



Wellbot: A Companion And A Mental Health Chatbot For Emotional Wellbeing

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Abstract: Mental health is an important aspect of overall well-being in the world we live. Many people face emotional struggles and stress, but there is no easy way for help. WellBot, a companion, is designed to bridge the gap by offering a platform for users to engage in conversations about their mental state. WellBot uses cutting-edge Natural Language Processing and sentiment analysis techniques to identify the emotional tone of users' text inputs and respond with thoughtful and supportive messages. The main idea behind WellBot is to give users a safe place to express their feelings. If someone just needs anybody to talk to, WellBot will listen. It is the first step in to help users to reflect on their mental state and might guide them towards suitable resources. Instant responses to people who may feel isolated or uncomfortable seeking human help is provided by the chatbot. Machine learning improves WellBot's understanding of emotional words. WellBot uses sentiment analysis to understand subtle emotional cues within user inputs and tailor appropriate responses. The user experience is improved by making conversations feel more personal.

I. INTRODUCTION

Mental health issues like depression and anxiety, affect millions of people worldwide. However, many find it hard to access traditional therapy or support services. Wellbot tries to fill this gap by providing an AI-powered conversational assistant that gives users emotional support, useful resources, and guidance. Being digital tools, chatbots like Wellbot are scalable and hence easily accessible, which in turn makes them a very important resource in addressing the global mental health crisis.

1. Literature survey

a) **AI in Mental Health Support:** This study presents a text-based chatbot designed to foster meaningful interactions, potentially for mental health support or general assistance. The chatbot uses technologies like NLP and AI frameworks to deliver empathetic communication and tailored responses. The paper explores the methodology, user engagement strategies, and the chatbot's effectiveness in facilitating supportive conversations, contributing to the ongoing developments in AI-driven virtual companions.

b) **Sentiment Analysis in AI Companions –A Text Companion** by Chen, L. & Wang, Z.

This research is about a text chatbot. The paper outlines the architecture, features and user-centered design of WellBot by applying advanced artificial intelligence techniques. An important advancement in virtual companion technologies is marked by the experimental evaluations that show its capacity to engage in empathetic and context-sensitive conversations.

c) **Challenges in Developing Empathetic Chatbots** by Das, R. & Gupta, A. The paper introduces a text-based chatbot that could potentially be used in areas like mental health or general assistance. NLP and Artificial Intelligence frameworks are likely to be used in the system. The paper highlights the methodology, user engagement techniques, and the chatbot's effectiveness in providing supportive conversations, contributing to the progress of artificial intelligence-driven virtual companion technology.

d) **Mental Health Chatbots for Adolescents by Green, S. & Patterson, J.** This study presents WellBot, a text-based chatbot designed to engage users in meaningful and supportive exchanges, particularly focusing on mental health or general assistance. The chatbot employs techniques like NLP and ML to enable empathetic communication and customized responses. The paper covers the methodology, user feedback, and the effectiveness of WellBot in facilitating supportive and context-aware conversations which makes it a good contribution.

II. RESEARCH METHODOLOGY

In this system, WellBot is an AI-driven text-based bot which is designed to engage in meaningful and conversations with users. It uses NLP and ML techniques to provide supportive interactions. To achieve this, the chatbot is trained on a diverse dataset of conversations, enabling the bot to understand the user inputs and respond to it in a personalized manner. Combining this with sentiment analysis and emotion detection, WellBot will be able to tailor its responses to meet the user's needs, whether for mental health assistance, general advice, or companionship.

The foundation of the system has complex NLP algorithms, including recurrent neural networks (RNNs) and transformer models like BERT, which increase the capacity of WellBot to understand the human language. The chatbot will be able to recognize emotional signals in text and modulate its responses to provide the most appropriate and empathetic support.

To improve efficiency, the chatbot will undergo testing to determine whether it indeed is able to maintain context and respond accordingly in different given situations. The main focus is the development of a scalable and reliable solution to address the widest possible range of questions from users, provide them with emotional support, and advise them caringly and in a non-judgmental manner.

Training Datasets WellBot's training dataset contains a mixed collection of publicly available conversational datasets and some custom-created material. There are over 100,000 dialogue samples touching on such topics as mental healthsupport, general assistance, and social conversations. This dataset will be labeled both with emotional markers and according to specific context recognized it identifies different emotional states, like happiness, sadness, anxiety, and stress.

In the training set, dialogues with many conversational attributes—up to 40—are included, with features ranging from tone to sentiment to intent. That helps the model understand more about the user's feelings and allows it to write empathetic responses. Specifically, this dataset includes examples of pre-defined responses to ensure the ability of WellBot to keep a meaningful and contextual conversation going.

Altogether, the dataset consists of 120,000 pairs of dialogue, each attributed to emotional indicators and contextual information. Such a comprehensive dataset offers ample opportunity for extensive training that allows WellBot to detect communication patterns and emotional cues, helping to bring about a chatbot able to provide individualized supportive interaction

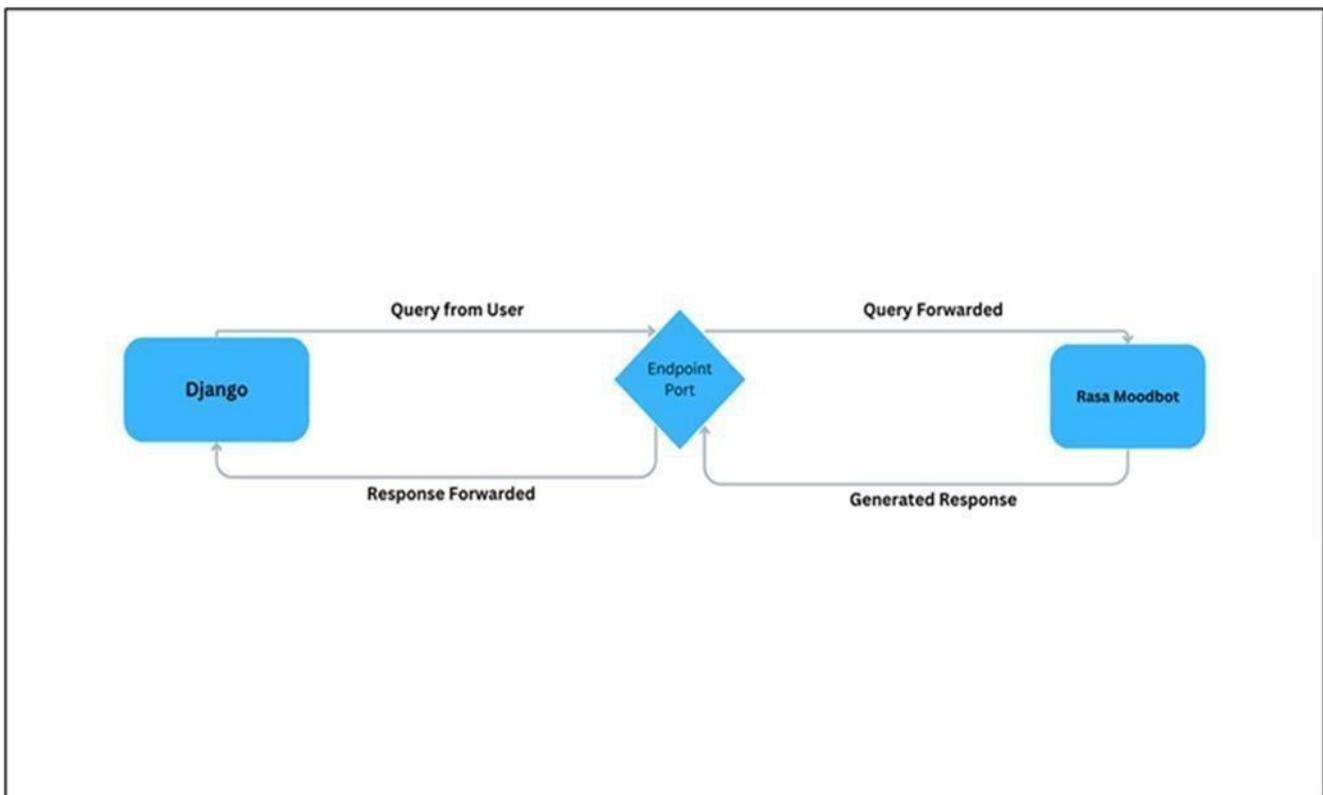


Fig 1: Flowchart of the proposed system of the model

- **Chatbot Framework:** Use Rasa for the conversational model.
- **Natural Language Processing (NLP):** Integrate pre-trained NLP models for understanding user inputs and detecting emotional tones.
- **User Interface:** Develop a simple text interface accessible via web and mobile platforms.
- **Sentiment Analysis:** Train the model using diverse datasets of emotional text to improve accuracy.
- **Security and Privacy:** use secure storage and encryption for all conversations to protect user privacy.

III .MODEL BUILDING AND TRAINING

In developing WellBot, we follow the approach of supervised ML, where pairs of features and labels are used in training a model that can understand the user's input and generate empathetic and context-sensitive responses. The dataset of WellBot contains dialogues annotated with emotional states, context, and user sentiment. Those labeled datasets are used to train the model so it can predict appropriate responses given different conversation characteristics.

1. Logistic Regression Logistic Regression is applied to binary classification tasks, like determining whether the user is in a positive or negative emotional state based on his/her input. This estimates the probability that a response falls under one out of two classes, such as "happy" or "sad," based on extracted features from the conversation. This model is simple to interpret and acts as a good baseline for the analysis of user sentiment.

2. k-Nearest Neighbors (K-NN) K-NN is the algorithm used to classify the emotional tone of any conversation. It identifies similar dialogues to a user's current conversation by comparing it with past examples in the feature space and classifies it based on the majority class of its nearest neighbors. K-NN is very simple to implement but is computationally demanding when dealing with large datasets.

3. Support Vector Classifier (SVC) SVC is one of the strong methods for classifying user emotional states, especially in handling complex, high-dimensional conversational data. Applying kernel functions makes it possible to deal with non-linear relationships in data, and it is effective in multiple-class classification tasks.

4. Naive Bayes It is based on the assumption that the features, such as words or phrases, in a conversation are independent of each other. It uses Bayes' theorem to calculate the probability of a specific emotional state given the conversation. Even though this approach makes simplifying assumptions, Naive Bayes is often effective

in text classification tasks and can efficiently categorize user inputs into predefined emotional categories.

5. Decision Tree Decision Tree model is used here for hierarchical classification where the chatbot breaks down the conversation into decision nodes based on features such as tone, sentiment, and context. The model recursively divides the data into small subsets based on the most distinguishing features, which makes it easy to visualize and interpret. However, decision trees are prone to overfitting and require careful pruning to ensure they generalize well.

6. Random Forest Random Forest is a learning method used to improve the model's robust nature by combining multiple decision trees. Each tree is trained with random data, and the prediction is made using the majority vote of all the trees. This approach helps reduce overfitting and provides more accurate and generalized predictions compared to using individual decision trees.

7. Gradient Boosting In order to predict the user's emotional state, an ensemble of weak learners, typically decision trees, can be created. Correcting the residual errors from the previous tree is a priority for each tree in the sequence. Highly accurate models that adapt to varying conversations are provided by this technique.

8. Training Process The model is trained using techniques that maximize performance and avoid overfitting. This process learns to identify patterns in text data, associate emotions with user inputs, and generate responses that correspond to the identified emotional state.

9. Goal The objective of the model development and training process is to enable WellBot to engage users in emotionally aware, empathetic, and accurate conversations. By experimenting with different ML techniques, the target is to find out the most effective model for emotional recognition and response generation.

IV. RESULTS

We have tested our project and got the results. Following are some of the screenshots of the results

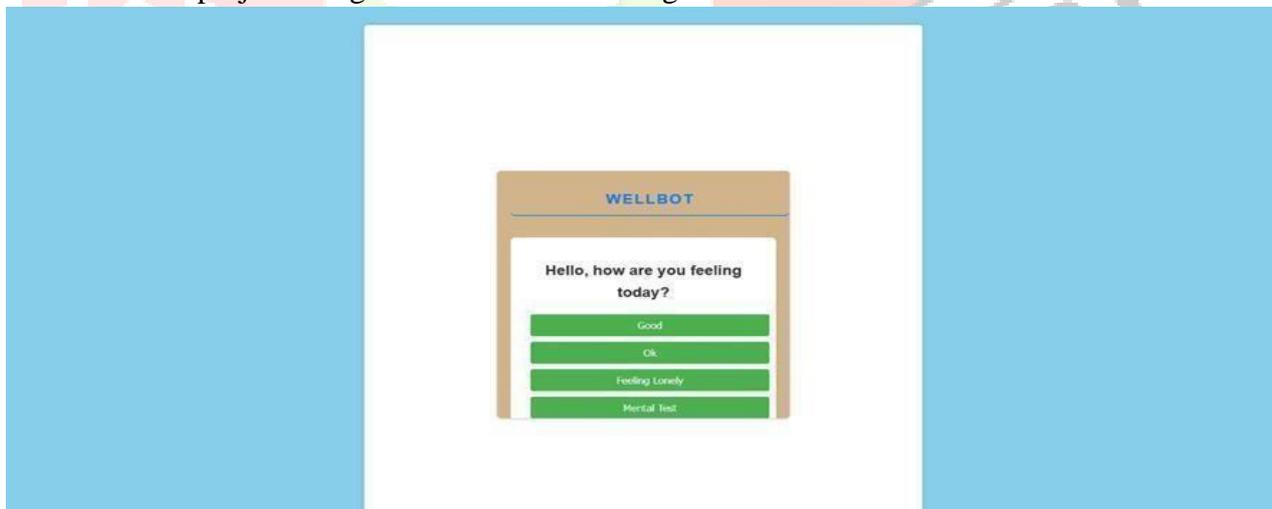


Fig 2 :Chatbot Homepage



Fig 3 :Good Page

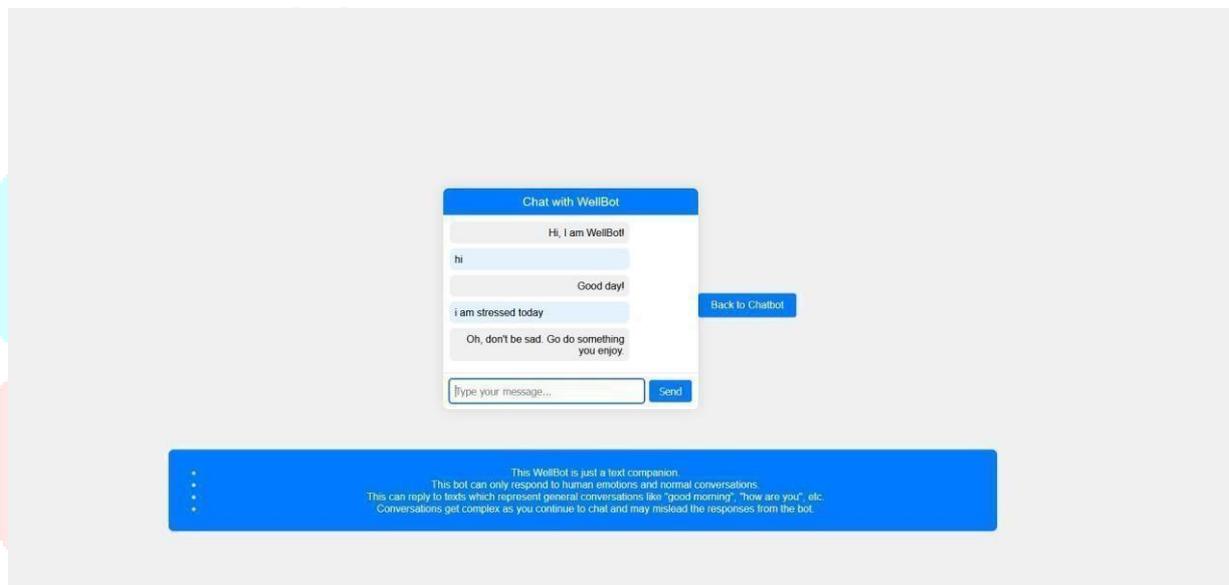


Fig 4 :Wellbot Chat

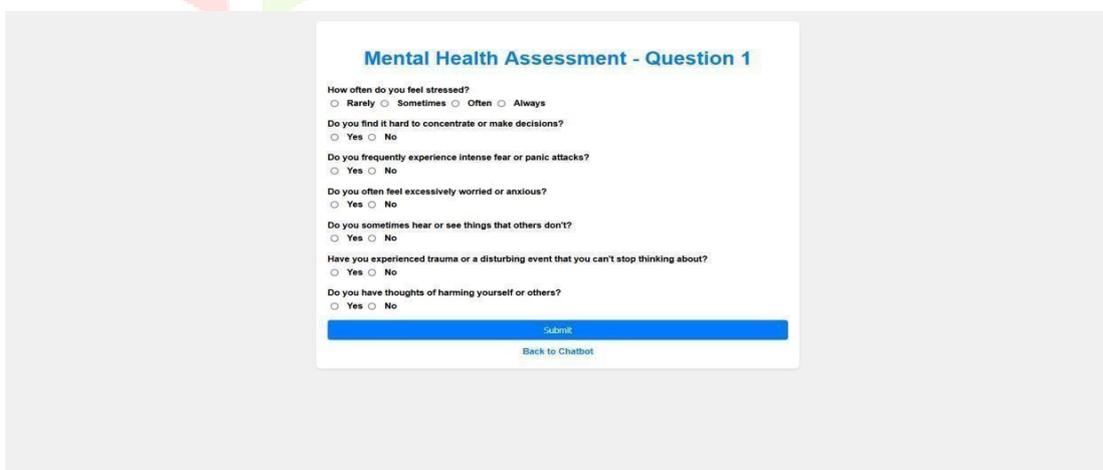


Fig 5 :Mental Health Test

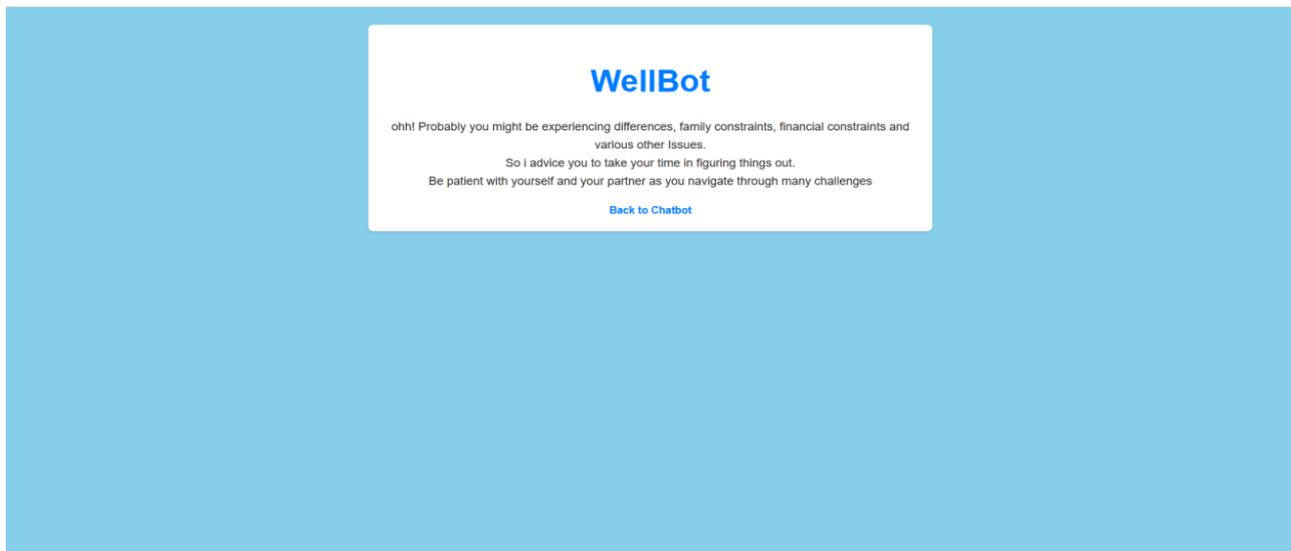


Fig 6: Suggestion Page Example

V.CONCLUSIONS

In conclusion, the WellBot project marks a significant step forward in digital companionship and mental health support. By combining Rasa's conversational AI with the powerful Django web framework, WellBot provides users with an empathetic, responsive text-based companion. Its ability to offer personalized suggestions and conduct mental health assessments demonstrates its potential to make a positive impact on individuals facing loneliness or emotional challenges. The project showcases the practical use of AI in promoting personal well-being, emphasizing the importance of accessibility and support in mental health solutions.

Additionally, WellBot exemplifies the successful integration of technology with human-centered design. Its interactive features are designed to build authentic connections and offer meaningful insights, improving the user experience and contributing to overall mental wellness. The successful deployment of WellBot suggests that similar AI-driven initiatives could play an essential role in expanding emotional support tools and enhancing their everyday application. As technology progresses, WellBot's framework provides a flexible and scalable model for addressing emotional needs and fostering mental health.

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