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Building the TacMed Chatbot to Support Medical Education in Low- Resource Settings: A Low-Code Platform Approach

Introduction

As technology continues to advance, humans and technology have developed together to meet our needs, changing the way we live. This evolution forms the foundation of cyberpsychology [\[1\]](#).

Chatbots, which are virtual agents that communicate with users, play an important role in fields like

customer service, healthcare, and e-commerce [2][3]. Chatbots can either follow simple rules (rule-based) or use AI technologies like Natural Language Processing (NLP) and Machine Learning to interact more intelligently. However, AI chatbots may present challenges, including the risk of delivering incorrect information, especially in high-stakes domains like healthcare. Health Tech Without Borders (HTWB) developed a TacMed Chatbot for frontline responders in Ukraine. The chatbot provides lifesaving medical information in critical situations. This study describes the steps taken to build this chatbot using a low-code platform, addressing the rationale behind the design choices and the process of deployment.

Methods

Pre-planning and Research

The TacMed Chatbot project began by assessing the needs of Ukrainian frontline responders. The results highlighted the need for a simple, protocol-based tool, as many first responders in conflict zones had limited medical education and worked in high-stress conditions. A decision was made to use a low-code platform to develop the chatbot, focusing on decision tree logic. A low-code platform is a software development approach that requires minimal coding, enabling rapid application development using visual interfaces. This makes it accessible and allows for faster deployment of applications. The TacMed Chatbot was built using a low-code platform to streamline development and localization. Decision tree logic is a structured rule-based model that guides users through predefined steps based on their inputs, ensuring consistency and reliability.

Chatbot Design

The chatbot used vetted information from sources such as Stop the Bleed and Tactical Combat Casualty Care (TCCC) protocols. A low-code platform was selected to facilitate decision tree logic and ensure seamless localization into multiple languages. Key design considerations included adapting the chatbot for Ukrainian medical terminology and integrating visual aids to support understanding.

Testing Phase

The testing phase involved diverse user groups, including medical professionals and civilians, across the US, EU, Ukraine, and Middle East. The team ran feedback sessions and tested the chatbot's clarity and usability during a conference in Lutsk, Ukraine and virtually to medical professionals in Sudan. The goal was to ensure the chatbot was simple, effective, and appropriate for both healthcare professionals and non-medical users.

Results

By the end of July 2023, the TacMed Chatbot had delivered over 32,000 messages to more than 500 users. Its primary use cases involved providing emergency medical protocols for treating war casualties. Feedback from users indicated the chatbot's ease of use and its potential to be a valuable educational tool for frontline workers.

Discussion

The medical field continues to embrace chatbots, leveraging digital technologies to drive economic growth and improve public services. The TacMed Chatbot is an example of how technology can be harnessed to support healthcare delivery in conflict zones. The development process highlighted the benefits of using a low-code platform [4], which allowed for efficient creation, localization, and easy adjustments.

Despite not utilizing AI, the TacMed Chatbot proved effective in delivering critical medical information. It complemented other educational tools and demonstrated the potential for chatbots to enhance long-term memory retention for medical protocols. However, further developments could integrate AI to handle unrecognized queries, enhancing the chatbot's ability to provide broader support.

Limitations

The TacMed Chatbot, while effective, does not incorporate advanced AI, limiting its ability to handle complex or out-of-scope queries. Moreover, it was designed primarily for frontline workers in Ukraine and Sudan, and its adoption may face challenges in other regions due to language and cultural differences. Additionally, its reliance on decision tree logic may restrict flexibility in responding to unique situations outside the predefined protocols.

Conclusion and Future Directions

The TacMed Chatbot has demonstrated the potential of simple chatbot technology to support emergency medical care, especially in high-pressure environments like warzones. The success of this tool highlights the need for continued collaboration between medical professionals, NGOs, and technologists to improve healthcare delivery in disaster and conflict settings. In the future, we aim to update the chatbot to incorporate AI to understand questions it doesn't recognize and provide more personalized answers. Future studies can focus on creating chatbots that are adaptable for global use, aiming to build systems that can improve medical education and response during crises around the world.

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References

1. Caponnetto, P; Milazzo M. Cyber Health Psychology: The use of new technologies at the service of psychological well being and health empowerment. *Heal Psychol* [Internet]. 2019; Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6904845/pdf/hpr-7-2-8559.pdf>
2. Adamopoulou E, Moussiades L. Chatbots: History, technology, and applications. *Mach Learn with Appl* [Internet]. 2020 [cited 2023 Jul 12];2:100006. Available from: <https://doi.org/10.1016/j.mlwa.2020.100006>
3. Baek TH, Bakpayev M, Yoon S, Kim S. Smiling AI agents: How anthropomorphism and broad smiles increase charitable giving. *Int J Advert* [Internet]. 2022 Jul 4 [cited 2023 Jul 28];41(5):850–67. Available from: <https://www.tandfonline.com/doi/full/10.1080/02650487.2021.2011654>
4. Bock, A. C., & Frank, U. (2021). Low-code platform. *Business & Information Systems Engineering*, 63, 733-740