

Virtual assistants with personality can help with mental illness

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Computer scientists have pioneered a new method that could be used to develop more "natural" automated virtual assistants to help people suffering from mental illness.

The new method, called SMERTI (pronounced: "Smarty"), enables [virtual assistants](#) (VA) to use [natural language](#) and emotional cues that change depending on the relationship and situations they are used. The result allows for the development of VAs that better connect with people they are used to help.

"Certain personalities or emotions within a virtual assistant appeal more to certain individuals," said Steven Feng, an undergraduate student in Waterloo's David R. Cheriton School of Computer Science. "Enabling virtual assistants, based on the situation, to tweak the words or sentences used to match the personalities could lead to on-demand chatbots available to talk to people with [mental illness](#) and cognitive disabilities whenever they require.

"There is an increasing number of people who require mental health therapy, but there are not enough therapists to deal with these cases. Being able to automate some aspects of treatment will be beneficial as it would reduce wait time and make the process more affordable. But the emotional aspects of mental health are a major challenge for virtual assistants."

SMERTI represents a number of artificial intelligence software tools working together, including similarity masking (SM), entity replacement (ER) and text infilling (TI). SMERTI's job is to take a text response from a virtual assistant that has a certain personality and adjust it, so it fits the current situation. For example, it would take the advice of "It is sunny outside; I know you hate to, but you must wear sunscreen" to "It is rainy outside; I know you hate to, but you must bring an umbrella."

To evaluate SMERTI, the [computer scientists](#) presented eight fellow researchers with original pieces of text that were written by humans, along with various modifications from multiple tools, including SMERTI. The respondents were then asked to blind review the sentences

and rate them on a scale of one to five based on fluency, sentiment preservation, and content exchange—how well the new text substitutes for the words replaced.

"Based on the respondents' ratings of the various systems it was found that SMERTI outperformed all the baseline models especially in terms of fluency and overall replacement of the text to fit the new semantics," said Jesse Hoey, an associate professor in the Waterloo's Cheriton School of Computer Science.

"What we were mainly focused on was the fluency and semantic exchange aspects to show that the task is possible and measure the emotional preservation, which was decently high. The next step is to research how to preserve personality or persona rather than just emotion, which is more complicated."

The researchers are now working on a system to generate the personality-flavored [text](#) in the first place, which, when combined with SMERTI, will result in virtual assistants that have a more consistent personality. Consistent [personality](#) is a key component of future virtual assistants for mental health support.

The study, "Keep Calm and Switch On! Preserving Sentiment and Fluency in Semantic Text Exchange," authored by Waterloo's Faculty of Mathematics researchers Feng, Hoey and research assistant in the Cheriton School of Computer Science, Aaron Li, will be presented at the Conference on Empirical Methods in Natural Language Processing, November 3-7, 2019 in Hong Kong.

Provided by University of Waterloo

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