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ManasMitra: A Mental Health Aiding Android Application

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Abstract - *Depression has a widespread occurrence among people, particularly during the COVID-19 pandemic. However, mental health services have been limited and underrated worldwide. Mental health chatbots are an innovative digital technology to provide fully automated responses for depressive symptoms. Chatbots in mental health are nascent, and although chatbots have demonstrated possibility to provide mental health treatment, more reliable evidence regarding the success and acceptability of mental health chatbots is needed, particularly during the COVID-19 pandemic. Clinical applications of Artificial Intelligence for mental health care have experienced a rapid rise in the past few years. AI-enabled chatbot software and applications have been administering substantial medical treatments that were formerly only available from experienced and proficient healthcare professionals. Such initiatives, which range from "virtual psychiatrists" to "social robots" in mental health, aspire to improve patient care and financial oversight, as well as fulfilling the mental health needs of vulnerable and underserved populations. Conversational agents are used that act as an intermediate between the user and the computer. A person opens up more in an online chat rather than a face-to-face conversation. There is a need for the mechanism of using chatbots to make people know about the choices the technology is providing to maintain user motivation regularly. Chatbot provides free access to the mental health therapy and allows anytime, anywhere access to these therapies.*

***Key Words*: Chatbot, Artificial Intelligence, Virtual Psychiatrists, Social Robots, Healthcare Professionals**

1. INTRODUCTION

Presently the worldwide mental health care system is going through challenging times. According to the World Health Organization (WHO), among four people there is one person who is affected by mental illness at some juncture in their lives. Mental disorder is the leading cause of health-related economic hardship around the world. In particular, depression and stress are the most common causes, in spite of such growing burden, there seems to be a severe scarcity of mental health professionals worldwide [1]. Despite the fact that there are efficient and well-known therapies for numerous mental and neurological disorders, only half of people, afflicted by mental disorder, receive them. Even when people have access to healthcare assistance but may delay using the service for reasons such as thinking that their feelings are not enough to visit a psychiatrist or they are afraid that the people around them will judge them. Chatbots are always available which is very beneficial as people do not have to wait for an appointment. These tools are not for replacing human healthcare professionals, but they are helping them to do their jobs better. Chatbots have user friendly interface and have an interactive platform. There are even non-depressed people who genuinely have a bad and require motivation to boost their energy. Mental health chatbots are designed to simulate human-like conversations, allowing users to express their thoughts, feelings, and concerns in a conversational manner. Through dialogue-based interactions, chatbots can offer psychoeducation, coping strategies, mindfulness exercises, and referrals to professional services based on the user's needs and preferences. To enhance the access to mental health support and promote well-being in today's digital age, an Android application using Java and Natural Language Processing (NLP) is developed.

Java is the primary language supported by Android since its inception. Google provided extensive documentation, APIs, and development tools specifically for Java-based Android development [2].

Natural Language Processing (NLP) for chatbots involves the utilization of computational techniques to comprehend, interpret, and generate human language, facilitating seamless communication between machines and humans [3]. This process

begins with text preprocessing, where the input data is cleaned and normalized. NLP systems then identify the user's intent, categorizing their message into predefined intents, and extract relevant entities mentioned. Understanding the context of the conversation is crucial, requiring the system to maintain a memory of the conversation history and track the flow of dialogue.

Overall, the Android Application provides several advantages in terms of accessibility, cost-effectiveness, interactivity, etc. These factors result in the effective use of the application by the modern users.

1.1 MOTIVATION

Mental health issues affect millions of people worldwide. Creating an app that can help individuals manage their mental health effectively can have a profound impact on the lives of users, potentially improving their well-being and quality of life. Many developers have personal experiences with mental health struggles, either themselves or through friends and family. Creating an app that addresses these issues can be a way to channel personal experiences into something positive and helpful for others. The field of mental health apps is constantly evolving, with new technologies and approaches emerging all the time. Developing an app allows you to be at the forefront of innovation in this field, exploring new ways to leverage technology to support mental well-being [9]. There's a growing community of developers, clinicians, and mental health advocates working together to create resources and support systems for those struggling with mental health issues. Contributing to this community by developing an app can be highly motivating, knowing that your part of a larger movement to destigmatize mental health and provide help to people in need. With the widespread use of smartphones, an Android app has the potential to reach a large and diverse audience. Knowing that your app could potentially help thousands or even millions of people can be a powerful motivator to keep pushing forward in the development process. Unlike many other types of software, mental health apps often provide opportunities for direct feedback from users. Seeing how your app positively impacts users' lives and receiving their gratitude and testimonials can be incredibly rewarding and motivating [10]. Developing a mental health app involves understanding psychological principles, user experience design, and possibly integrating various therapeutic techniques. It's a path of continuous learning and growth, which can be personally fulfilling for developers who enjoy expanding their skill set and knowledge base. Overall, the motivation for developing an Android app aimed at aiding mental health often stems from a combination of passion, a desire to make a positive effect and the satisfaction of contributing to a growing field of technology and healthcare [3].

2. LITERATURE SURVEY

1. A review of mobile apps for mental health

This review provides an overview of mobile apps for mental health, emphasizing evidence-based principles for app design and evaluation. It discusses various types of mental health apps, their features, and the importance of evidence-based practices in their development [9].

2. Mobile apps for mental health: A rapid review

This rapid review evaluates the effectiveness of mobile apps for mental health. It examines the evidence supporting the use of apps for various mental health conditions, such as depression, anxiety, and stress. The review highlights the potential benefits of mobile-based interventions in improving mental well-being [10].

3. Enhancing the user experience of mental health apps: User perspective

This study explores user perspectives on mental health apps, focusing on factors that influence user engagement and adherence. It discusses the importance of user-centered design and personalized features in enhancing the usability and effectiveness of mental health apps [11].

4. Privacy and security in mobile health research

This article examines privacy and security concerns in mobile health (mHealth) research, including mental health apps. It discusses regulatory frameworks, data protection measures, and ethical considerations related to the collection and storage of sensitive health information on mobile platforms [12].

3. PROBLEM STATEMENT

In today's fast-paced and stressful world, mental health has become a growing concern, with many individuals experiencing anxiety, depression, and other psychological challenges. To address this issue, there is a need for a comprehensive mental health application that combines various features to support users in managing their mental well-being effectively [4]. The reluctance of individuals to seek professional help from psychiatrists presents a significant challenge in addressing mental health issues effectively. This reluctance stems from various factors, including the enduring stigma surrounding

mental health conditions. Many individuals fear judgment or discrimination if they disclose their struggles or seek support, leading them to avoid seeking help altogether. Limited awareness of mental health conditions and available treatment options also contributes to this issue, as some may not recognize the signs of mental illness or understand the benefits of psychiatric treatment. Additionally, financial constraints and limited access to mental health services pose barriers to seeking help, particularly for those without adequate insurance coverage or affordable options.

4. EXISTING SYSTEM

Doctors provide invaluable expertise and personalized care but there are drawbacks to traditional healthcare services. Accessibility can be a significant barrier with doctors, as individuals may face long wait times for appointments, limited availability of specialists in their area, or difficulty accessing care due to geographical constraints. Additionally, the cost of healthcare services can be prohibitive for many individuals, especially those without adequate insurance coverage [5]. Doctors' appointments may also involve travel time and expenses, making it challenging for some individuals to prioritize their mental health needs. Furthermore, there is a stigma associated with seeking help from mental health professionals, which may discourage individuals from seeking timely care. Mental health apps offer a solution to these challenges by providing convenient, affordable, and accessible support and resources that can be accessed anytime, anywhere.

5. PROPOSED SYSTEM

The proposed system aims to empower users with accessible tools and resources to proactively manage their mental well-being, seek support when needed, and cultivate habits that promote overall wellness and resilience.

The proposed system aims to provide users with comprehensive support for managing their mental well-being by integrating various features into a single platform.

The key components of the proposed system include:

1. **Chatbot**

   The application will feature a chatbot powered by Natural Language Processing (NLP) technology to offer personalized support and guidance to users [6]. The chatbot will be capable of understanding users' concerns, providing empathetic responses, offering resources, and guiding users through self-help techniques.

2. **To-Do List**

   Users will have access to a to-do list feature within the app, allowing them to set and prioritize tasks related to their mental health goals. This feature will help users stay organized, track their progress, and maintain consistency in their self-care routines.

3. **Relaxation Strategies**:

   The app will offer a variety of relaxation strategies to help users reduce stress, manage anxiety, and improve overall well-being. This will include guided meditation videos, breathing exercises, and relaxing music playlists curated to promote relaxation and mindfulness.

4. **Multimedia Content**

   The relaxation section of the app will include a library of multimedia content, including videos of guided meditation sessions led by certified instructors, instructional videos demonstrating breathing exercises, and curated playlists of calming music and nature sounds. Users can access these resources anytime, anywhere to support their mental health needs.

5. **Data Privacy and Security**

   Ensuring the privacy and security of user data is the top priority in the development of the app. We will implement robust security measures to protect user information and adhere to relevant regulations and best practices for handling sensitive health data.

Through the integration of chatbot functionality, to-do list features, and multimedia relaxation resources, the app will offer a holistic approach to mental health support that is convenient, personalized, and effective.

6. METHODOLOGY

The app is built using Java, a widely-used programming language for Android app development. Java offers robust support for mobile app development, providing a familiar and powerful environment for building Android applications. NLP techniques are employed to enable natural language understanding and dialogue processing within the chatbot feature of the application [7].

The Mental Health Android App incorporates a secure authentication system using Firebase Authentication for user sign-up and login functionalities. Upon launching the app, users are presented with a user-friendly sign-up or login page, where they can either create a new account or log in to their existing account. Firebase Authentication seamlessly handles the authentication process,

ensuring robust security measure such as email/password authentication for added protection. For new users, the sign-up process collects essential information such as email address and password, guiding them through the account creation process with clear instructions and validation checks to ensure data accuracy [8]. Once the user submits their sign-up information, Firebase Authentication securely registers the new account, storing user credentials in a secure database for future authentication.

For returning users, the login page prompts them to enter their credentials that is email and password. Upon submission, Firebase Authentication verifies the user's credentials against the stored information, granting access to the app's features upon successful authentication.

The integration of Firebase Authentication streamlines the user authentication process within the Mental Health Android App, providing users with a seamless and secure experience while accessing the app's functionalities.

The to-do list feature within the Mental Health Android App provides users with a structured tool for organizing tasks and activities, promoting a sense of productivity and accomplishment. Users can easily create, edit, and prioritize tasks, helping them stay organized and focused on their mental well-being goals.

The relaxation strategies feature offers users a variety of resources and techniques to support their mental health and promote relaxation. This feature includes curated content such as meditation videos, breathing exercises, and calming music, sourced from reputable source that is YouTube. Users can engage in guided relaxation sessions, practice mindfulness exercises, or unwind with soothing music, all within the convenience of the app.

Dialog and intent recognition are core components of the chatbot functionality. Dialog management allows the chatbot to engage in conversations with users, while intent recognition enables it to understand the user's intentions or requests.

NLP models are trained or configured to recognize specific intents related to mental health support, such as providing guidance, offering relaxation techniques [3].

The chatbot is integrated into the application using an API (Application Programming Interface). This API serves as a communication interface between the app and the chatbot service.

The API allows the application to send user queries or messages to the chatbot service and receive responses in return.

This integration enables the chatbot functionality to be hosted remotely, allowing for scalability, updates, and improvements without requiring changes to the app itself.

The API utilizes RESTful endpoints to facilitate interaction between the application and the chatbot service [6].

Users interact with the chatbot feature through a messaging interface within the application.

They can type messages or input queries related to mental health, well-being, or any other relevant topics.

The chatbot processes user inputs using NLP techniques to understand the intent behind the messages and formulate appropriate responses.

Responses generated by the chatbot are displayed to the user within the messaging interface, providing guidance, support, or information based on the user's queries.

The API-based integration enables seamless communication between the application and the chatbot service, ensuring reliability, scalability, and flexibility.

6.1 System Architecture

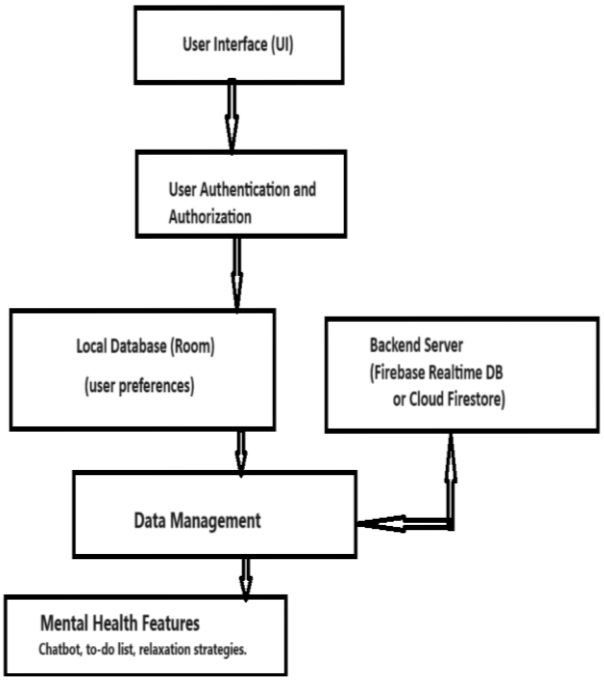


Fig-6.1: System Architecture

1.User Interface (UI):

Android Application using Java for a user-friendly and responsive interface.

2. User Authentication and Authorization:

Secure user login with email/password or social media integration.
Implements strong password hashing and data encryption to safeguard user privacy.
Token-based authentication for secure access to app functionalities.

3. Data Management:

Utilize a local database (Room) for storing user preferences and basic app data.
Integrate with a secure backend server (Firebase Realtime Database) for storing sensitive user data like moods, journaling entries, etc.
Ensure data encryption at rest and in transit.

4. Mental Health Features:

Chatbot: A user friendly virtual assistant.
To-do List: Help users stay organized, track their progress, and maintain consistency
Meditation and relaxation techniques: Integrate guided meditations and breathing exercises to promote relaxation and mindfulness.

6.2 System Flow

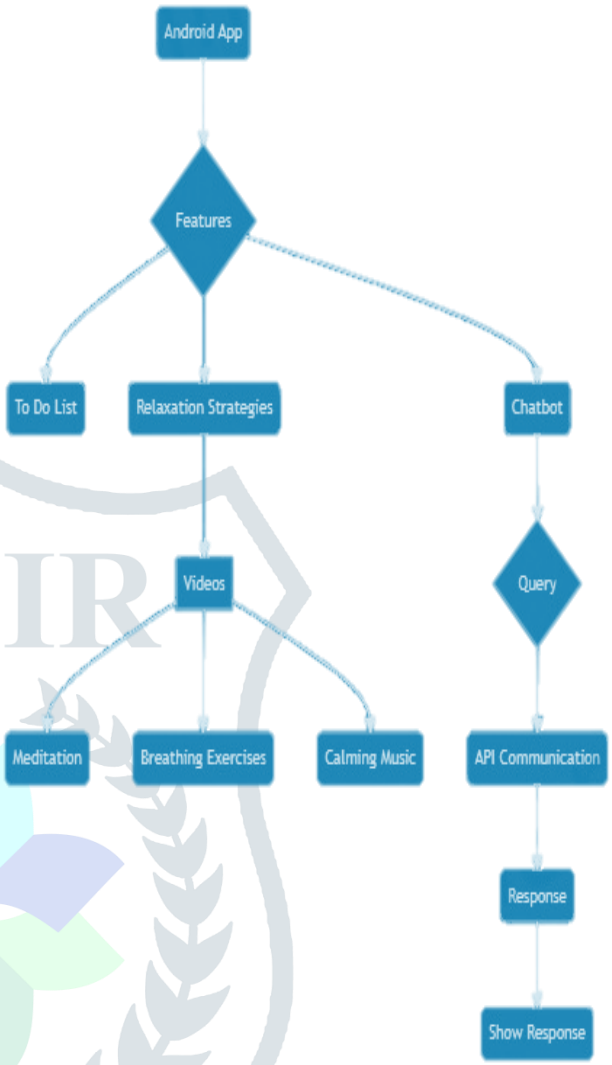


Fig-6.2: System Flow

The given figure 6.2 represents the flow of system and it tells how the Application and its features work. After the screen is launched user is provided with three features that is Chatbot, Relaxation Strategies and To-do list. In Chatbot, the query is provided at the User Interface by the user which is then processed and the response is fetched through the API and then the response is showcased at the User Interface.

7. RESULTS

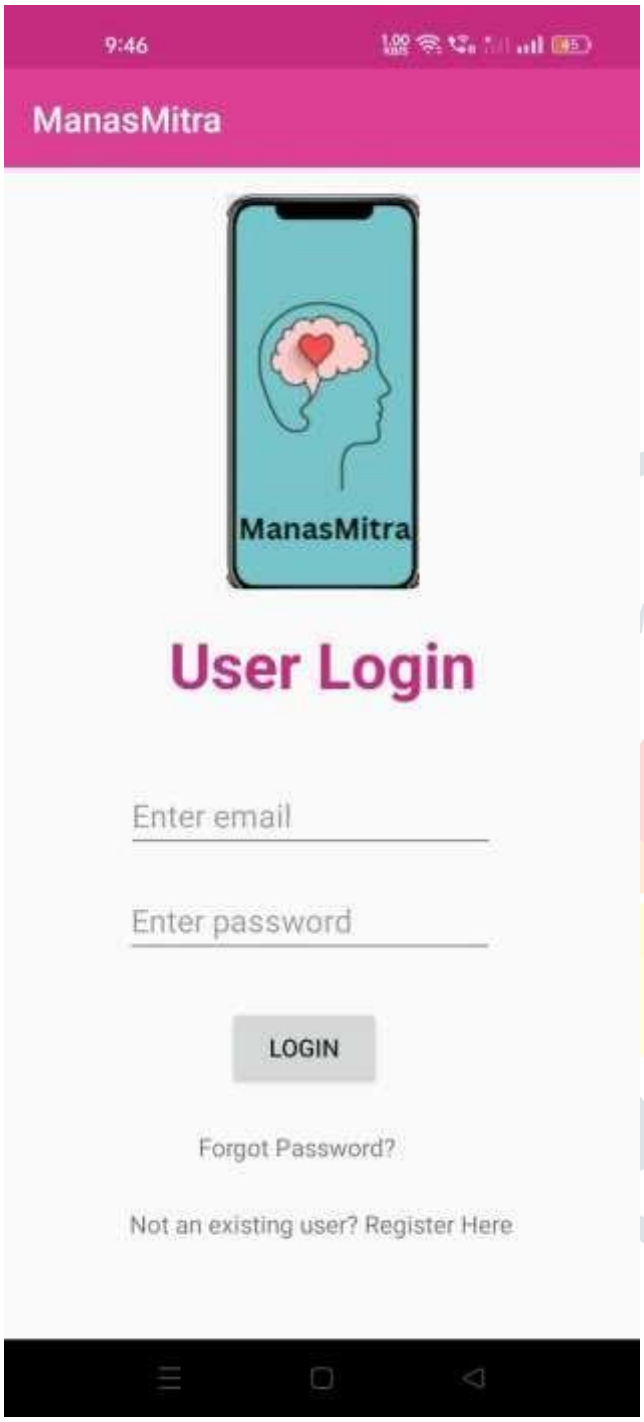


Fig-7.1: Log In page

Fig-7.2: Profile Page

Fig-7.3: Chatbot Page

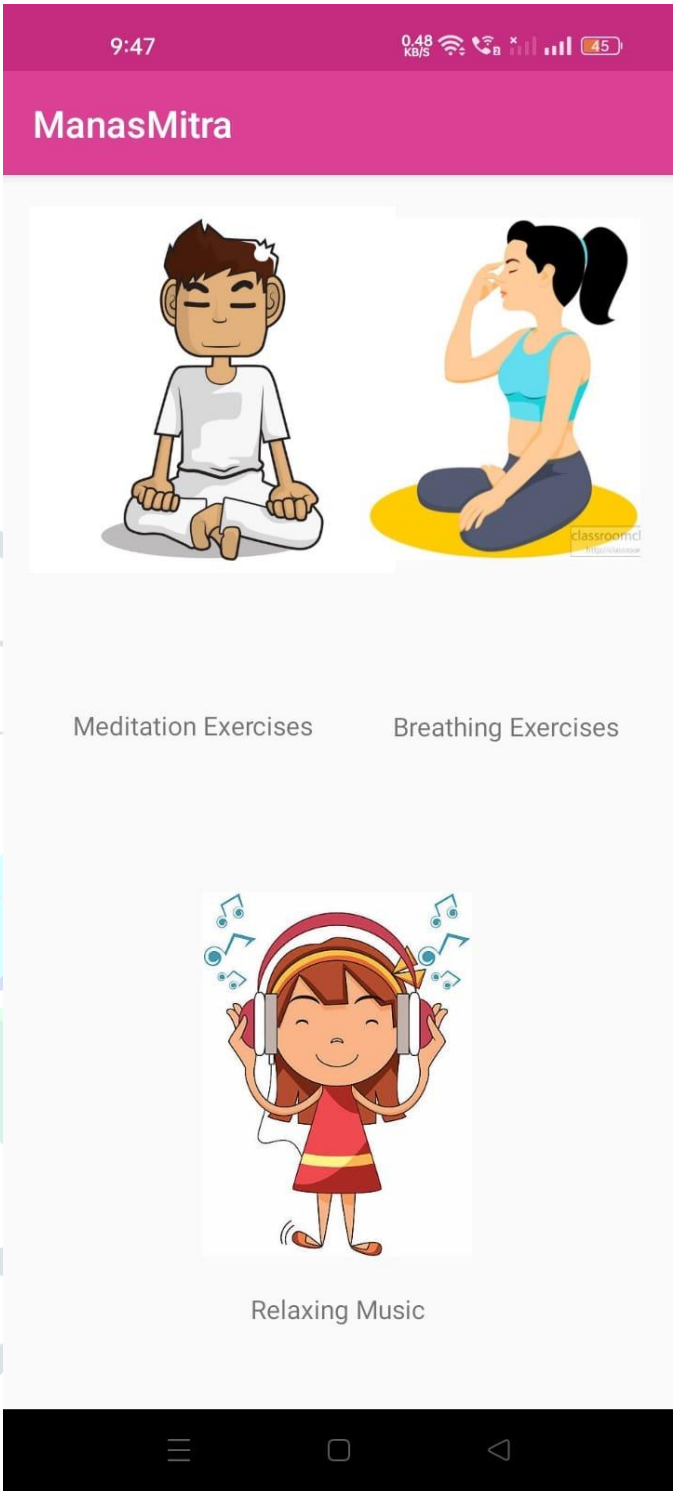
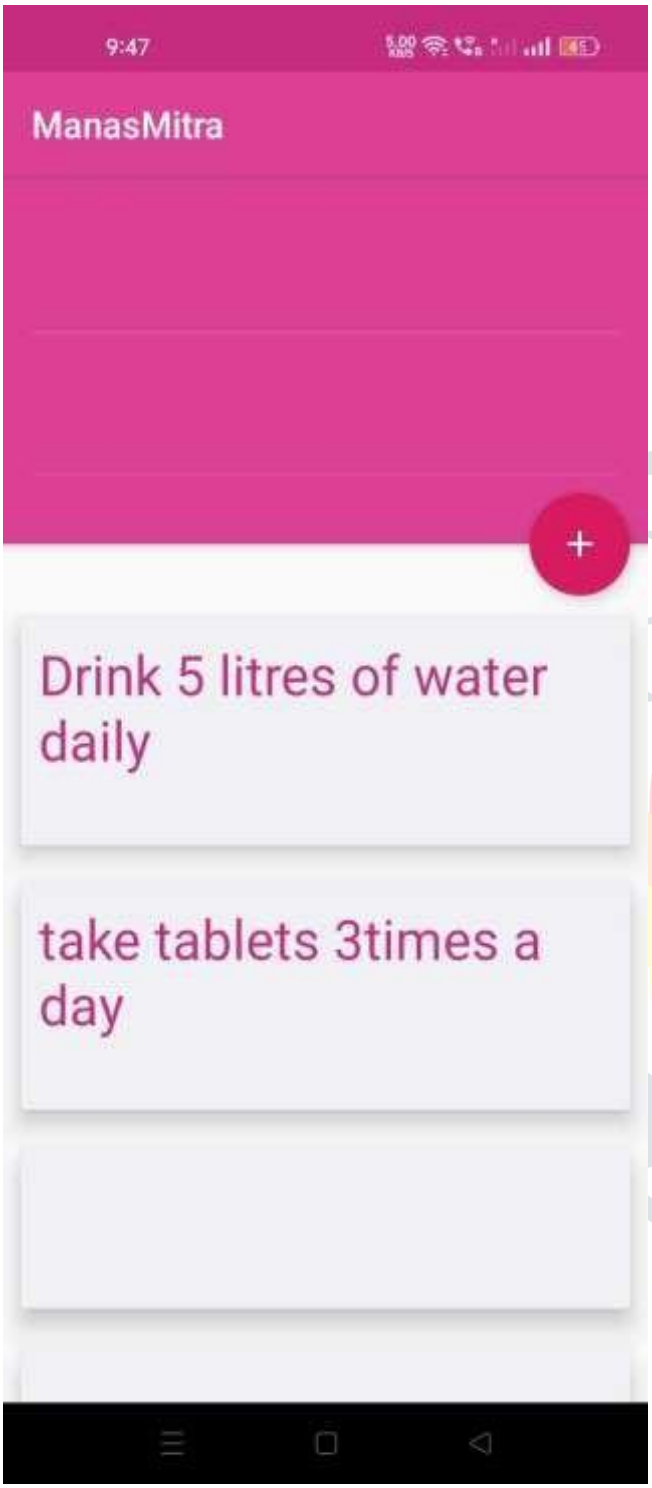


Fig-7.4: Relaxation Strategies Page

Fig-7.5: To-do List Page



8. FUTURE SCOPE

The future scope for the ManasMitra Mental Health Android App holds immense potential for further enhancing user experience and mental well-being support. By integration of wearable devices, such as fitness trackers or biosensors, with mental health apps to collect real-time physiological data for personalized interventions and outcome monitoring. Explore the potential of VR and AR technologies in enhancing the delivery of evidence-based interventions, exposure therapy, relaxation techniques, and immersive environments for stress reduction and anxiety management. Investigate the cultural adaptation of mental health apps to diverse populations, including linguistic translation, cultural tailoring of content, and consideration of cultural beliefs and norms in app design. Investigate methods to personalize app content and interventions based on user preferences, behaviors, and clinical needs. Explore adaptive algorithms that dynamically adjust app features to match users' changing mental health states. With ongoing updates and improvements, the app has the opportunity to become a trusted companion for individuals seeking to prioritize and improve their mental health in today's digital age.

9. CONCLUSION

The ManasMitra Mental Health Android App represents a significant step forward in promoting mental well-being and offering accessible support tools to users. Through the integration of various features such as a chatbot, to-do list, and relaxation strategies, the app provides a comprehensive platform for users to manage their mental health effectively.

Overall, the Mental Health Android App serves as a valuable tool for users seeking to prioritize their mental health and well-being in today's fast-paced world. Through its innovative features and user-centric design, the app empowers individuals to take proactive steps towards achieving a healthier and more balanced lifestyle.

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