AlterEgo opens silent spring of computer connections via wearable

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OK, we get it. Artificial intelligence experts are on a fast clip from year to year, month to month, showing off what their research can promise. But could it be that we have reached that stage in human-computer interaction, where you can think of a question —— without saying a word— and the machine will respond with the answer?

How much does all this cost? What is the weather in Denver?

Project AlterEgo indicates we have reached such an exciting no-talk stage.

"AlterEgo is a non-invasive, wearable, peripheral neural interface that allows humans to converse in natural language with machines, artificial intelligence assistants, services, and other people without any voice—without opening their mouth, and without externally observable movements—simply by articulating words internally."

The user's feedback is through audio, via bone conduction. The user is able to transmit and receive streams of information to and from the computing device.

How do you do it? How do you send forth words if you do not speak aloud? This is through internal vocalization, neuromuscular signals from the tongue and the back of the palate translated to computer commands.

Ok, you are silently conversing with your machine, but it's not a brunch act in Vegas. This is your second self. It's more as if you wind up speaking to yourself. "AlterEgo seeks to combine humans and computers—such that computing, the Internet, and AI would weave into human personality as an internal 'second self' and augment human cognition and abilities," according to the project page.

It is not reading your mind as a result of your just thinking. This is silent speech.

"Silent speaking is a conscious effort to say a word, characterized by subtle movements of internal speech organs without actually voicing it. The process results in signals from your brain to your muscles which are picked up as neuromuscular signals and processed by our device," said

the project site.

The technology is described in part as through bone-conduction audio. The user's wearable is a bone conduction headphone. Signals are transmitted through a 'sticker, said *Quartz*, worn along the user's neck and jawline, and the answers are fed through an ear piece.

Who is behind this project? Those who were at a recent TED conference found that out; he is MIT Media Lab's Arnav Kapur, an intelligence augmentation researcher.

Anne Quito reported for *Quartz* and noted an earlier prototype last year. "Though the 2018 prototype of AlterEgo made the wearer look like he has a head injury," Kapur said they're focused on refining the wearable to the point that they become unnoticeable. "Indeed, the design he showed at TED was nearly undetectable apart from the wire coming out of Eric's ear," said Quito.

When might we see this device as a product? Not any time soon.

"This is a university-based research project. We are continuing to further develop the system focusing on improvements such as reducing the number of electrodes required, designing more socially acceptable form factors, improving the neural networks that recognize the silent speech, as well as working on reducing the training and customization required, and last but not least, designing the end-to-end user experience and applications," the project ream explained. "Any hopes for commercialization are premature."

That, however, does not stop the team from posing realworld applications. As *Fast Company* commented, implications that this headset can read internal speech vibrations are enormous. Beyond silently asking what the weather is like in another city. Or how much the

groceries cost so far.

One such beneficiary of AlterEgo could be a person who has lost the ability to speak because of ALS, throat cancer or stroke. The individual with speech disability could communicate real-time.

In the bigger picture, the MIT team is doing its bit to seed interesting areas in technology, call them "cognitive enhancement," or "intelligence augmentation." If engineers spend so much time making our screens smart, what about us? That is Kapur's question. "Instead of making that box smarter, how do you improve humans so they're more creative and connected?"

Working with Kapur on this project are Pattie Maes, a professor, who runs the Media Lab's Fluid Interfaces research group, and Eric Wadkins, machine learning lead. He joined the Fluid Interfaces group to work on creating a continuous subvocal speech recognition system for the project.

More information: www.media.mit.edu/projects/alterego/overview/