**Mind Mate**

**(Project Proposal)**

**Project Advisor:**

Sir Saad Razzaq

**Project Manager:**

Sir. Fahad Maqbool

**Project Team Names:**

|  |  |
| --- | --- |
| **Team Members** | **Roll No.** |
| M. Zubair Sharif | BSSE51F20R028 |
| Zainab Arooj | BSSE51F20R039 |
| Aaima Zainab | BSSE51F20R005 |

**Submission Date:** 5 Oct, 2023

**Table of Contents**

1. Abstract................................................................................................................................ 2

2. Background and Justification............................................................................................... 2

3. Project Methodology............................................................................................................ 3

4. Project Scope....................................................................................................................... 3

5. High level Project Plan....................................................................................................….. 3

6. References ........................................................................................................................... 4

**1. Abstract**

With the help of artificial intelligence, the way humans are able to understand each other and give a response accordingly, is fed into the chatbot systems, i.e. into systems that are supposed to communicate with a user. The bot understands the user’s query and triggers an accurate response. In the healthcare domain, such chatbot based systems gain in interest since they promise to increase adherence to electronically delivered treatment and disease management programmes.

However, the scarcity of mental healthcare providers exacerbates this issue, hindering effective patient treatment and potentially leading to severe outcomes, including suicidal behavior and fatalities.The shortage of mental healthcare professionals limits personalized, one-on-one interactions with patients, adversely impacting the treatment process and overall mental health outcomes.

To address this critical issue, we propose the development of an AI web-based chatbot utilizing natural language processing and deep learning techniques. This chatbot will serve as a virtual mental health assistant, providing a platform for individuals to seek guidance and support for mental health-related concerns.

Our project aims to design and implement an AI-powered chatbot, capable of effectively engaging with users, understanding their queries, and generating appropriate responses. The core contribution is leveraging natural language processing and an Artificial Neural Network to categorize and respond to user questions accurately.

The user's input will undergo lemmatization and preprocessing before being fed into the deep learning model. The Artificial Neural Network will categorize the input to generate a targeted response, enhancing the chatbot's efficacy.

This chatbot aims to holds a high accuracy rate of in providing appropriate responses, ensuring reliable assistance for mental health-related inquiries. Moreover, this AI-driven chatbot will serve individuals who may hesitate or feel stigmatized seeking help from traditional mental healthcare providers, ultimately promoting better mental health outcomes and reducing the burden on the existing mental healthcare infrastructure.

**2. Background and Justification**

Mental illness is a global public health crisis affecting a significant portion of the population annually. The shortage of mental health resources, inadequate funding, and low mental health literacy pose significant challenges, especially in low-income and middle-income countries, leading to a rise in suicidal behavior. Technology-based solutions, like chatbots, offer a means to engage with individuals who may be hesitant to seek traditional mental health assistance, ultimately promoting better accessibility and fostering open conversations about mental well-being.

**3. Project Methodology**

The project methodology starts with a detailed analysis of mental health symptoms and diagnostic criteria. The chatbot's backend integrates natural language processing (NLP) and Large Language Models (LLMs) for effective communication. Concurrently, frontend development employs Bootstarp and Javascript for a seamless user experience. The chatbot's responses are refined through continuous feedback loops, ensuring empathetic and accurate interactions. User privacy and data security are paramount and are integrated into the methodology.

**4. Project Scope**

Mind Mate includes the development of an AI-driven chatbot capable of symptom analysis, diagnosis, and calming interactions. It integrates NLP algorithms for understanding user inputs effectively. The chatbot will also offer resources for self-help and recommend professional help when required. The scope encompasses a user-friendly interface, stringent data privacy measures, and integration with mental health databases for accurate recommendations.

**5. High-Level Project Plan**

Week 1-2: Design chatbot interactions and basic UI layout.

Week 3-4: Implement symptom analysis algorithms and basic calming responses.

Week 5-6: Integrate NLP for improved communication and user understanding.

Week 7-8: Develop backend infrastructure for user sessions and data storage.

Week 9-10: Implement professional recommendations and self-help resources.

Week 11-12: Refine chatbot responses based on user interactions and feedback.

Week 13-14: Conduct comprehensive testing and address any remaining issues.

Week 15-16: Prepare for the official launch, including marketing and outreach strategies.

**6. References**

* Corey Schafer. Visual Studio Code (Windows) - Setting up a Python Development Environment 2019.

<https://www.youtube.com/watch?v=-nh9rCzPJ20&list=PL>

* Boucher, Eliane M., et al. "Artificially intelligent chatbots in digital mental health interventions: a review’’. *Expert Review of Medical Devices* 2021. [www.tandfonline.com](https://www.tandfonline.com/doi/full/10.1080/17434440.2021.2013200)
* Russell A. Poldrack. Toward Data Driven Ontologies for Mental Functions.

[Toward Data Driven Ontologies for Mental Function.](https://www.youtube.com/watch?v=EwOHERNd3aQ&ab_channel=OfficeofBehavioralandSocialSciencesResearch)

* Inkster, B., Sarda, S., & Subramanian, V. An empathy-driven, conversational AI agent (**Wysa**) for digital mental well-being: real-world data evaluation mixed-methods study. *JMIR mHealth and uHealth 2018.*

[mhealth.jmir.org](https://mhealth.jmir.org/2018/11/e12106/)

* Cameron, G., et al.: Best practices for designing chatbots in mental healthcare (2018).

[www.scienceopen.com](https://www.scienceopen.com/hosted-document?doi=10.14236/ewic/HCI2018.129)

* Pandey, Sumit, Srishti Sharma, and Samar Wazir. ‘’Mental healthcare chatbot based on natural language processing and deep learning approaches: Ted the therapist’’ *International Journal of Information Technology* 2022.

[www.link.springer.com](https://link.springer.com/article/10.1007/s41870-022-00999-6)