

**Marcus Chatbot: Advancing Mental Health Care through Innovative Depression Screening
Technology**

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On my honor as a University Student, I have neither given nor received unauthorized aid on this
assignment as defined by the Honor Guidelines for Thesis-Related Assignments

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Motivation

Depression is a prevalent issue across the United States, with college students particularly at risk due to their high stress environments. Traditional methods of diagnosis often involve direct interaction with healthcare professionals which can deter individuals who are reluctant to discuss their mental health openly. The motivation for the "Marcus" chatbot project is to offer a discreet, approachable, and user friendly platform for mental health screening. This chatbot aims to analyze user responses and assist in the diagnosis of depression without direct human intervention. By ensuring privacy and comfort, the chatbot encourages authentic interactions and potentially leading to early and accurate detection of depressive symptoms.

Introduction

The Marcus chatbot is currently in development with ongoing research aimed at enhancing its efficiency and diagnostic accuracy. Utilizing the OpenAI GPT API, the platform leverages advanced machine learning techniques to process and analyze user responses. The primary functionality of Marcus involves posing strategically crafted questions to users and interpreting their responses based on the PHQ-9, a standard diagnostic tool for assessing depression. This process aims to streamline the initial screening of depression and making it more accessible to individuals who might otherwise avoid seeking help.

Methods

The development of the Marcus chatbot represents a substantial endeavor to harness digital interventions in the battle against depression, relying heavily on iterative refinements through user interactions. Preliminary phases of research involve a critical examination of existing literature on digital mental health interventions. Notably, Dosovitsky et al. (2020) have demonstrated how integrating Cognitive Behavioral Therapy (CBT) principles with chatbot

technology enhances their effectiveness in mental health interventions. This study serves as a foundational reference for incorporating therapeutic modalities into the Marcus chatbot's design.

Furthermore, the study by Klos et al. (2021) underscores the importance of accessibility and efficiency in depression chatbots which influences our approach to user interface design to ensure that Marcus is user-friendly and easily accessible to a wide audience. This aligns with findings from Rathbone et al. (2017), which emphasize the need for chatbots to adapt dynamically to individual user preferences, a feature that has been pivotal in maintaining user engagement and satisfaction in our chatbot's development.

The economic implications discussed by Cartwright et al. (2023) also guide our strategic planning for Marcus by suggesting ways in which artificial intelligence can streamline healthcare delivery which can then help informing our development process towards creating a scalable and economically viable product.

Results

While still in the development phase, the Marcus chatbot has demonstrated promising potential in engaging users in meaningful dialogues about their mental health. Preliminary surveys were conducted to assess individual preferences for a mental health chatbot, drawing responses from a diverse group of college students, predominantly from STEM fields. The demographic diversity, with a good representation across different ethnicities and languages, underscores the need for culturally sensitive responses. The survey revealed a nearly even split between introverts and extroverts, highlighting the importance of the chatbot's adaptability in interaction styles to match the social preferences of the user.

Most respondents are studying fields related to science and technology, suggesting that integrating topics relevant to these areas could make the chatbot interactions more relatable and engaging. A critical insight from the survey is the expressed need for confidentiality and rapid support, which chatbots can potentially fulfill better than traditional therapy due to their accessibility and immediacy. There is also a noticeable openness among students to use digital tools for mental health support, provided these tools are effective and maintain a personal touch.

These survey insights are crucial in the ongoing development and refinement of the Marcus chatbot. Early testing phases have shown appreciation for the privacy and anonymity provided, which facilitates honest communication. However, challenges such as maintaining long-term engagement and achieving high diagnostic accuracy are evident. These are being addressed through continuous development and testing which is informed by current research and user feedback. By integrating these findings, the chatbot is being optimized to meet the nuanced needs of its users effectively to ensure it remains a valuable tool in the evolving landscape of digital mental health care.

Discussion

The introduction of chatbots like Marcus in mental health care represents a significant shift towards more accessible and less stigmatized mental health services. However, the effective deployment of such technologies requires careful consideration of various factors, including user engagement, privacy, diagnostic accuracy, and ethical implications. Ensuring the success of such interventions involves not only technological development but also broad stakeholder engagement, including mental health professionals, patients, and technology experts, to create a balanced approach that enhances care while respecting user autonomy.