to access support and guidance. The platform is designed to scale effectively accommodate an expanding user base and data. Below is a detailed analysis of the technical, economic, and operational feasibility of the project.

## 1. Technical Feasibility

The system is technically feasible due to the use of well-established technologies such as Django, Python, MongoDB, and OpenAI API. Django's framework ensures secure handling of user data and real-time updates, while MongoDB provides a flexible, scalable database solution for storing user profiles and mental health assessments. The integration of OpenAI's API enables a chatbot that can offer personalized support, making it an effective tool for mental health assistance. With proper cloud infrastructure, the system can handle growing user traffic and maintain seamless user interaction.

## 2. Economic Feasibility

The project is economically feasible as it relies on open-source technologies like Django and MongoDB, which help minimize development costs. The use of cloud services for hosting and database management ensures that infrastructure costs are scalable and can be adjusted as the user base grows. The integration of OpenAI's API may involve costs for API usage, but these can be managed efficiently within the budget. Given the increasing demand for accessible mental health solutions, the potential return on investment is high, as more users seek online support for mental well-being.

## 3. Operational Feasibility

The operational feasibility of the system is high, as it provides a user-friendly interface and supports seamless integration with existing mental health frameworks. The chatbot's interaction with users is simple and intuitive, while the system allows for easy tracking of user progress and mental health improvements. The platform's backend is designed to handle multiple users, ensuring smooth operations even with increasing data and interactions. Continuous monitoring and user feedback will help optimize the system's functionality and ensure it remains efficient as it scales to accommodate more users and support the growing demand for mental health resources.

# SYSTEM ENVIRONMENT

## Hardware Environment

The hardware environment refers to the physical infrastructure necessary to support the development and deployment of the mental health support system.

### Computing Resources:

- Processor: 2 GHz or higher, a multi-core processor (quad-core or better) is recommended to handle computational demands efficiently, including chatbot interactions and data processing.
- Storage:
  - Sufficient Disk Space: 512 GB SSD or higher.
- Memory (RAM):
  - 8 GB RAM or more to ensure smooth operation and efficient handling of user data, chatbot processing, and self-care tracking functionalities.

### Internet Connectivity:

- High-Speed Internet: A stable and high-speed internet connection is crucial for accessing online APIs (OpenAI), resources, libraries, and datasets during development and deployment.

## Software Environment

### 1. Operating System:

- Windows: Windows 10/11 or Windows Server 2019/2022.
- Linux: Ubuntu 20.04 or later (if hosting on cloud platforms).

### 2. Web Framework:

- Flask: A lightweight and flexible Python web framework for backend development.

### 3. Backend and Runtime Environment:

- Python: Version 3.9 or later.
- Required Python Libraries:
  - Flask (for backend development)
  - Flask-Cors (to handle cross-origin requests)
  - Flask-WTF (for handling form validation)
  - Flask-Login (for authentication and user session management)

- Flask-Mail (for email notifications)
- openai (for chatbot integration)
- numpy and pandas (for data processing)
- matplotlib (for progress tracking visualization)
- Celery (for task scheduling like reminders)
- Requests (for API handling)
- pymongo (for MongoDB database connectivity)

#### **4. Database:**

- MongoDB (for robust data storage and management).

#### **5. Frontend Development:**

- HTML5 (For structuring web pages).
- CSS3 (For styling and responsive layout).
- JavaScript (For client-side interactivity).
- Bootstrap (For responsive and user-friendly UI design).

#### **6. Browser Compatibility:**

- Google Chrome: Version 90 or later.
- Mozilla Firefox: Version 85 or later.

#### **7. Email Services:**

- SMTP Server: Gmail (via App Passwords) or third-party services like SendGrid for email notifications and reminders.

#### **8. Development Tools:**

- Code Editor/IDE:
  - Visual Studio Code (with Python, Flask, and HTML/CSS extensions).
- Debugging Tools:
  - Flask Debug Toolbar for performance monitoring.
  - Browser Developer Tools for frontend debugging.
- Version Control:
  - Git and GitHub for code collaboration and version control.

# SUPPORTING LITERATURE

## Literature Review

### Paper 1: Development and Evaluation of a Mental Health Chatbot Using ChatGPT 4.0

The paper titled “**Development and Evaluation of a Mental Health Chatbot Using ChatGPT 4.0**” by Boyoung Kang and Munpyo Hong explores the creation of a chatbot-based intervention designed to support mental health among Korean young adults. The study recognizes the increasing prevalence of stress, anxiety, and depression among students, particularly in the post-pandemic era, where social isolation and academic pressure have contributed to worsening mental health conditions. Traditional counseling services face barriers such as social stigma, long waiting times, and limited accessibility, making AI-powered chatbots a promising alternative for providing immediate, stigma-free mental health support. The primary aim of this research is to develop a chatbot that is culturally adaptive, personalized, and capable of providing real-time mental health assistance. The chatbot, HoMemeTown Dr. CareSam, is built using OpenAI’s ChatGPT 4.0 and integrates features such as emotion recognition, gratitude journaling, and risk detection algorithms to enhance user experience and effectiveness.

The study adopts a mixed-methods approach, combining both quantitative and qualitative assessments to evaluate the usability and effectiveness of the chatbot. The pilot usability study involved 20 Korean young adults aged between 18 and 27, recruited through university email lists and social media platforms. These participants were selected based on their familiarity with existing mental health apps and chatbots, ensuring a well-informed comparison. The chatbot was evaluated on key parameters such as positivity, empathy, active listening, personalization, and professionalism. Additionally, the chatbot was benchmarked against existing digital therapy tools such as Woebot and Happify to understand its comparative effectiveness. The chatbot was developed using OpenAI’s ChatGPT API, with cross-lingual capabilities supporting both Korean and English, allowing for broader accessibility. Its key functionalities include real-time sentiment analysis, interactive gratitude journaling, and AI-powered risk assessment for detecting early signs of mental distress. The evaluation metrics involved Likert-scale surveys to assess usability, semi-structured interviews to gather qualitative insights, and the Trust in Automation Scale to measure user confidence in AI-generated mental health support.

The results of the study indicate high levels of user satisfaction, with the chatbot scoring 9.0 out of 10 in positivity, 8.7 in empathy, and 8.0 in active listening. However, areas such as personalization, complexity of responses, and professionalism scored lower, at 7.4, 7.4, and 7.0, respectively. When compared to existing chatbot-based mental health solutions, HoMemeTown Dr. CareSam demonstrated superior engagement and satisfaction among users. However, some challenges were identified, including slower response times, occasional inconsistencies in Korean language fluency, and limitations in contextual

understanding during prolonged conversations. The study highlights that while AI-driven mental health interventions offer considerable benefits, they also face challenges related to response accuracy and real-time adaptability.

A comparative analysis with Woebot and Happify reveals that HoMemeTown Dr. CareSam provides a more interactive and engaging experience due to its dynamic AI-driven conversation flow, whereas Woebot relies on pre-scripted responses, making interactions feel less natural. Happify, on the other hand, focuses primarily on Cognitive Behavioral Therapy (CBT)-based exercises rather than real-time conversational support. However, Woebot was rated slightly higher in response clarity, as HoMemeTown occasionally produced redundant or unclear AI-generated responses. This highlights the need for further refinement in chatbot-generated dialogues to ensure conversational accuracy and user engagement.

Despite its promising results, the study acknowledges several limitations. The small sample size of 20 participants restricts the generalizability of the findings, making it necessary to conduct larger-scale clinical trials. Additionally, AI-generated responses sometimes lacked contextual accuracy, leading to minor conversational inconsistencies. Ethical concerns regarding the use of AI in mental health interventions were also noted, particularly in terms of privacy, data security, and the potential risks of AI replacing human therapists in critical scenarios. The authors suggest that future iterations of the chatbot should focus on improving natural language processing, refining response accuracy, and integrating real-time crisis intervention features. Moreover, enhancing security protocols and transparency regarding AI decision-making processes would be essential for building long-term trust among users.

In conclusion, the study underscores the potential of AI-driven chatbots as effective mental health support tools. HoMemeTown Dr. CareSam demonstrated strong engagement, personalized interaction, and high user satisfaction, making it a viable alternative to traditional mental health support systems. However, challenges such as AI-generated hallucinations, response speed, and ethical considerations must be addressed before large-scale deployment. Future research should explore the integration of chatbot interventions with professional mental health services, ensuring that AI support remains complementary rather than a replacement for human therapists. The study serves as a valuable contribution to the growing field of AI-driven mental health interventions, emphasizing both the benefits and limitations of using conversational agents for psychological support.

## **Paper 2: Artificial Intelligence-Based Chatbot for Student Mental Health Support**

The paper titled “Artificial Intelligence-Based Chatbot for Student Mental Health Support” by Linda Uchenna Oghenekaro and Christopher Obinna Okoro presents a novel AI-driven chatbot designed to assist students with mental health challenges. The study recognizes the increasing burden of stress, anxiety, and depression among students and the limitations of traditional counseling services in addressing these issues. Due to the stigma associated with seeking professional psychological support, many students hesitate to

utilize traditional therapy services. The research aims to bridge this gap by developing a chatbot that provides accessible, stigma-free, and personalized mental health assistance using artificial intelligence. By leveraging AI-based Cognitive Behavioral Therapy (CBT) techniques, the chatbot is designed to support students in managing their emotions, recognizing negative thought patterns, and providing timely self-help strategies. The study explores the potential of AI chatbots as a cost-effective, scalable alternative to human therapists, providing students with a supportive conversational interface that enhances mental well-being while maintaining privacy.

The study follows a mixed-methods research design, incorporating quantitative surveys and qualitative user feedback to evaluate the chatbot's usability and effectiveness. The chatbot was developed using ReactJS, Vite, SCSS, and Dido training frameworks, with data sourced from Kaggle and GitHub, ensuring that the chatbot's conversational responses are grounded in real-world mental health dialogues. The chatbot was integrated with Natural Language Processing (NLP) algorithms to enable dynamic interactions and intelligent response generation. System integration involved a front-end interface allowing students to engage with the chatbot seamlessly, while the back-end processed and analyzed user inputs to provide appropriate responses. The chatbot also incorporated sentiment analysis and conversation tracking mechanisms to tailor its interactions to the specific emotional needs of students. The evaluation process involved pre- and post-intervention mental health assessments, measuring user engagement levels, sentiment shifts, and effectiveness in reducing stress and anxiety levels.

The findings reveal that the chatbot successfully increased student engagement and improved mental health outcomes, with users reporting higher satisfaction levels compared to traditional mental health apps. Participants appreciated the conversational ease and anonymity of the chatbot, which encouraged them to express emotions freely without fear of judgment. The chatbot was effective in delivering CBT-based strategies, including cognitive restructuring and guided self-reflection exercises, allowing students to recognize and modify distressing thoughts. A comparative analysis with existing mental health chatbots such as Woebot, Ellie, and Tess demonstrated that the AI-driven chatbot offered more interactive and personalized responses, making it a more effective tool for mental health intervention. However, challenges such as user skepticism, privacy concerns, and occasional chatbot response inaccuracies were noted. Some users expressed concerns regarding data confidentiality and the chatbot's ability to provide reliable advice, highlighting the need for enhanced security measures.

Compared to Woebot and Ellie, which rely on scripted dialogues, the AI chatbot developed in this study employs real-time AI-generated responses, making conversations feel more dynamic and engaging. However, AI hallucination risks and potential response inaccuracies were identified as limitations. Privacy and ethical considerations were also discussed, with researchers emphasizing the importance of user data protection and transparency in AI-driven mental health interventions. The study suggests that integrating human oversight into chatbot interactions could further enhance trust and credibility in AI-assisted therapy. Moreover, developing context-aware conversational models would allow for better adaptation to diverse student needs.

Despite its advantages, the study acknowledges certain limitations. User trust remains a significant challenge, as students may hesitate to rely entirely on an AI-driven system for mental health guidance. Ethical concerns related to AI decision-making, data security, and user anonymity require further

exploration to ensure safe deployment. Additionally, while the chatbot provides general emotional support, it is not equipped to handle high-risk cases requiring professional intervention. The study recommends further improvements in chatbot personalization, AI interpretability, and integration with institutional healthcare systems to enhance trust and user engagement. Ensuring real-time therapist intervention options in critical scenarios is suggested as a potential solution to mitigate the limitations of AI-driven mental health chatbots.

In conclusion, this study highlights the transformative potential of AI in student mental health support. The chatbot successfully enhances engagement, accessibility, and emotional well-being, providing students with a cost-effective and readily available mental health resource. However, ethical considerations, AI response reliability, and user trust remain key challenges that need to be addressed before widespread implementation. The study serves as a valuable contribution to the growing field of AI-assisted psychological interventions, emphasizing both the strengths and limitations of chatbot-based mental health support. Future research should explore the integration of AI chatbots into university mental health services, further personalization through deep learning, and the development of hybrid AI-human support systems to ensure a comprehensive and trustworthy mental health solution for students.

### **Paper 3: Supporting Mental Health Self-Care Discovery Through a Chatbot**

The paper titled “Supporting Mental Health Self-Care Discovery Through a Chatbot” by Joonas Moilanen, Niels van Berkel, Aku Visuri, Ujwal Gadiraju, Willem van der Maden, and Simo Hosio explores the use of conversational agents in mental health self-care discovery. Recognizing that mental health self-care is an essential aspect of well-being, the study investigates how AI-driven chatbots can assist users in discovering and adopting self-care strategies. Traditional mental health services often focus on clinical interventions, but self-care can act as a preventive and complementary approach to managing mental health. The study aims to evaluate the trust, engagement, and effectiveness of chatbots in guiding individuals toward self-care practices through an experimental comparison between two interfaces: a conventional web-based Decision Support System (DSS) and the same system integrated into a chatbot interface. The primary objective is to analyze user trust, system security perception, and the impact of conversational interactions on mental health support.

The study employed a between-subjects experimental design, involving 80 higher education students who were divided into two groups. One group used a standalone web-based DSS to explore self-care techniques, while the other engaged with the same system through an AI-powered chatbot. The chatbot facilitated conversational interactions, guiding users through different self-care recommendations based on their responses. User trust in the system was evaluated using the Trust in Automation Scale, which measured factors such as system integrity, reliability, security perception, and user confidence in AI-generated suggestions. The chatbot was designed to provide personalized self-care recommendations,



drawing from a crowdsourced repository of mental health self-care methods previously validated by experts.

The results of the study highlight notable differences in user engagement and perceived trust between the two groups. While chatbot users exhibited higher engagement and interaction rates, they reported lower trust in the system's security and integrity compared to those using the traditional web-based DSS. The authors speculate that privacy concerns and AI-driven conversational uncertainties contributed to this skepticism. Users were more inclined to trust the DSS as a more structured and predictable system, whereas the chatbot's human-like behavior and adaptive responses led to concerns about data privacy and response reliability. Despite this, the chatbot successfully increased accessibility, engagement, and ease of use, making mental health self-care discovery more approachable for users who might otherwise avoid such resources.

A comparative analysis of chatbot-based versus DSS-based self-care recommendations revealed mixed perceptions. Some users appreciated the conversational flow and interactive guidance, stating that it made self-care exploration more intuitive and engaging. However, others expressed discomfort with the chatbot's lack of transparency regarding response generation and data usage. Additionally, while the chatbot offered personalized guidance based on user inputs, some users found the DSS's direct access to self-care methods more reliable and efficient. These findings suggest that while chatbots can enhance engagement, they must address trust issues through improved transparency, ethical AI practices, and stronger security measures to be widely adopted in mental health self-care applications.

The study identifies several limitations. The perceived lack of security and integrity in chatbot-based interactions suggests a need for further refinement in AI-driven mental health applications. Ethical concerns regarding data privacy, user anonymity, and chatbot decision-making must be addressed before large-scale implementation. Moreover, while the chatbot provided effective self-care recommendations, it lacked real-time professional oversight, raising concerns about misleading or incomplete guidance for users with severe mental health conditions. The authors suggest that future research should focus on enhancing chatbot transparency, integrating human oversight, and refining AI-driven self-care personalization to improve trust and usability.

In conclusion, this study provides valuable insights into the potential and challenges of AI-powered mental health self-care chatbots. The chatbot-based approach demonstrated higher engagement and accessibility, but trust-related concerns remain a significant barrier to adoption. Future improvements should include enhanced security measures, real-time human intervention options, and clearer communication about AI decision-making processes. The research contributes to the growing field of digital mental health interventions, highlighting the need for trust-building mechanisms and ethical AI practices in chatbot-assisted self-care discovery. As AI continues to evolve, refining chatbot design and improving user confidence will be critical in leveraging conversational agents for mental health support and self-care empowerment.

# Literature Summary Table

TITLE	YEAR	JOURNAL NAME/PUBLISHER	SUMMARY
Development and Evaluation of a Mental Health Chatbot Using ChatGPT 4.0	2025	JMIR Medical Informatics / ©2025 JMIR Publications	This study presents HoMemeTown Dr. CareSam, an AI chatbot built on ChatGPT 4.0 to provide mental health support for Korean young adults. Using emotion recognition, gratitude journaling, and risk detection, the chatbot was evaluated with 20 participants. Results show high user satisfaction, outperforming Woebot and Happify, but challenges remain in response accuracy and crisis intervention. Future improvements focus on better NLP processing and therapist integration.
Artificial Intelligence-Based Chatbot for Student Mental Health Support	2024	Open Access Library Journal / ©2024 Open Access Library Inc.	This paper explores an AI chatbot for student mental health, integrating CBT-based interventions. Developed using ReactJS and Dido training, it was trained on Kaggle and GitHub datasets. The chatbot effectively improved emotional well-being and engagement, surpassing Woebot and Ellie in personalization. Challenges include privacy concerns and user trust, with future work emphasizing better security and AI adaptability.
Supporting Mental Health Self-Care Discovery Through a Chatbot	2023	Frontiers in Digital Health / ©2023 Frontiers Media	This study evaluates AI chatbots for mental health self-care by comparing a web-based DSS and a chatbot-integrated DSS. Conducted on 80 students, results show higher engagement but lower trust due to security concerns. While the chatbot improves self-care discovery, concerns about privacy and AI transparency remain. Future research aims at enhancing chatbot reliability and integrating human oversight.

## Findings and Proposals

From the literature review of the three research papers, several key findings have emerged, providing valuable insights into the development of a chatbot-integrated mental health support system.

The first paper emphasizes the role of AI-driven chatbots in providing accessible mental health support, focusing on emotion recognition, risk detection, and user engagement. The study highlights that AI chatbots, when properly designed, can outperform traditional therapy apps in engagement and responsiveness, but still face challenges in real-time intervention and response accuracy.

The second paper builds upon this by exploring the integration of Cognitive Behavioral Therapy (CBT) in AI chatbots, aiming to provide structured, evidence-based interventions to students struggling with stress and anxiety. The findings indicate that AI-driven CBT strategies can effectively improve student well-being, but issues such as user trust, privacy concerns, and AI adaptability need to be addressed for widespread adoption. The study suggests that better AI personalization and enhanced security protocols will be essential to increase trust and usability.

The third paper shifts focus towards mental health self-care discovery, investigating how chatbots can guide users in identifying personalized self-care techniques. The study shows that while chatbots enhance engagement in self-care practices, trust issues related to AI decision-making remain a major barrier. Users preferred the interactivity of chatbots but expressed concerns over privacy and response transparency.

Among the three research papers reviewed, the second paper aligns most closely with my project, as it explores the integration of Cognitive Behavioral Therapy (CBT) in AI chatbots to provide structured, evidence-based interventions for mental health support. My project builds upon this by implementing AI-driven chatbot interactions to assess mental health conditions, provide self-care recommendations, and guide users toward professional intervention if needed. Additionally, key concerns highlighted in the reference papers, such as user trust, privacy, and AI adaptability, are directly addressed in my project through enhanced security measures, AI personalization, and transparent chatbot communication. By combining insights from all three papers, my project aims to develop a holistic mental health support system that not only engages users effectively but also ensures ethical AI practices and real-time crisis detection.

# DATABASE DESIGN

**Table: User**

Primary key: user\_id

Attribute	Datatype	Constraints	Description
user_id	ObjectId	Primary Key, Unique	Unique identifier for each user
name	String	Not Null	Full name of the user
email	String	Unique, Not Null	User's email (unique)
password	String	Not Null	Encrypted password
age	Number	Not Null, Positive	Age of the user
gender	String	Not Null	Gender of the user
interests	Array	Nullable	List of user interests for analysis

**Table: Assessment**

Primary key: assessment\_id

Attribute	Datatype	Constraints	Description
assessment_id	ObjectId	Primary Key, Unique	Unique identifier for each assessment
user_id	ObjectId	Foreign Key (User)	Reference to User who took the assessment
date	Date	Not Null	Date of assessment
score	Number	Not Null, Positive	Total score of the quiz
category	String	Not Null	Assessment category (Anxiety, Depression, Stress, Normal)

**Table: ProgressTracker**

Primary key:progress\_id

Attribute	Datatype	Constraints	Description
progress_id	ObjectId	Primary Key, Unique	Unique identifier for tracking progress
user_id	ObjectId	Foreign Key (User)	Reference to User
assessment_id	ObjectId	Foreign Key (Assessment)	Reference to Assessment
progress_data	Array	Not Null	List of progress scores over time
generated_report	String	Nullable	Link to generated progress report

**Table: Reminder**

Primary key:reminder\_id

Attribute	Datatype	Constraints	Description
reminder_id	ObjectId	Primary Key, Unique	Unique identifier for each reminder
user_id	ObjectId	Foreign Key (User)	Reference to User
activity	String	Not Null	Activity for which reminder is set
reminder_time	Date	Not Null	Time for the reminder

**Table: Chatbot**

Primary key:chatbot\_id

Attribute	Datatype	Constraints	Description
chatbot_id	ObjectId	Primary Key, Unique	Unique identifier for chatbot interaction
user_id	ObjectId	Foreign Key (User)	Reference to User
message	String	Not Null	User's query to the chatbot
response	String	Not Null	Chatbot's response

**Table: SelfcareActivity**

Primary key:activity\_id

Attribute	Datatype	Constraints	Description
activity_id	ObjectId	Primary Key, Unique	Unique identifier for each activity
title	String	Not Null	Activity title
description	String	Not Null	Detailed description
resource_link	String	Nullable	External link for more info

**Table: Therapist**

Primary key:therapist\_id

Attribute	Datatype	Constraints	Description
therapist_id	ObjectId	Primary Key, Unique	Unique identifier for therapist
name	String	Not Null	Therapist name
specialization	String	Not Null	Area of expertise
contact_info	String	Not Null, Unique	Contact details

**Table: SystemAdmin**

Primary key: admin\_id

Attribute	Datatype	Constraints	Description
admin_id	ObjectId	Primary Key, Unique	Unique identifier for admin
username	String	Not Null, Unique	Admin username
email	String	Not Null, Unique	Admin email
password	String	Not Null	Encrypted password

**Table: QuizQuestions**

Primary key:question\_id

Attribute	Datatype	Constraints	Description
question_id	ObjectId	Primary Key, Unique	Unique identifier for each question
question_text	String	Not Null	The text of the quiz question
options	Array	Not Null	List of answer choices (A, B, C, D)
category	String	Not Null	The category of the question (e.g., Anxiety, Depression, Stress)
score_map	Object	Not Null	Mapping of options to scores (e.g., {A: 1, B: 2, C: 3, D: 4})

**Table: UserCaretaker**

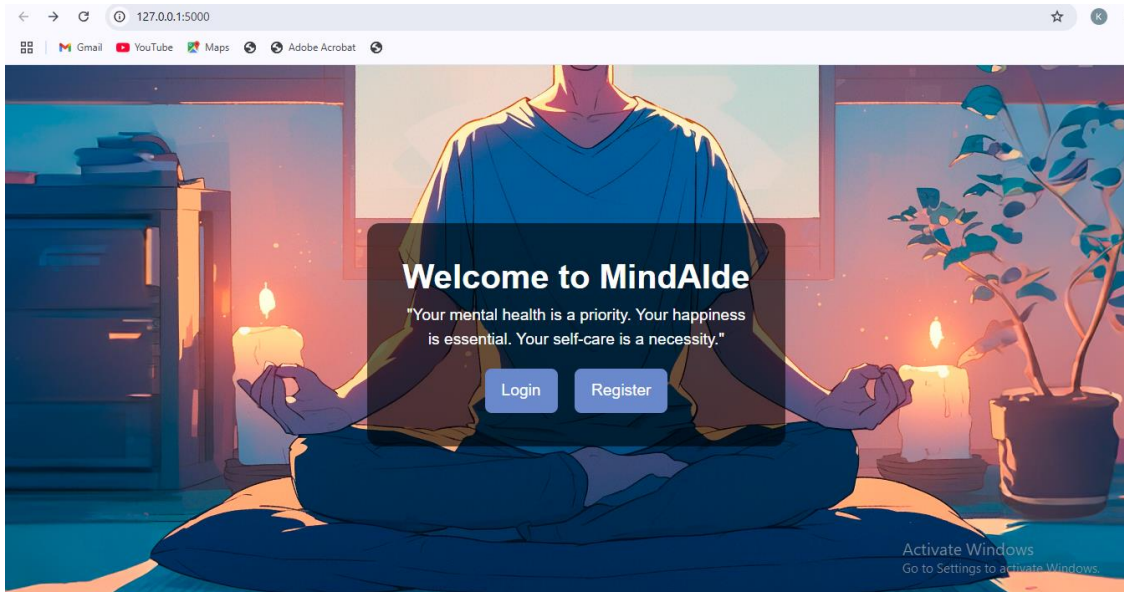
**Primary Key:** caretaker\_id

Attribute	Datatype	Constraints	Description
caretaker_id	ObjectId	Primary Key, Unique	Unique identifier for each caretaker
user_id	ObjectId	Foreign Key (references User table), Not Null	References the user who is assigned a caretaker
name	String	Not Null	Full name of the caretaker
email	String	Unique, Not Null	Caretaker's email for communication
relationship	String	Not Null	Relationship of the caretaker with the user (e.g., Parent, Friend, Guardian)
contact_info	String	Not Null	Contact details of the caretaker



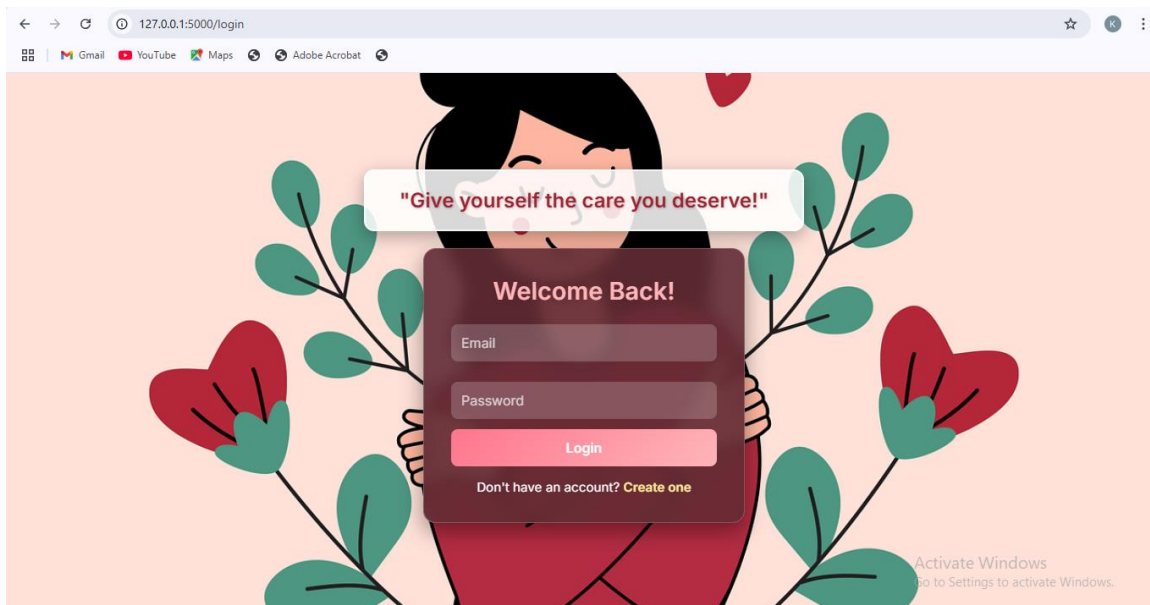
# UI DESIGN

## 1.Home page



- This is the starting page of MindAlde, where users can log in or sign up.
- It helps users access mental health support and self-care tools.
- The page highlights the importance of mental well-being with a welcoming message.
- After logging in, users can take a quiz, chat with the bot, and get mental health tips.

## 2.Login page



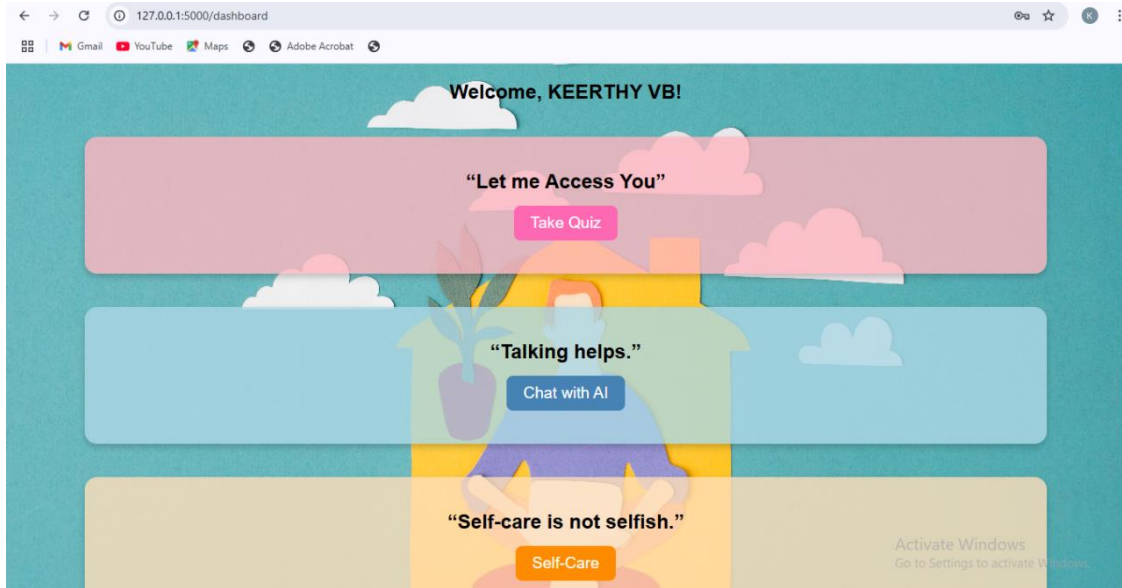
- This page allows registered users to log in using their email and password.
- It provides a motivational message to encourage users to prioritize mental well-being.
- A "Create one" link is available for new users to register if they don't have an account.
- After logging in, users can access mental health assessments, chatbot support, and self-care tools.

### 3 . Create account

The screenshot displays a web browser window with the address bar showing '127.0.0.1:5000/signup'. The browser's taskbar includes icons for Gmail, YouTube, Maps, and Adobe Acrobat. The main content area features a 'Create Account' form with the following fields: 'Full Name', 'Email', 'Age', a gender dropdown menu (currently set to 'Female'), 'Your Interest', and 'Password'. A pink and blue gradient 'Create Account' button is positioned below the password field. The background of the page is a blurred image of hands clasped together. In the bottom right corner, there is a watermark that reads 'Activate Windows Go to Settings to activate Windows.'

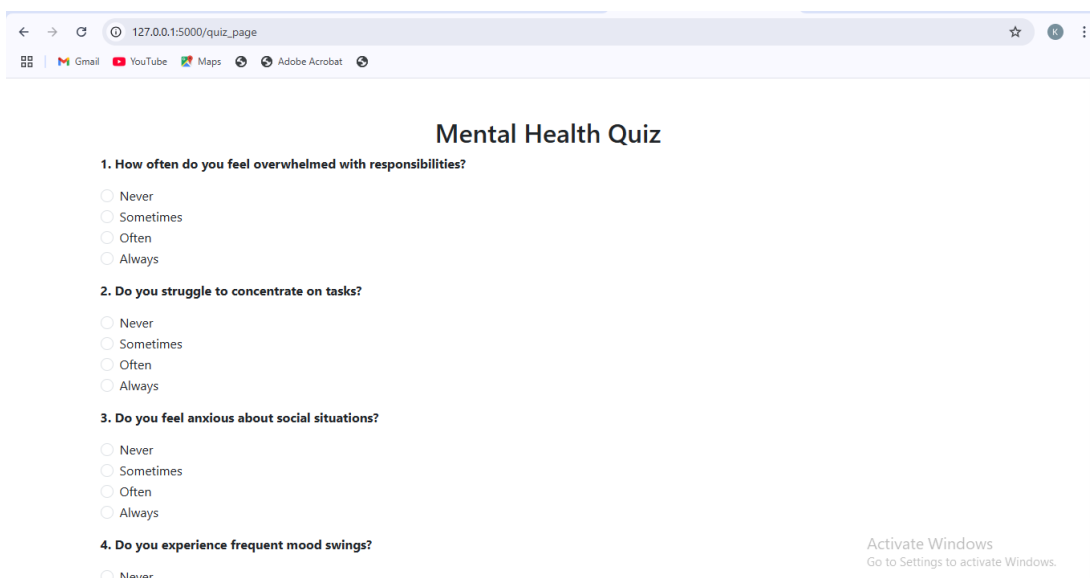
- Allows users to create an account for personalized mental health support.
- Collects user details like name, email, age, gender, interests, and password.
- Uses the "Your Interest" field to tailor recommendations based on user preferences.
- Grants access to mental health assessments, chatbot support, and self-care resources.

## 4 . Dashboard

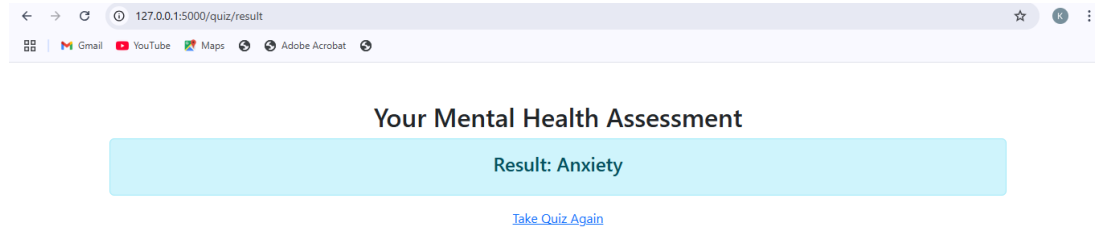


- Provides users with a personalized dashboard for mental health support.
- Offers a self-assessment quiz to evaluate mental well-being.
- Integrates an AI chatbot for emotional support and guided conversations.
- Encourages self-care with tailored activities and resources.

## 5.Assesment

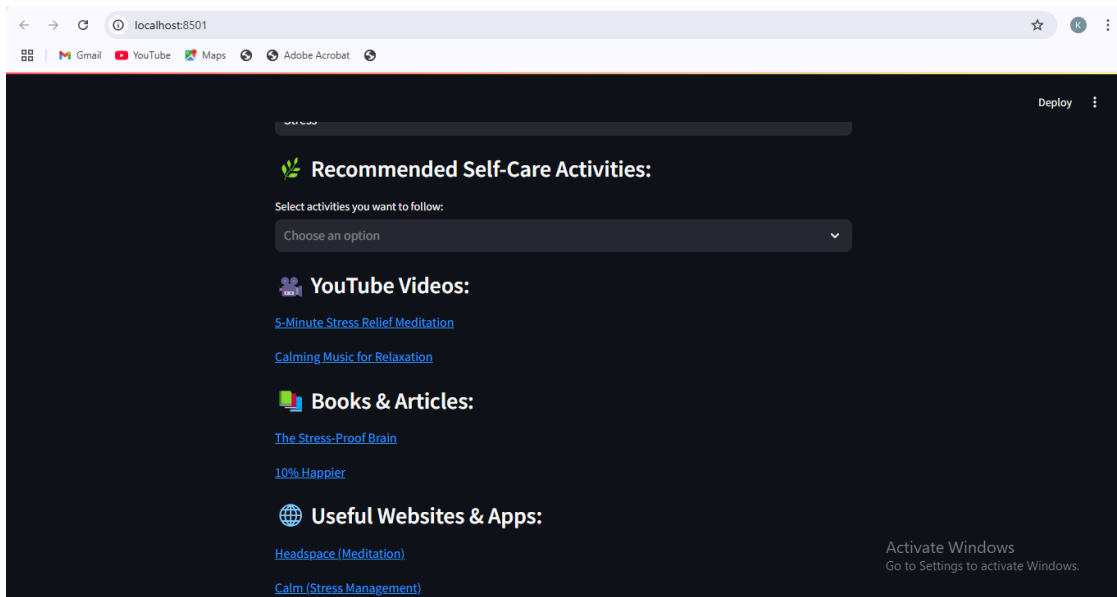


## 6. Assessment result



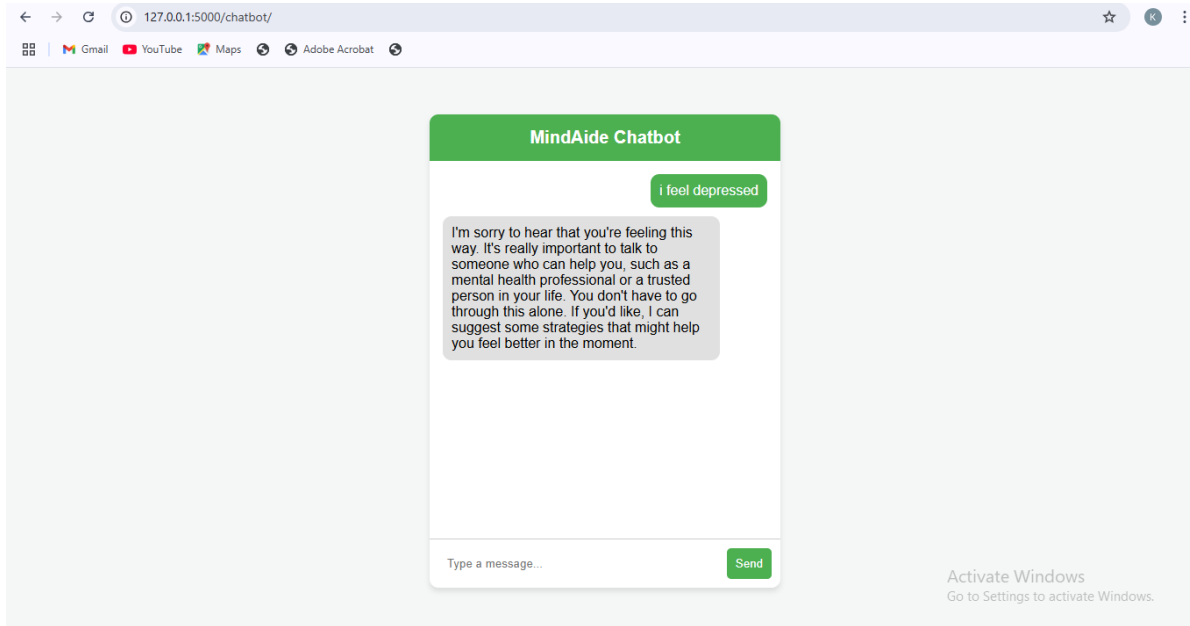
- Provides a mental health self-assessment quiz to help users evaluate their well-being.
- Contains multiple-choice questions covering anxiety, stress, and emotional well-being.
- Users' responses are analyzed to determine their mental health category.
- Helps in identifying areas where support or self-care is needed.

## 7. Selfcare Recommendations



- Provides personalized self-care recommendations based on the user's mental health quiz results.
- Includes YouTube videos, books, articles, and useful websites/apps for stress relief and well-being.
- Users can select activities they want to follow for better mental health management.
- Encourages mindfulness, relaxation, and self-improvement through curated resources.

## 8 . Chatbot



- The chatbot provides empathetic and supportive responses for mental health concerns.
- It encourages users to seek professional help and talk to trusted individuals.
- It offers suggestions for coping strategies to improve emotional well-being.
- The interface is simple and user-friendly, promoting ease of interaction.

Check mongodb stores quiz\_results

Check selfcare page