

MITRA: Depression Fighting Chatbot

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ABSTRACT

Depression is a widely discussed topic of the decade. But, the groundwork is left to psychologists alone. People employed in this profession have seen a regular increase over the years but the rates of suicide have seen an alarming growth. There's a gap that exists between the two ends. If not attended firmly, this issue can take a catastrophic form. So, to tackle this issue, we propose an intelligent chatbot that can help the person in need by understanding their emotions and providing solutions accordingly.

Keywords: - Depression, psychologists, chatbot, emotions.

1. INTRODUCTION

Major depression is a disabling disorder with symptoms such as feelings of sadness, worthlessness, and losing interest in activities. Depression is the single largest contributor to the global disability with an estimated 300 million or approximately 4.4% of the world's population (2015) affected by it [1]. Severe depression can lead to suicide, which was the second leading cause of death among people aged 15 to 29 years globally in 2015 [1]. Suicide due to depression has become the second leading cause of death in 15-29-year-olds. Between 76% and 85% of people in low- and middle-income countries receive no treatment for their disorder. Barriers to effective care include a lack of resources, lack of trained healthcare providers, and social stigma associated with mental disorders. The WHO Mental Health Atlas 2017 reported that there is a global median of 9 mental health workers including approximately 1 psychiatrist per 100,000 people [6]. In India, there are approximately 10 mental health professionals for 100,000 people affected by mental health problems [7].

2. PROPOSED SYSTEM

In the system, after login, the user is redirected to their dashboard wherein they have to take a few tests. Here the tests are based on Patient Health Questionnaire (PHQ-9) to categorize a person in one of the five categories A, B, C and D, E (A-normal, B-mild, C-moderate, D-dangerous, E-emergency). After doing so the person is assessed for any specific mental health disorder like post-traumatic stress, anxiety, etc. The result is stored in the database and a detailed report of the same is available on the Dashboard. Next is the chatbot interaction.

Here, for categories A, B, and C the interaction with the bot contains various types of therapies to help the person in need. After the chatbot session is over, the user can view scheduled sessions and their status. For categories D, E and expert consultation will be advised. As per them, the PHQ-9 test and behavioral test can be accessed again and the recovery percent can be calculated.

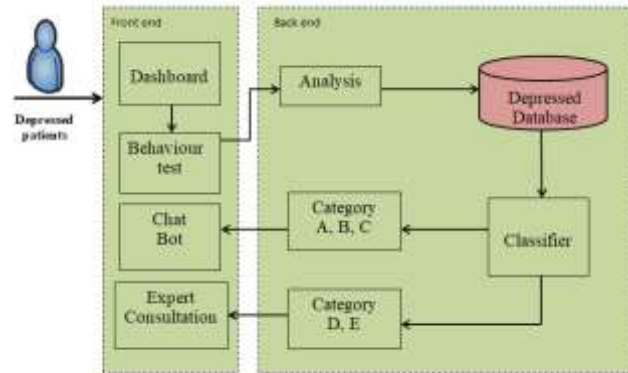


Fig -1:Proposed System

2.1 Login /Signup

The process is simple and interactive. Existing users can log in via their Username and Password. On successful login, they will be redirected to the dashboard. For new users, they can fill a SignUp form and can get registered. Once the registration is done, they can access the platform as an existing user

2.2 Tests

The tests that the users have to go through are divided into two parts. The first one assesses the user’s overall mental health by asking them to answer a few questions. These Questions are a part of the standard PHQ-9 test. This helps in categorizing the user into one of the five categories (A, B, C, D, E) based on the score calculated. The next test focuses on understanding a specific Mental Health Disorder that the user might have. This test is also a Multiple Choice Question(MCQ) test with every option containing a weightage. Based on the calculated score, the user's area of concern is narrowed down. The results of these tests are available in the Dashboard with proper visualization for making the result easily understandable.

2.3 ChatBot Interaction

Based on RASA NLU, the entity search module, a chatbot for depression handling therapy is built. In the MITRA chatbot, all interactions between the bot and users are through the WeChat window. First, the user sends a greeting message to the bot, and then RASA NLU abstracts entities from the messages. Then the bot gets users’ intent and responds properly according to the state machine. Intent refers to the intention that the user is expressing through his/ her message in natural language, and entities are the extracted pieces of structured information that would contribute to helping the chatbot to chart out well-reasoned actions. For example, If a user sends “I am feeling anxious” then RASA NLU abstracts intent as anxious and then the bot gives therapy for anxiety. Accordingly, depending on user intent the bot will perform further action.

2.4 Recovery Calculation

Users can access the everyday Schedule that they have to follow for completing their therapy. These sessions ask users to give the tests again. Based on their present score and previous scores the recovery rate is calculated.

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3. TECHNOLOGIES

3.1 Rasa

RASA is an open-source implementation for NLU and DIET models. It can interact with the database, API, conversational flow, interactive learning with a reinforcement Neural network. Rasa Conversational AI assistant is quite different than earlier traditional FAQ interactions as it is based on natural conversations means like how humans interact with each other by considering what earlier the context was sent and what actions are to be taken about the contexts and gracefully handling the unexpected conversation and driving the conversation when the user drifts from normal conversation path and also improve over time thus it's far beyond the FAQ Interactions. Rasa Conversational AI assistant normally consists of two components and they are Rasa NLU and Rasa Core. Rasa NLU can be just treated like an ear that is taking inputs from the user and Rasa Core is just like the brain which will take decisions based on user input.

1. The message from the end-user is fed to the Rasa NLU(Interpreter) whose output is structured output containing the original text, the intent, and entities if any, shown in Fig 2
2. The tracker maintains the conversation state and receives the structured output from the interpreter.
3. The output from the tracker is fed to the Policy, which acts on the current state of the tracker.
4. The policy decides which appropriate next action is to be performed.
5. The log of selected actions is maintained by a tracker.
6. The appropriate response is provided to the user, using intents defined in nlu.md, like utter_response

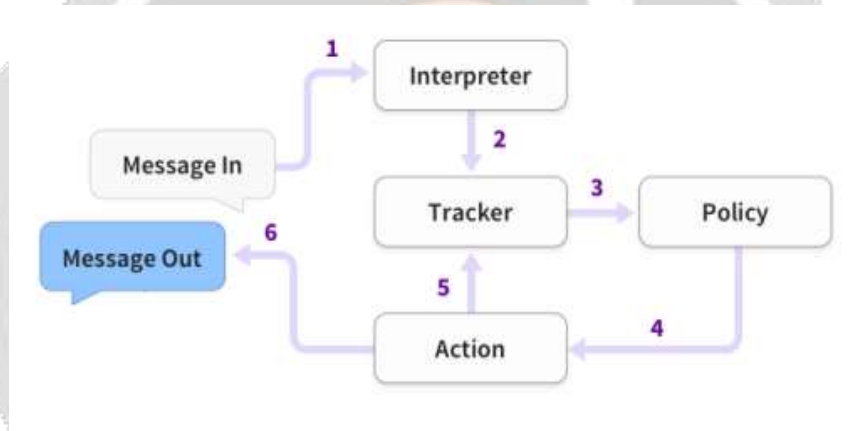


Fig -2 Rasa architecture flow chart

3.2 Django

Django is an excessive-level python web framework that encourages speedy development and easy, pragmatic design. Built by experienced developers, it takes care of much of the hassle of Web development, so you can focus on writing your app without needing to reinvent the wheel. It's free and open source.

The project is developed under the Django Python Web Framework. It encourages speedy development and clean, pragmatic design. The front quit of the undertaking has been made consumer-pleasant with efficient use of Html, CSS, and javascript. The back end has been coded in Python Programming Language. We without difficulty attain greater functions with fewer strains of code using python. Internet development with python is very popular because of its clarity and performance. Python is used for the development process taking the security issues in concern. Python is more secure than several widely used programming languages. Django further helps enterprises enhance the security of their websites and web applications by preventing various security attacks — cross-site scripting (XSS), cross-site request forgery (CSRF), SQL injection, and clickjacking. The web application is made to securely exchange data with the webserver by deploying the web application behind HTTPS. The security issues are resolved to prevent any unwanted attack on the database as well as the server.

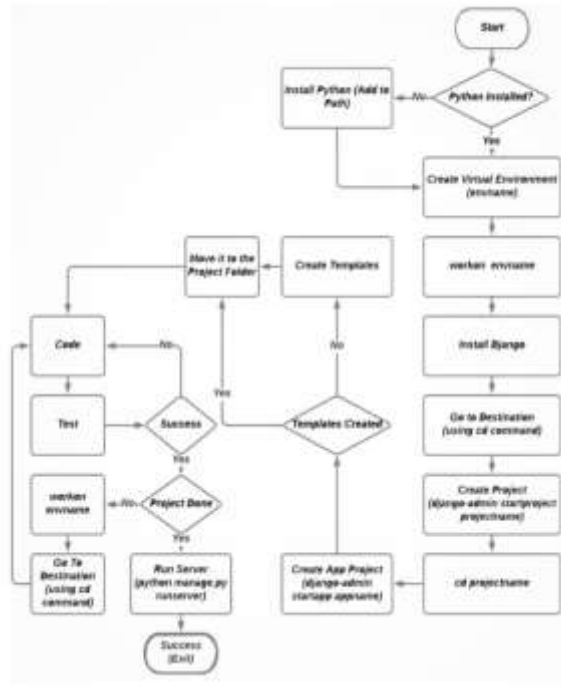


Fig -3:Flow chart of Django

4. RESULT

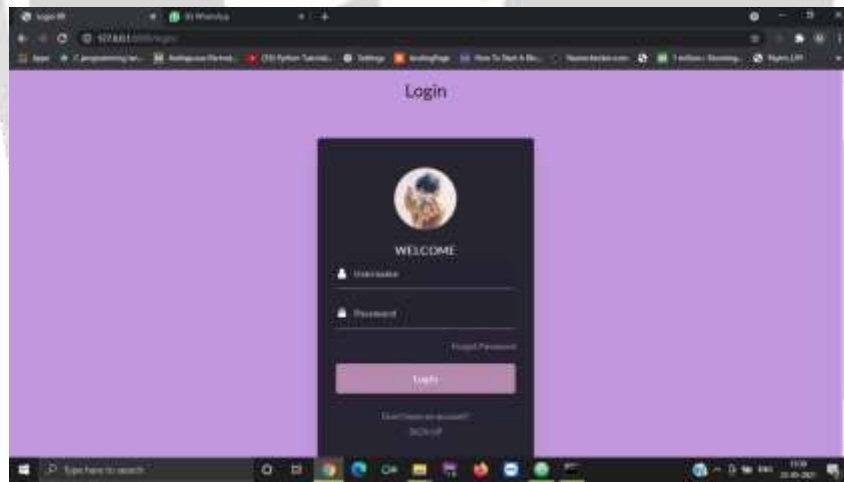


Fig -4: Sign-up page

Fig-4 shows the SignUp page. It asks the user for their basic details and to select a username, password for their account. These credentials will be required for log-in purposes.

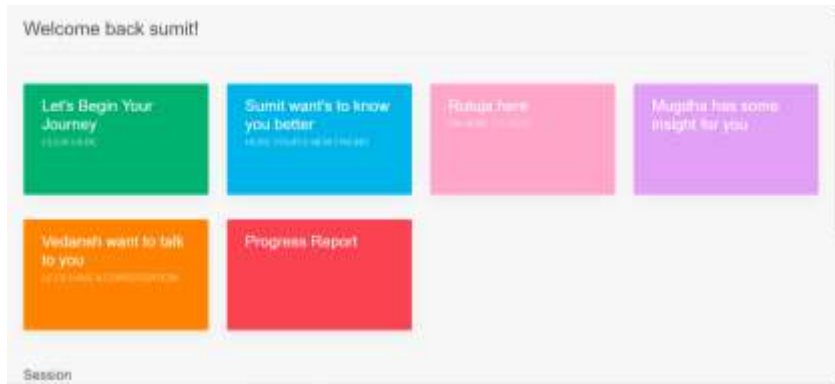


Fig -5:Personalized Dashboard

Fig-5 is the personalized dashboard that every user will have access to. They can have a detailed schedule for their planned sessions and can see the status for the same i.e completed or pending.

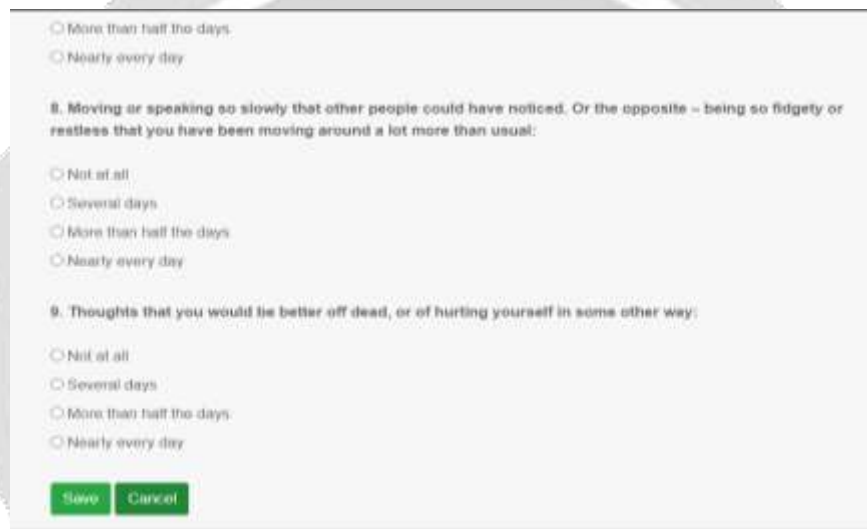


Fig -6:Behavioural Test

Fig-6 is the test that every user has to give so that they are categorized into one of the 5 categories A, B, C, D, E. These tests are MCQ, which consist of PHQ-9 and Behavioural tests. The scores are calculated based on the weighted option in every test.



Fig-7: Test results

Fig-7 shows the results from the tests. The user can access this so that they can understand their state of mind well and their concern can be narrowed down to a specific mental disorder.

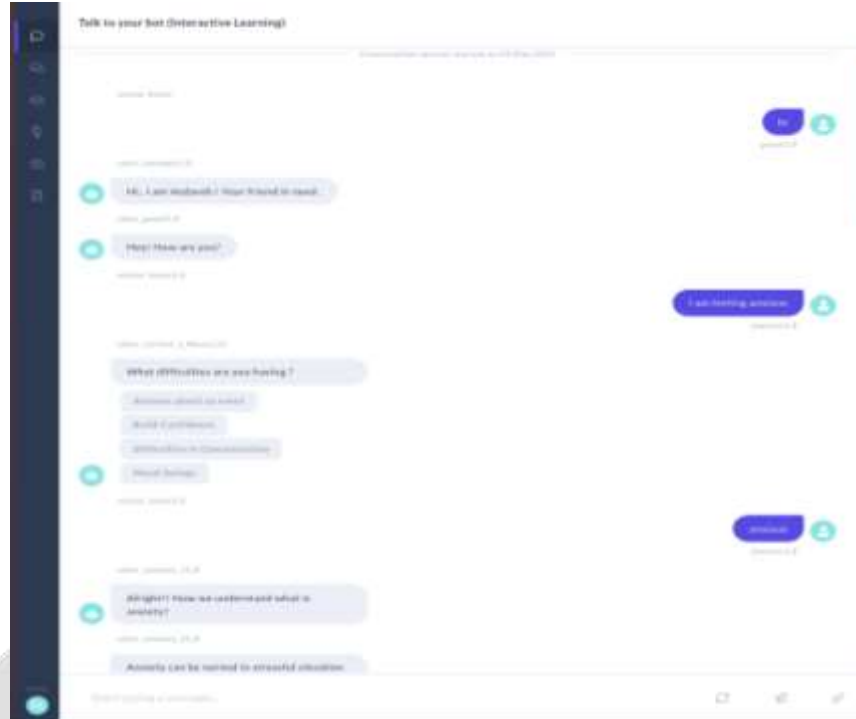


Fig -8: MITRA-chatbot

Fig-8 is the interaction of the chatbot with the user. To understand users' needs bot gives the user to choose from various options that define his current state of mind the best. Accordingly, it gives various therapies.

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5. ACKNOWLEDGEMENT

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6. CONCLUSION

Human speech and conversational style is a complex structure of words and emotions. Every word when expressed in different moments can convey a different meaning. Every user will have their state of mind, their input hence will be difficult to comprehend. Their emotions can provide extra insight into what they're going through. This also helps in deciding the therapies and making the schedule.

With this, we ask the user to start the conversation and then the bot starts with the therapy. To understand the user well, before interacting with the bot, the user gives some tests and that helps in determining the therapy for the particular user. The sessions are planned on similar grounds.

The future work would focus on understanding the emotion while conversing with users and providing therapies dynamically. We develop the bot so well that it will help in averting suicidal tendencies.

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