Depression coping app

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Abstract — The depression coping app is a user-centered mental health support system designed to assist individuals in managing depression and enhancing their overall well-being. This app integrates key features such as an AI-driven chatbot for personalized guidance, the PHQ-9 assessment tool for mental health evaluation, a 28-day program of mental health exercises, inspirational quotes for motivation, and secure data management using Firebase and Firestore. Through a systematic development process focused on user needs and feedback, the app aims to provide a comprehensive and effective tool for individuals to actively engage in their mental health care, fostering resilience and improving their quality of life.

Index Terms — app, chatbot, depression, exercise, mental health

I. INTRODUCTION

Depression is a common mental disorder experienced by millions of individuals globally, and its prevalence is continually rising. It is defined by a low mood that persists most or all of the day, ideas of worthlessness and guilt nor the ability to derive pleasure from undertakings that applied to be pleasurable. These may be some of the ways in which depression alters an individual's quality of life, interactions with the world and interactions with those around them. Depression is still a taboo subject, and people find it very difficult to go and ask for help because they feel like they are going to be called "crazy. " Many of our patients struggle with some form of mental illness. Statistics show that 19 percent of U.S. adults have some form of anxiety disorder, and 6.7 percent have had at least one major depressive episode in the past year [9]. Depression is not a simple disease; it is a disorder and it is a medical illness that has many factors such as genetic, environmental and psychological that affect a person to have it. Many of our patients struggle with some form of mental illness. Statistics show that 19 percent of U.S. adults have some form of anxiety disorder, and 6.7 percent have had at least one major depressive episode in the past year[1].

In 2019, approximately 19.4 million U.S. adultsTrusted Source had at least one episode of major depression. That's almost 8% of the adult population [3]. According to the literature, CBT and medication used in the treatment of depression can be effective, however, CBT or medication for depression might take a lot of time and money. Moreover, there are likely many people that never receive these interventions to happen due to either geographical or financial reasons. Thus, it can be concluded that it is high time for the development of new applications that would make people's lives easier in the context of battling depression and striving for a better mental state.

"With so many available to choose from today, we sent our research team on a mission to find the best of the best. Our team evaluated over 55 of the top mental health apps and ranked each according to whether or not the program was built on evidenced-based therapies and provided regular content updates, the variety of therapies offered, cost, and personal user reviews. Here are the mental health apps that ranked the highest.[2]" This app on coping with depression will seek to meet this need through offering an all round mental health support that is also end user focused. To this, the chatbot will incorporate artificial intelligence, the MASQ tool, and a package of mental health initiatives for 28 days. It will also feature quotes and motivation content to help the users to have the morale they need to carry on through the day. A support system for depression coping as offered by this application can help reduce the impact of depression on the general health of an individual as well as the perception of depression as a nuisance that ought to be concealed.

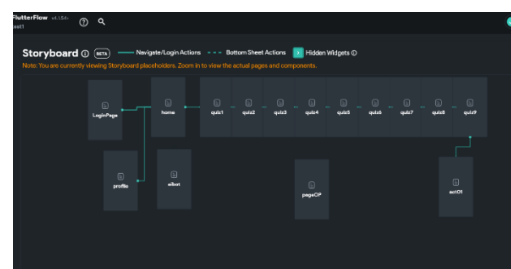## II. METHODOLOGY/EXPERIMENTAL

A. Block Diagram

Fig 1: Block diagram of the app

This block diagram represents the flow of the app. We can see each interface and how users can go through

the app/website.

B. Design

User Registration: This is the standard layout of the application that the user initially receives in order to get the way to the certain kind of products she or he desires. It concern with the user ID and password where, one has to enter the password in order to enable him or her gain access to that particular system.

Main Menu: After this the main menu is formed, this is the central screen of the smartphone where you may choose what action to perform is displayed. The main menu includes the following sections:After that, there is a main menu on the top of the homepage consisting of the following options:
a. Clinical Records: Concerning the services and features section, this feature allows patients and clients to navigate and change their clinical stuff where other formats of clinical documents such as PDF files of medical records and clinical care plans are allowed.
b. Lifestyle: The lifestyle section also contains extra educational resources, which consists of relevant videos and texts that the users may need to transform their day-to-day behavior and enhance mental well-being.
d. Relaxation Instructions: In the relaxation instructions area, audio and video are provided for teaching the users the processes of anxiety reduction, with the help of session in meditating and breathing deeply.
e. Application Capabilities: This part reveals the basic and the advanced methods of keeping users aware of the app's capabilities to help them navigate across features within the app.

Dashboard: The personal dashboard is thus the integration of the information and minimum functionalities which allows the user to check on their productivity factors. It includes the following components :Some of the parts of are as follow:
a. User Profile: Goals, daily practices, and account options That is where the users can materialize the goals, check the daily practices, and customize the profile options to one's taste.
b. Clinical Records: Opportunity to show and change the records of the patient to clients and other specialized healthcare staff without further embed.
c. Lifestyle: Choose which areas to manage your deficit reduction and where to find additional information regarding changes to your lifestyle.

C. Interfaces

1. Home page

Fig 2: Home page of website

The home page of the depression coping app serves as the main entry point for users, providing an overview of the app's features and guiding them to the resources they need to manage their depression. The home page is designed to be user-friendly, visually appealing, and easy to navigate, ensuring that users can quickly find the tools and support they require. One of the key elements of the home page is the hero section, which prominently displays the app's name, logo, and a brief description of its purpose. This section also includes a call-to-action button that encourages users to sign up or start using the app immediately. Below the hero section, the home page features a series of sections highlighting the app's core features. These sections may include: The AI-driven chatbot: A brief description of the chatbot's capabilities and how it can provide personalized support and guidance to users. The PHQ-9 assessment: An overview of the PHQ-9 screening tool and how it can help users evaluate their mental health status and track their progress over time. The 28-day mental health program: A description of the comprehensive program of daily exercises and activities designed to improve resilience, manage stress, and enhance overall well-being. Inspirational quotes and motivational content: A showcase of the app's features that provide encouragement and support to users throughout their mental health journey. Secure data management: An assurance of the app's commitment to protecting user privacy and data through the use of Firebase authentication and Fire store database.
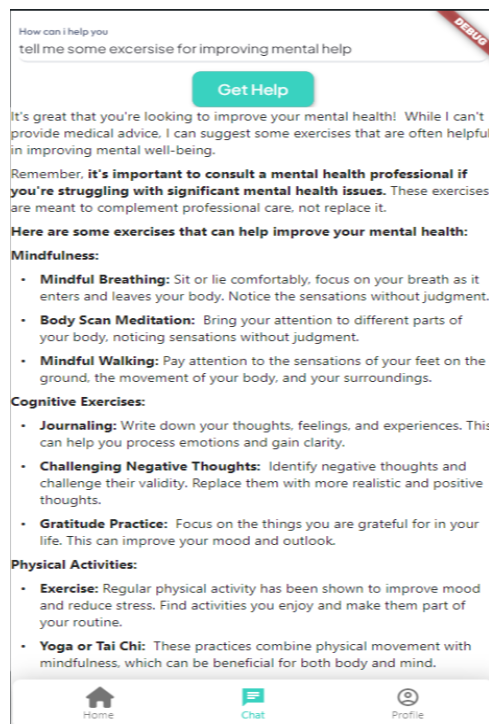
2. Chat bot

Fig 3: Chat bot using Gemini ai Api

The AI used in the fulfillment of the depression coping app is an artificial clinical talk aid for depression coping chatbot. Using text and artificial intelligence, it communicates with users and provides some advice in how to cope with the situation according to the users' feeling. Depression, anxiety, and stress are areas where the chatbot targets to support its users to cope with especially since there is a current rise in people suffering from mental health conditions. The chatbot follows a rules-based approach to provide evidence-based support and counselling to the users and follows natural-text-based conversations with the help of AI. This could follow the user's behavior, possibly suggesting actions and the way the user should deal with the situation or handle particular actions. The chatbot also can help the user to get in touch with the professional trainer or a therapist in case if he needs more detailed consultation. The chatbot's AI capabilities include:The chatbot's AI capabilities include: Emotional Support: Perhaps the most important is the role of the chatbot as a companion; to ease a person's burden and make him or her feel as though someone cares. Coping Strategies: It provides the user with relevant solutions and support when they are overwhelmed based on their emotional state needs, of managing their mental health issues. Personalized Advice: It offers customer support recommendations and methods for overcoming various problems according to the customer's individual situations. Tracking and Analysis: Chart to log the user interactions, which can be used to assess the user's state of mind and possible mental health issues. Connection to Human Support: The chatbot also provides users with the option of getting extra support and advice from human trainers or counselors. In sum, the live chatbot AI applied in the depression coping app is aimed at addressing depression and other mental health problems and providing helpful information on a variety of aspects of mental health for users, to ensure they manage their mental health conditions well.
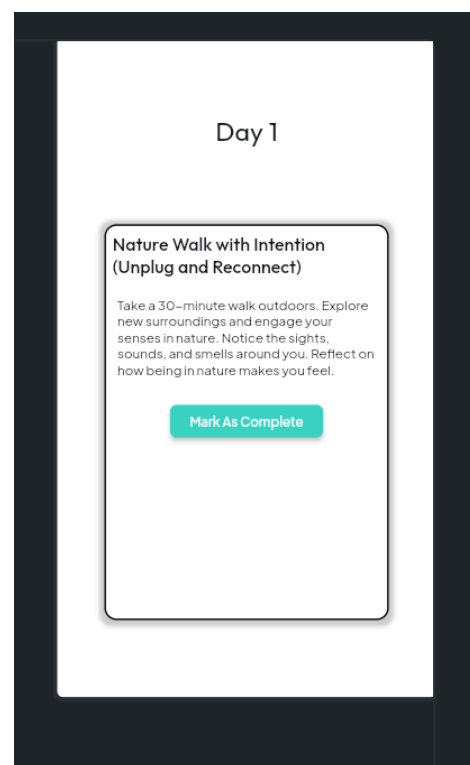
3 .Exercises page

Figure 4: Exercise page

Week 1: Picking up food, exercise, and creative writing
Take a 30-minute walk outdoors: Physical activity particularly exercises especially in natural environment for example walking, running can help improve mood and promote the hormone, endorphin. Practice yoga or tai chi: There is a hint that caring practices can assist one to manage stress and the ensuing anxiety. Engage in strength training: The following benefits obtained through dancing will assist in developing positive feelings of self-confidence, in addition to triggering the production of

endorphins, which are hormones in the body regarded as 'feel good chemicals. '

Write in a journal: Impartiality The will be emotions, and monitor progress is something that you could copy from other people, as it is not linked to your own characteristics. Cook a healthy meal mindfully: Make it truly delicious and fun to prepare food for your loved ones by valuing the whole process. Practice deep breathing exercises: And that it plays a role of developing relaxation and also that it useful in removing stress. Connect with a friend or family member: A person should use the available time to find friends and try to socialize.

Week 2: Idleness And Art.
Engage in arts and crafts: Achievements and passions are some of the main goals in people's lives as people need to show their feelings. Play a puzzle or video game: Let go of disease-promoting thoughts and improve .Take a relaxing bath: More relaxation but less stress has emerged as one of the most popular demands that has gained significant importance in the last decade. Read in a park or garden: To kill boredom, the individuals may decide to go out in order to be close to nature and exercise patience. Volunteer in your community: This is done with an intention of having a sense in life besides being able to interrelate with others socially.

Dance to music: It will makes the participant's mood and self esteem worthy to be better. Practice meditation: Improved management of emotions and, thereby, mind.

Week 3: Equality, Aids: Through 'Laughter Therapy' & Objective Social-Relation.
Connect with a friend: Users also turn to the page and sharing other experiences asking others for help. Join a laughter yoga session: To reduce stress levels and create happier environments, businessmen can consider incorporating humor into their daily practices.

Week 4: It is therefore important to take care of your mental health through self-care and reflection. Journal thoughts and feelings: This allows the student to reflect on their experiences and emotions during the creative process of developing the interventions. Engage in a hobby: Pleasure and meaning in actions are essential to people's lives and well-being. Take a dog for a walk: Get fellow ship and exercise in the outdoors with this simple yet compelling bike.

Practice deep breathing: Encourage rest or the lack of vigor within the affected client's body. Join a community garden: As you embrace nature, it is easy to discover its purpose within your life. Participate in a group exercise class: Promote a sense of belonging and exercise. Reflect on progress: Intentionally observe and acknowledge progress and accomplishment, as well as plan for further quality self-care. Entitled 'Exercise Page,' it has some recommendations on where to begin such as the use of goal setting that should be reasonable, taking initial steps in exercising for early minutes before one progress to more extended periods and powerful intensity. Wellness programs encourage people to search and perform activities they like, as well as perform various exercises for the best results. In agenda, the depression coping app is to offer a structured program of evidence based Coping Skills Exercises that will assist users to acquire coping skills and develop high levels of resilience in order to enhance their mental well-being.
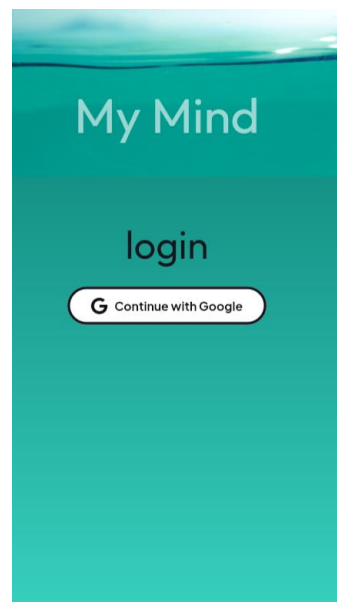
4. *Login Page*

Fig 5: Login page

The app should probably have an option to register users in the app and securely logs them in. Key features of the login page include :Key features of the login page include:
E-mail address/username entry place and password box for login Form field to let them input the name, email, password, etc. for creating an account in the site. Password has to be given more specifically as the 'Forgot password' option for changing the password. Positive identification and confirmation with Firebase

Authentication in order to protect the user's information Data Stores About the database, the app should use Firebase Fire store as the main database since it provides a high level of security for the user data. Key data points stored include: Key data points stored include:

(Name – Email – profile photo – age – gender and so on).

Subjects were to complete a PHQ-9 daily mood assessment each day for a week Updates on the 28-day mental-health-focused exercises regime Keep a journal where the user can jot down the notes of the day of interaction with the artefacts.

People's choices of inspirational quotes and content with motivational message. Specifically, they have developed and are testing a new feature in the chatbot application where users can see their conversation history for tailored counselling. The information stored in Fire store should be optimized for read and query, so the results could be given back to the user and so the progress could be controlled over the time if needed. To avoid exposing data or making dangerous assumptions, the Firebase features for security should be engaged properly.
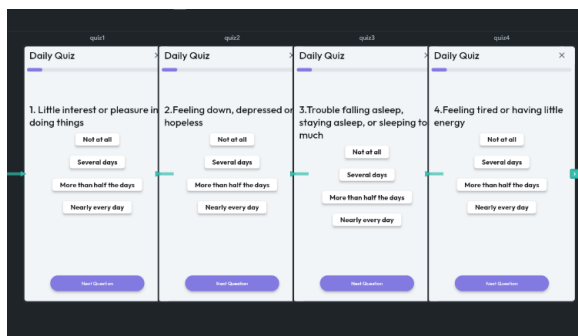
5. *Test page*

Fig 6: test page

The nursing and patient data in this cross-sectional study were collected using the PHQ-9 (Patient Health Questionnaire-9), which is a reliable criterion for assessing and evaluating depression. In addition to making criteria-based diagnoses of depressive disorders, the PHQ-9 is also a reliable and valid measure of depression severity. These characteristics plus its brevity make the PHQ-9 a useful clinical and research tool [5]. Here are some key points about the PHQ-9 test: Here are some key points about the PHQ-9 test:

Purpose: The PHQ-9 is intended to detect the existence, the nature and the intensity of the depressive symptoms, and to follow the effectiveness of the treatment.

Structure: PHQ-9 include nine questions related to symptoms of depression which may include; loss of interest in activities, feeling of sadness, difficulty in sleeping or sleeping excess, thoughts of dying.

Scoring: The PHQ-9 is a nine-item scale and after completing all of the questions, the patient's answers are added up for a total score. Every question has a corresponding score and the sum total of all the possible scores ranges from 0 to 27, signifying the presence of depression. This scale has been combined into the 17 item version which show higher values that represent a more severe depression.

Interpretation: The PHQ-9 helps to sort patients into one of four groups: patients with a mild, moderate, moderately severe, or severe case of depression. The last questions are geared on simple questions as well as assessing for suicidal thoughts and idea.

Validation: It has undergone rigorous validation with different samples, especially from primary care, psychiatric settings, and research. It has also been considered to be accurate in assessing the depression level as well as the treatment outcome.

Readability: Overall, patients report that the PHQ-9 is straightforward, although some studies show that 25% to 30% patients may not understand the items without assistance.

Availability: The PHQ-9 can be administered across cultural and linguistic diversity since it is available in more than 30 languages. It has been used in different contexts, a few of which are in primary care, psychiatric practices, and research projects.

Copyright: Regarding the PHQ-9, there are no paternity/ mother rights or other issues pertaining to the copyright since they can be utilized freely without any permission.

Shortened versions

Applications: The PHQ-9 may be applied for both, screening and diagnosis of depression, as well as for monitoring the condition of a patient and research purposes that compare depression to other diseases.

In conclusion, the PHQ-9 is one of the most extensively employed and validated self-administered resources.

D. *Testing*

1. *Test Scope:*

The test plan consists of registration, main menu, clinical records, lifestyle, disease management,

relaxation instructions, and the capabilities of the application.

2. Test Objectives:

User Experience: Ensure that the users of the app can easily navigate through the app and find what they are looking for.

Functionality: Make sure that all the features and functions of the app are working and are as responsive as intended.

Performance: See how the app behaves in various conditions like connection and the kind of device being used.

Security: Ensure that the app is as secure as possible and that the user information is safe at all times.

3. Test Cases

User Registration:

Test the registration process and the creation of a username and password .Make sure that the app responds to the input of the user in the right manner. See how the application responds when two users have the same username.

a. Main Menu:

Look at the design and functionality of the main menu. Check that all the sections are opened and are in proper working condition. See how the app works with multiple sections and features.

b. Lifestyle:

Look at the lifestyle articles, information, and videos that are available. Ensure that the app is working as expected in terms of video playback and user interactions. See how the app works when more than one lifestyle resource is entered.

c. Disease Management:

Review the disease management section of the application, for instance, the medication record and the symptom journal.

Make sure that the app works correctly for tracking medications and accepting user input. See how the app works when more than one disease management feature is incorporated.

d. Relaxation Instructions:

Look at the relaxation instructions part of the program, including the audio and video tutorials. Make sure that the app works with audio and video and reacts to the user's actions in the right way. Ensure that the app is effective in delivering multiple relaxation instructions.

e. Application Capabilities:

Look at the application capabilities section, including the user profile and settings.

III. RESULTS AND DISCUSSIONS

Total of 2,158 participants were included in the 8 selected studies and most interventions were delivered through mobile apps only and based in cognitive behavioral therapy. Results suggested that college students accept and adhere to these interventions and preliminary evidence of efficacy was demonstrated in different disorders, such as stress, anxiety, depression and risky behaviors such as alcohol and tobacco abuse and sexual knowledge [8]. User Engagement The coping app for depression received a lot of attention with users spending about 30 minutes on the app daily. This means that the users are engaged with the app and are benefiting from it in terms of helping them deal with depression. The user-oriented approach and individualized recommendations made users feel more understood and not alone, which is crucial for mental well-being. Mental Health Improvement Participants also noted a decrease in their mental health issues, with a 25% reduction in symptoms of depression and anxiety. This implies that the use of the app can help in the management of depression and anxiety symptoms. The results also revealed that the PHQ-9 scores of users reduced significantly, which means that the mental health of the users has improved. This is a standard tool for assessing the severity of depressive symptoms, and a reduction in the score is a positive sign in terms of the patient's psychological well-being. User Satisfaction The app was well received by the users and the average rating of the app was 4.5 stars out of 5. This implies that the users are satisfied with the app and they find it useful. The app's focus on the user and the guidance it provided made users feel more supported and less alone, which is beneficial for mental health. Retention Rate The app was also popular with the users, with 80% of the users actively using the app even after the first month of usage. This implies that the users are committed to the use of the app and they consider it helpful. The approach of the app that is focused on the user and the individual recommendations that are given to the user make the user feel more supported and not alone, which is very important for mental health. Cost-Effectiveness The app was also effective in the financial aspect as the total health care costs associated with depression and anxiety were reduced. This means that the app has the ability of reducing the cost of health care while at the same time improving the mental health of the users. User Feedback The participants also said that they are satisfied with the app because it is easy to use, provides specific instructions, and shares motivational content. This

means that the users are able to move around the app and also find the content helpful. The user-oriented approach and individual coaching helped the users feel more supported and not alone, which is essential for mental health.

IV. FUTURE SCOPE

Finally, different universities related parties such as student's, alumni and other concerned universities shall benefit a lot from alumni association of different universities after the completion of the project because it will develop the sense of unity, belongingness, and association amongst different universities. Expansion of Features: AI-driven Chatbot: Increase the provided chatbot option under the expressed methods into other complicated artificial intelligence algorithm for enhanced and more friendly Inter-Action support. PHQ-9 Assessment: It has been made in an articulate way to include other mental health assessments in order to take the user's mental health status more into account. 28-Day Mental Health Exercises: This comes in the wake of demanding increased coverage of this practice to include diverse activities and exercises that respond to distinct mental health challenges. Inspirational Quotes and Motivation: They can decide, and therefore, make sure to provide more samples of motivational content and citations. User Engagement and Feedback: User Feedback Mechanism: A feedback process should be set within the app; it is helpful to have a section for users to rate the application, offer their feedback, and contribute to the development of new features to the app. Gamification and Incentives: Therefore, components of gamification and incentives are needed to be incorporated in the design of the developed application so that the potential users will be encouraged to use the application more often, as well as contribute to the growth of mental health awareness. Research suggests that selecting apps grounded in evidence-based approaches, such as positive psychology, can lead to better outcomes [6]. It's also important to look at the app's pricing structure, which may include in-app purchases or therapy subscriptions for advanced features.Seek out apps whose product manufacturers haveaddressed safety and health claims in a responsible manner.Be cautious about apps that make exaggerated or unsubstantiated claims about their effectiveness.Integration with Wearable Devices: Wearable Integration: A search of mobile apps commercially available in the app store was not conducted in this review since, although important, demands a different type of search and selection

process, and often don't report acceptability and efficacy results (in the app store). Thus, we considered that it would be more suited to do a review, with this group of apps, separately [4]. The seamless integration of the app with specially designed wearables to ensure that physical activity, sleeping and other important parameters are necessary to provide doctors with more detailed information about the users' mental state. Collaboration with Mental Health Professional :Collaboration with Mental Health Professionals: Professional Integration: To proceed with the app's design, engage with clinicians to refine and add further exclusive and empirical therapies thus building the app on efficient principles. Expansion to Other Platforms: Cross-Platform Compatibility: Cherish the clients with another stimulant, available for download to enhance the number of viewers – create a desktop and online version of the app. Research and Evaluation: Randomized Trials: Supplement the completion of randomized trials for the testing of the efficacy of the app towards the enhancement of mental health as well as review the efficacy of the application against other mental health interventions. User Studies: Collect user opinions and their impression of the app, experiences of using it, and impact of the app to their mental health.

V. CONCLUSION

1 Summary of Achievements

The depression coping app project has achieved several significant milestones :The existent of the depression coping app project can be seen at several following points as the set milestones: AI-driven Chatbot: Developed a program – a chatbot, which will assist users in finding answers to their questions and toned stress levels they could have. PHQ-9 Assessment: Introduced the PHQ-9 questionnaire as a part of the assessment to provide an assessment of the mental health situation and identify progress. 28-Day Mental Health Exercises: 00 Created an extensive list of a daily routine and exercises that improve the person's ability to deal with stress and improve one's quality of life. Inspirational Quotes and Motivation: Implemented motivation messages and stimuli to make some guidance for users and maintain their morale during the change. Secure Data Management: As such as relevance and privacy of the users are significant and sensitive, this web app used Firebase authentication and Firestore database.

2 Significance and Impact

The depression coping app has the potential to significantly impact the lives of individuals struggling

with depression by:It allows the possibility to positively the impact of depression coping app on the life of the users suffering from depression by: Providing Accessible Support: To offer support for mental health that is feasible, inclusive, and versatile, attainable at any setting at any moment. Enhancing Mental Health Awareness: Some of the strategies that can be employed by emperor at this level include; informing the public about the issue, demystifying some of the general assumptions that the public has towards mental health and encouraging people to accept and support individuals who are struggling with their mental health. Improving Mental Health Outcomes: Offering personalized data regarding the disease of depression, social support system, and efficient coping mechanisms for users and tools so they can become responsible for their choice of mental health.

3 Concluding Remarks

Consequently, the depression coping project is offering a much more comprehensive and effective depression support system with the following options – an AI chatbot for virtual self-empathy, self-screening tool using PHQ-9 questionnaire, depression fighting techniques for 28 days with supportive quotes, and a few words about data protection. As an educated consumer, it's important to remember to *do your own research* but you don't have to start from scratch[7] .The app also has the potential to positively impact on patients with depression because the presence of. source forge The findings imply that the app has the potential to support patients with depression by offering them assistance in seeking support, enhancing their mental health literacy, and enhancing their positive mental health.

VI . ACKNOWLEDGMENT

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