

Developing and Implementing a Machine Intelligence mental Health System Navigation Chatbot to Support Healthcare Worker in Two Canadian Provinces (Study Protocol)

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Introduction

One in three Canadians will experience addiction and/or mental health challenges at some point in their lifetime. Unfortunately, there are multiple barriers in accessing mental health care including system fragmentation, episodic care, long wait times, and insufficient supports for health system navigation. Additionally, stigma may further reduce an individual's likelihood to seek support.

Digital technologies present new and exciting opportunities to bridge significant gaps in mental health care service provision, reduce barriers of stigma, and improve health outcomes for patients and mental health system integration and efficiency.

Chatbots, i.e., software systems that use machine intelligence (artificial intelligence and machine learning) to carry out conversations with people, maybe explored to support those in need of information and/or access to services, and present the opportunity to address gaps in traditional, fragmented and/or episodic, mental health system structures, on-demand, with personalized attention.

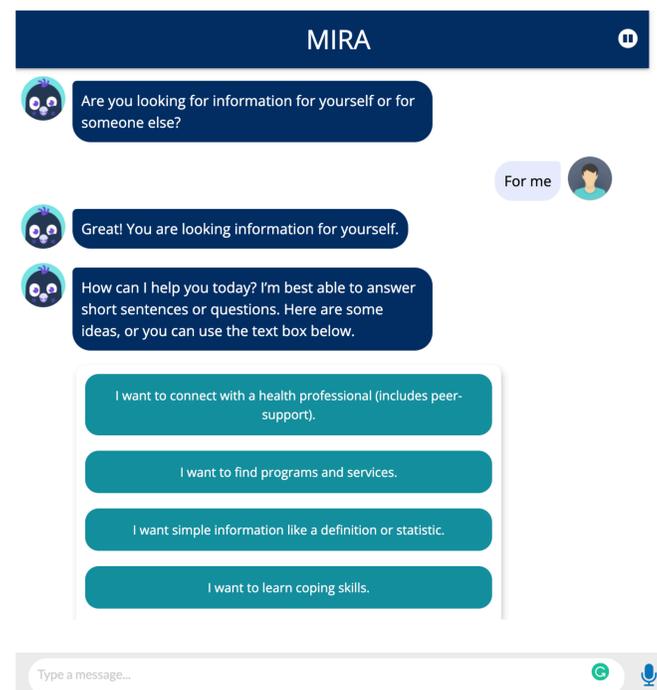
Objective

This pilot study seeks to evaluate the feasibility and effectiveness of a mental health system navigation machine intelligence chatbot (the Mental Health Virtual Assistant).

About the chatbot

In this study, we are developing a chatbot to carry out useful mental health information and services to clients. To give the chatbot the ability to understand what clients say or type, different variations of each sentence have been defined and a state-of-the-art machine learning model is trained based on the gathered sentences (training data). Following this training, the client can then chat or speak with the chatbot like a

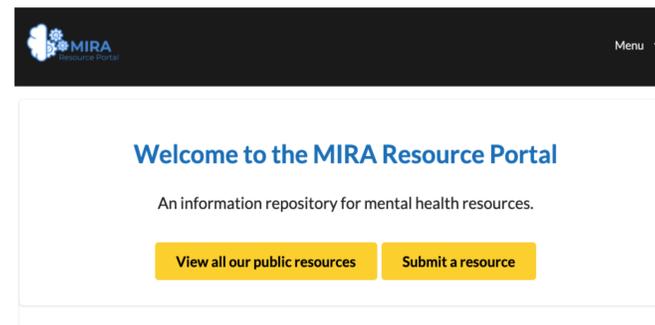
human. Also, to further enhance the chatbot, some techniques like spellchecking and entity extraction (extracts useful keywords from a sentence) are employed. Furthermore, text-to-speech and speech-to-text are added to the chatbot, so the clients can speak with the chatbot and hear from it. All the conversations with the chatbot will save anonymously in a database only accessible to the chatbot. The chatbot can then use conversation logs to refine its functionality further.



About the portal

To offer evidence-based and verified resources to the clients, we have developed a unique portal where the resources can be stored and, following verification by experts, accessed by the chatbot. The definition of "resource" for the purposes of this project is broad and may include websites, graphics, and more. Verification of resources is done via a review process reflecting that of peer-review academic journals (two reviewers per resource with an

editor to support). Resources are then re-assessed weekly via an automated process to flag any changes to which may require further review for quality by a human.



Methods

Participants will be healthcare workers and their families located in the Canadian Provinces of Alberta and Nova Scotia (Total n=1,000; n=500 from Alberta; n=500 from Nova Scotia). The effectiveness of the technology will be assessed in comparison/complementing to the status quo health navigation service provision (e.g., mental health navigation call centers and/or self-driven use of publicly available online search engines), and will be collected via voluntary follow-up surveys, and client interactions and engagement with the chatbot. Additionally, the collection and analysis of aggregate health system utilization data will be explored, assessing service use prior to, and following the chatbot deployment.

Results

This project was initiated April 1st, 2021. Ethics approval was granted on August 12th, 2021 by the University of Alberta Health Research Board. Data collection is anticipated to begin

November 8th, 2021, and conclude February 7th, 2021. Publication of a final report will be sought following the synthesis of analysis with a target date of March 31st, 2022.

Conclusions

Our finding can be incorporated into public policy and planning around mental health system navigation by any/all Canadian mental health care providers – from large public health authorities through to small community-based not-for-profits. This may serve to support the development of an additional touchpoint or point of entry for individuals to access to the right services/care, at time of need, wherever they are and on-demand.

Acknowledgement

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Our partners:

- Mood Disorder Society of Canada
- Alberta Machine Intelligence Institute (amii)
- University of Alberta
- Mitacs
- Dalhousie University
- University of Saskatchewan
- AI4Society