

Towards Youth Mental Health Support: Developing a Prototype AI Counselor

Teryn Cha^a, James Cha^b, Samuel Lim^b, Soon Ae Chun^c

^aEssex County College, ^bNorthern Valley Regional High School at Demarest, ^cCity University of New York–College of Staten Island
yan@essex.edu, {20251117, 20251066}@nvnet.org, soon.chun@csi.cuny.edu

Abstract

Many youths suffer from mental, emotional, and behavioral illnesses. Prevention and treatment require health professionals with empathetic and dedicated guidance that takes time and frequent interfaces. Frequent visits to the professionals are not always afforded for many youths. Automated AI chatbot can be a good alternative to visits to professionals. In this study, an AI chatbot is designed and implemented with youth engagement. Their engagement is aimed to identify the requirements for the automated consulting chatbot, and to generate responses that are using language style more relatable to youths. As a preliminary study, youth engagement was data analytics to understand drug overdose status. Their input was used to identify design requirements that can help the youth on drug issues. A prototype ChatDemi is implemented, trained with youth generated response dataset to show the feasibility of AI-driven virtual counselor that generate responses to meet the needs of youths to cope with drug abuse or other behavioral and mental illness prevention and treatment.

Introduction

AI chatbots are deployed and used in many fields. For instance, a chatbot in emergency calls can swiftly analyze callers' keywords to assist emergency response, especially during crises when human capacity is overwhelmed. AI-powered virtual health assistants provide initial assessments, answer basic health queries, and schedule appointments. They can improve the availability, affordability, and proximity to healthcare, revolutionizing the access of patient care. Chatbots is shown to promote behavioral changes, such as healthy lifestyles, smoking cessation, treatment or medication adherence, and reduction in substance misuse (Aggarwal et al., 2023).

In this study, we present a chatbot, named ChatDemi, that can incorporate the language styles of different age groups and the content of mental illness related content consulted from the generative AI ChatGPT. The language style used by teens, young adults or older age groups may different and

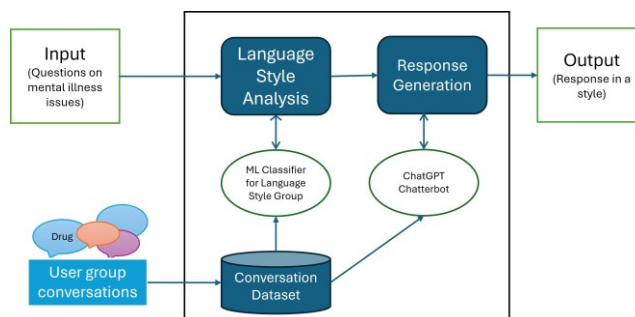


Figure 1 ChatDemi Mental Illness ChatBot Architecture

the mental illness related response should be adjusted to the language style of input question. We use the drug abuse case to train a language style classification machine learning model to classify the age groups and generate the drug-related counseling response for the age group's language style. We report the preliminary findings of our approach that is shown in the overall architecture (Fig 1).

Methods

We engaged the youths in the design and development of ChatDemi in order to enhance the chat tool to be a vehicle to enhance their awareness of the mental illness problems as well as their conversations to be reflected in the system. They played a role to provide the conversation types often discussed among themselves and gather their conversation as dataset to train machine learning models to classify conversational styles and the content types for the chatbot to use for generating conversational response. Their engagement is also used for evaluating the output responses, i.e., whether the response of conversation from the chatbot is aligned with their conversation style. This feedback will be used to fine tune the system.

As in Figure 1, the initial stage collects the conversations on mental health among different groups of people, especially youth groups. This data set from different age groups

or gender. The conversation features are used to train a classification model to identify the conversational style groups (e.g., genZ, millennial, middle ages, elders). We perform several models for the best performing one. The classification model is used for fine-tuning the generative AI models such as ChatGPT or language generation component of ChatterBot(Cox 2021) to generate their mental health responses in different styles targeting the patients. In addition, we are adding the generated response to be supportive and positive, as research findings indicate users prefer chatbots with supportive and positive traits that can listen, inform, and build connections (Potts et al. 2021).

ChatDemi: Prototype Counselor

Drug abuse or addiction is prevalent across all regions and ages. Map visualization in Figure 2 (a) of drug overdose dataset (Tanz et al. 2022) shows the severity of youth drug abuse by state showing the number of drug abusers among children aged 12 to 17. California has the highest number of drug abusers among children followed by Texas. Figure 2 (b) shows drug types that are related to youth drug overdose deaths in Connecticut (Connecticut State Department of Public Health 2023). It shows that Heroin has the highest death rate, accounting for more than 2,500 deaths in the state. Other drugs such as Fentanyl and Cocaine follow with over 2,200 and 1,500 deaths, respectively.

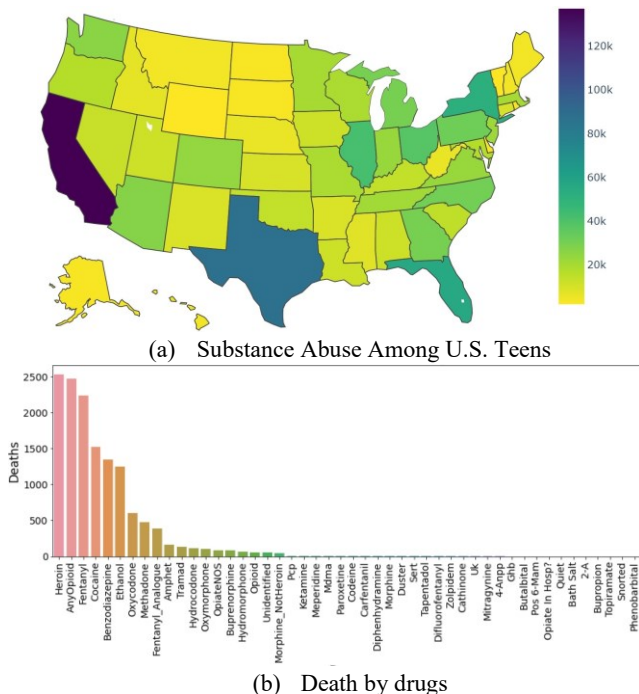


Figure 2 Substance Abuse Among U.S. Teens and Drug Types

ChatDemi is a conversational AI tool that is built to serve many teens who are suffering from drug overdose or mental issues associated with it. We exploit two options: a) using

ChatterBot, a Python-based library and b) using the style classification ML and ChatGPT. With Chatterbot, the generated response function was developed to take a user's input, analyze it using the bot's logic adapter, and produce a suitable response. Table 1 shows an example produced by the ChatDemi with Chatterbot predefined library (Response #1a) and the response generated by ChatDemi with the style ML classifier trained on the conversational dataset and ChatGPT to generate the response appropriate to teen's input (Response #1b).

Table 1 Example Inputs & Responses

<p>Input #1: I feel like I'm being peer-pressured by my friends to take drugs. How do I decline them without ruining our friendship?</p> <p>ChatDemi Response #1a: Remember that you should not do anything you will regret. Drugs are always a bad choice and you should never take them. It may be difficult to control an addiction and it may permanently ruin your life. You should be able to tell your friend that you do not want to take such a risk and do something that might bring you harm. If your friend cannot understand this or does not take your feelings into consideration, they may not be the right people for you to be with.</p> <p>ChatDemi response #1b: Yeah, that's a tough spot to be in, but you're not alone in dealing with peer pressure. First off, big props for recognizing that it's not cool to cave just to fit in. Your friends might not even realize they're pressuring you, so a chill convo about how you feel could clear things up. Try saying something like, "Hey, I'm all about hanging out, but I'm just not into the whole drug scene. I hope you can respect that." Real friends will totally get where you're coming from and respect your boundaries. And if they don't, it might be time to reevaluate those friendships. Your well-being comes first, always</p>

As shown in the example above, ChatDemi in both versions shows its capability to create customized chatbots, but with the style classifier, the response content is presented to cater to the specific style of young users. This is achieved by offering the option to train the tool on custom datasets.

Conclusion

We presented ChatDemi, our prototype AI Counselor, that leads conversation by generating mental health responses to the user questions according to the conversational style of the user. ChatDemi is showcased on drug overdose cases to offer self-care options. Our future research considers more mental health domains that are prominent among teens in school setting, such as anxiety, depression, eating disorder, body image related issues. Our work also includes collecting more conversational styles for improving style classification model building. We plan to analyze if the conversational style and contents influence the acceptability of the tool and enhanced engagement by the users through the qualitative evaluation of ChatDemi, to show its effectiveness in youth mental health support.

References

- Aggarwal, A., Tam, C. C., Wu, D., Li, X., & Qiao, S. 2023. Artificial intelligence–based chatbots for promoting health behavioral changes: systematic review. *Journal of medical Internet research*, 25, e40789.
- Braca, A., and Dondio, P. 2023. Persuasive communication systems: a machine learning approach to predict the effect of linguistic styles and persuasion techniques Persuasive communication systems. *Journal of Systems and Information Technology*, 25(2):1328-7265, DOI:10.1108/JSIT-07-2022-0166.
- Connecticut State Department of Public Health. 2023. Opioid and Drug Overdose Statistics. <https://portal.ct.gov/DPH/Health-Education-Management--Surveillance/The-Office-of-Injury-Prevention/Opioid-and-Drug-Overdose-Statistics>.
- Cox, Gunther. 2021. ChatterBot. <https://chatterbot.readthedocs.io/en/stable/>.
- Potts, C., Ennis, E., Bond, R., Mulvenna, M.D., McTear, M.F., Boyd, K., Broderick, T., Malcolm, M., Kuosmanen, L., Nieminen, H., Vartiainen, A.K., Kostenius, C., Cahill, B., Vakaloudis, A., McConvey, G., O'Neill, S. 2021. Chatbots to Support Mental Wellbeing of People Living in Rural Areas: Can User Groups Contribute to Co-design? DOI: 10.1007/s41347-021-00222-6.
- Tanz, L.J., Dinwiddie, A.T., Mattson, C.L, O'Donnell, J., Davis, N.L. 2022. Drug Overdose Deaths Among Persons Aged 10–19 Years — United States, July 2019–December 2021. *MMWR Morb Mortal Wkly Rep* 2022;71:1576–1582. DOI: <http://dx.doi.org/10.15585/mmwr.mm7150a2>.