



## MENTAL HEALTH THERAPIST AI CHATBOT

*Prof. Sheela Verma<sup>1</sup>, Ajay Kumar Chouhan<sup>2</sup>, Raj Sahu<sup>3</sup>, Tarun Kumar Miri<sup>4</sup>, Yogeshwar Verma<sup>5</sup>*

<sup>1,2,3,4,5</sup>Department of Computer Science And Engineering, Bhilai Institute of Technology, Raipur.

### ABSTRACT:

The World Health Organization acknowledges the severe shortage of mental health professionals globally, resulting in a lack of access to necessary interventions for approximately 70% of individuals in need. Chatbots offer a scalable solution to engage users in behavioral health interventions through interactive conversations. These systems, capable of communicating through various mediums, present promising tools for individuals with mental disorders, particularly those hesitant to seek traditional support due to stigma. Our Mental Health Chatbot System employs the Rasa framework, a Python-based platform leveraging Natural Language Processing (NLP) to understand user intentions. Rasa's adaptability facilitates the creation of tailored interventions, allowing our system to recommend video resources based on user sentiment and communication patterns. By incorporating NLU, our chatbot not only suggests relevant materials but also adjusts responses to better suit user needs. The chatbot utilizes AI algorithms to recommend videos and images aimed at refreshing users' moods. Additionally, it provides continuous conversation flow, enhancing user engagement and facilitating ongoing support. This innovative approach addresses the growing need for accessible mental health resources while offering tailored assistance to individuals seeking support. Through a combination of personalized recommendations and continuous interaction, the chatbot demonstrates promising potential in augmenting mental wellness initiatives.

Keywords: Rasa framework, Natural Language Processing (NLP), Behavioral health interventions, Accessible mental health resources, Personalized recommendations

### Introduction:

Chatbots could be a scalable solution that provides an interactive means of engaging users in behavioral health interventions. Chatbots are systems that can converse and interact with human users using spoken, written, and visual languages. Chatbots have the potential to be useful tools for individuals with mental disorders, especially those who are reluctant to seek mental health advice due to stigmatization. Our Mental Health Chatbot System helps users by recommending video links based on their sentiments by analyzing their patterns of communication with the chatbot. Here we have implemented the rasa framework. Rasa is a Python framework that helps us to build any kind of Chatbot easily. It is based on NLU (Natural Language Processing) which offers the possibility to understand what the user wants. Rasa's flexibility and robustness make it particularly suited for crafting tailored interventions in mental health support. By leveraging natural language understanding (NLU), our Mental Health Chatbot System can not only recommend relevant resources but also adapt its responses based on user sentiment and communication patterns.

In the realm of global healthcare, the World Health Organization (WHO) has underscored a pressing concern: a shortage of mental health professionals. With approximately 70% of individuals lacking access to vital mental health services, innovative solutions are imperative. Enter chatbots – interactive systems capable of conversing with users across various mediums.

In response to the critical shortage of mental health professionals highlighted by the World Health Organization (WHO), innovative solutions are imperative to bridge the gap in access to essential mental health services, with approximately 70% of individuals worldwide currently lacking such access. Among these solutions, chatbots stand out as promising tools capable of delivering scalable and interactive interventions. Chatbots, leveraging frameworks like Rasa, offer a compelling avenue for addressing this challenge by providing tailored support through natural language understanding (NLU) technology. Our Mental Health Chatbot System harnesses the power of NLU to engage users in behavioral health interventions, recommending personalized resources and adapting responses based on user sentiment and communication patterns. By offering a user-friendly and stigma-free platform, our system aims to extend mental health support to those who may be reluctant to seek traditional avenues of care, thus contributing to the global effort to improve mental well-being on a scalable and accessible level.

### What is Rasa?

Rasa is an open-source framework used for building conversational AI applications, including chatbots and virtual assistants. It provides tools and libraries for natural language understanding (NLU), dialogue management, and integration with messaging platforms.

Rasa offers two main components:

**Rasa NLU:** This component is responsible for understanding and interpreting user messages. It processes text inputs and extracts structured data, such as intents (the user's intention) and entities (specific pieces of information). Rasa NLU utilizes machine learning algorithms to train models for intent classification and entity recognition.

**Rasa Core:** This component handles dialogue management and maintains the conversation flow. Rasa Core uses a machine learning-based approach to predict the next best action or response based on the current dialogue context. It enables developers to design interactive conversational experiences by defining stories, which represent example dialogues between the user and the chatbot.

### *What is the use of Mental Health chatbot?*

A mental health chatbot offers a confidential and accessible platform for individuals to seek assistance and support for their mental well-being. By engaging in conversations with the chatbot, users can articulate their feelings, express concerns, and receive personalized guidance tailored to their unique needs.

One of the primary uses of a mental health chatbot is to provide immediate emotional support and crisis intervention. It can offer empathetic responses, active listening, and coping strategies to individuals experiencing distress or crisis situations, such as anxiety attacks or suicidal thoughts. The chatbot can help users manage overwhelming emotions, de-escalate crises, and connect them with appropriate resources, such as helplines or mental health professionals, if necessary.

---

## **Methodology:**

**Project Data and Model:** Data for the project was gathered from various sources including Kaggle and other websites, amounting to 1383 lines across 40 different intents. A critical aspect of constructing a Rasa Chatbot was the creation of 24 stories covering a range of emotions such as happiness, sadness, depression, anxiety, and stress. The key focus of the project lay in developing the chatbot itself, employing the Rasa Framework to accurately classify user intents and execute appropriate responses based on predefined stories. Efforts were made to infuse the chatbot with a touch of humor to help alleviate user stress and cultivate a positive atmosphere.

Furthermore, the project involved the creation of a web application comprising two main components: a front-end section providing information about the chatbot's features, background, and related blogs, and a chatbot interface. The chatbot was integrated into the website using a React-based chatroom component from Scalable Minds. Presently, the web application operates on localhost.

### *Rasa Technology And Chatbot:*

The central objective of our project is the development of a RASA Chatbot. Leveraging the capabilities of the Rasa Framework, we meticulously categorized user intents and repeatedly tested various conversational scenarios to ensure the chatbot's accuracy in responding to user queries. Furthermore, we infused the chatbot with a sense of humor to provide users with a lighthearted experience, especially during times of stress, aiming to alleviate their feelings and foster a cheerful atmosphere.

### *How Does Rasa work?*

**Rasa Configuration:** Let's delve into the files that constitute the initial project structure of Rasa:

**init.py:** This is an empty file that assists Python in locating your actions.

**actions.py:** Here lies the code for your custom actions. If your bot needs to perform specific tasks, this is where you define them.

**config.yml:** This file houses the configuration settings for your NLU (Natural Language Understanding) and Core models.

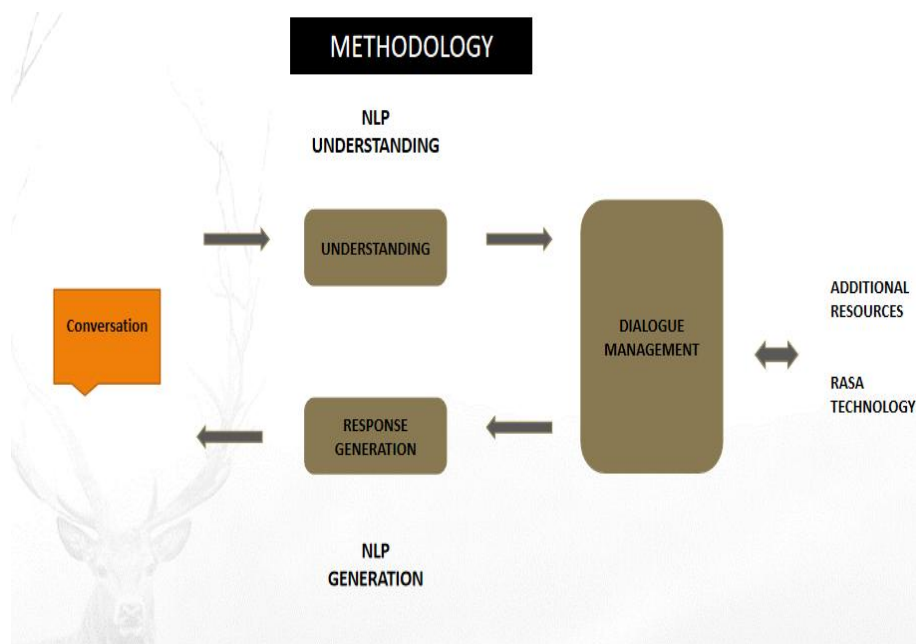
**credentials.yml:** This file contains the necessary details for connecting to external services. It's crucial to remember that hosting Rasa over an HTTPS domain is required for security.

**data/nlu.md:** In this file, you provide your NLU training data. Here, you define intents such as "depression" or "anxiety" along with related sentences. If you're using Rasa-X, your training intents and data will be automatically added.

**data/stories.md:** This file is essential for Rasa Core. It contains the dialog flow for the chatbot. Rasa Core manages the conversation flow between the user and the chatbot based on these stories. Adding diverse stories here helps the chatbot handle various contexts effectively.

**domain.yml:** This file outlines your assistant's domain. It includes different intents that the chatbot can detect and a list of bot replies. Additionally, you can define custom action server Python method names here, allowing Rasa to call these methods as needed.

**endpoints.yml:** Here, you provide details for connecting to channels like Facebook Messenger. This is primarily used for production setups. You can also configure databases like Redis to enable Rasa to store tracking information.

**Methods:****RASA NLU PIPELINE:**

The NLU Pipeline is defined in the "config.yml" in Rasa.

1. **sklearn pipeline.**
2.
  - a. pacyNLP
  - b. spacyTokenizer
  - c. SpacyFeaturizer
  - d. SklearnIntentClassifier
  - e. CRFEntityExtractor
  - f. EntitySynonymMapper

**Objective:**

- 1 To Personalized Support
- 2 Access to Relevant Resources
- 3 Improved Coping Skills
- 4 Emotional Support
- 5 Increased Awareness and Understanding

**Results**

This study focuses on a Rasa-based chatbot designed to bolster emotional well-being by offering accessible resources in the form of links to videos, refreshing audio, images, and articles. The primary aim is to empower users to alter their emotional state through online resources readily available via the chatbot.

Analysis of existing literature revealed a notable gap in accessible avenues for individuals seeking to improve their mood. Many lacked convenient means to access diverse resources capable of positively influencing their emotional state. Consequently, the chatbot was developed with a multifunctional feature set aimed at addressing this issue.

Participants engaged with the chatbot reported significant improvements in mood by utilizing the provided resources. Videos, audio clips, images, and articles served as effective tools for mood alteration, allowing users to transition to more positive emotional states. The chatbot's ability to swiftly provide a wide array of resources catered to individual preferences contributed to its efficacy in supporting users' emotional well-being.

Furthermore, the chatbot's user-friendly interface facilitated seamless navigation and resource accessibility, enhancing user satisfaction and engagement. Users appreciated the convenience of accessing mood-altering content within the chatbot platform, eliminating the need to search for external sources.

Overall, the study highlights the effectiveness of the Rasa-based chatbot in leveraging online resources to positively impact users' emotional well-being. By providing accessible links to diverse content types, the chatbot offers a practical solution for individuals seeking to improve their mood and enhance their overall emotional state. These findings underscore the importance of integrating AI-driven solutions into mental health care to meet the diverse needs of individuals seeking support and guidance.

## Conclusion

In the landscape of AI-driven mental health support, a multitude of chatbots aim to provide personalized assistance while preserving user privacy. Among these, our Rasa-based chatbot distinguishes itself with its innovative approach. Instead of predefined responses, it employs a unique story-building methodology that prioritizes understanding user intents and emotions for tailored support experiences. This adaptable framework is not only straightforward to implement but also ensures dynamic interactions that cater to individual user needs.

A key advantage of our chatbot lies in its simplicity of implementation. By structuring conversations around user intents and feelings, developers can efficiently construct dialogue flows that resonate with users.

Furthermore, our chatbot places a strong emphasis on user privacy, ensuring a secure environment for users to express themselves without fear of exposure.

Despite its simplicity, the chatbot delivers robust results. Through advanced natural language processing techniques, it accurately interprets user input and generates contextually relevant responses, providing meaningful support tailored to users' emotional states and needs.

## REFERENCES:

List all the material used from various sources for making this project proposal

### Research Papers:

1. Implementation of Mental Health Chatbot using RASA 2021, Ritik Kesharwani 1, Vishvesh Dumbre2, Aniket Patole 3, Harmeet p-ISSN: 2395-e-ISSN:39500560072.
2. Mental Health Chatbot Mrs. Lalitha. R1, Gitta Sherine. J. J, Kanishka Varshini. C.P3 , Thirivikraman. S.ISSN 2582- 7421, 2023
3. AI Mental Health Therapist Chatbot-2023, (IJRASET) ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538. [4]. Pathare, S., Vijayakumar, L., Fernandes, T. et al. Analysis of news media reports of suicides and attempted suicides during the COVID-19 lockdown in India. *Int J Ment Health Syst* 14, 88 (2020). <https://doi.org/10.1186/s13033-020-00422-2>
4. World Health Organization survey 2020, accessed 5 October 20 20, <https://www.who.int/news/item/05-10-2020-covid-19-disrupting-mental-health-services-in-most-countries-who-survey>
5. World Health Organization (2000). *The World Health Report 2000: Health Systems. Improving Performance*. WHO. Geneva.
6. Untreated mental illness. (2015, December 30). Retrieved February 23, 2021, from <https://rb.gy/tolzsh>.
7. K. Oh, D. Lee, B. Ko and H. Choi, "A Chatbot for Psychiatric Counseling in Mental Healthcare Service Based on Emotional Dialogue Analysis and Sentence Generation," 2017 18th IEEE International Conference on Mobile Data Management (MDM), Daejeon, 2017, pp. 371-375, DOI: 10.1109/MDM.2017.64.
8. Venkatesh Boddula, Akshath Rao Polkampally, Shaik Sohail, Shaik Sumair Pasha, UG Scholar, CSE Department, SNIST, Hyderabad, Telangana, India:04/Issue:08/August2022 Impact Factor- 6.752 [www.irjmets.com](http://www.irjmets.com)
9. World Health Organization (2000). *The World Health Report 2000: Health Systems. Improving Performance*. WHO. Geneva.
10. Introduction to Rasa X. (2021, February 18). Retrieved February 23, 2021, from <https://rasa.com/docs/rasa-x/>
11. Rasa architecture overview. (2021, February 11). Retrieved February 25, 2021, from <https://rasa.com/docs/rasa/arch-overview/>.
12. Implementation of Mental Health Chatbot using RASA 2021, Ritik Kesharwani 1, Vishvesh Dumbre2, Aniket Patole 3, Harmeet p-ISSN: 2395-e-ISSN:39500560072.
13. Developer documentation portal. (n.d.). Retrieved February,23,2021,from
14. T. Kamita, A. Matsumoto, T. Munakata, and T. Inoue, "Realization of self-guided mental healthcare through the digital content based on the counseling technique SAT method," *IPSJ Transactions on Digital Content*, vol. 6, no. 2, pp. 32–41, 2018.
15. F. B. Dickerson, W. N. Tenhula, and L. D. Green-Paden, "e token economy for schizophrenia: review of the literature and recommendations for future research," *Schizophrenia Research*, vol. 75, no. 2-3, pp. 405–416, 2005.
16. J. R. Lindahl, N. E. Fisher, D. J. Cooper, R. K. Rosen, and
17. W. B. Britton, "e varieties of contemplative experience: a mixed-methods study of meditation-related challenges in Western Buddhists," *PLoS One*, vol. 12, no. 5, Article ID e0176239, 2017.
18. K. H. Ly, E. Janni, R. Wrede et al., "Experiences of a guided smartphone-based behavioral activation therapy for depression: a qualitative study," *Internet Interventions*, vol. 2, no. 1, pp. 60–68, 2015.