'Duet of 1' possible with hand-controlled voice synthesizer

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New technology at the University of British Columbia makes it possible for a person to speak or sing just by using their hands to control a speech synthesizer.

UBC researcher Sidney Fels says the gesture-to-voice-synthesizer technology mirrors processes that human use when they control their own vocal apparatus.

"It's like playing a musical instrument that plays voice. Applications could include new forms of musical expression and aids for people with speaking disabilities," says Fels, professor of electrical and computer engineering at the Faculty of Applied Science and director of the Media and Graphics Interdisciplinary Centre (MAGIC).

Fels presented the technology today at the annual meeting of the American Association for the Advancement of Science in Vancouver.

Fels and his team used special gloves equipped with 3-D position sensors that locate the hand in space. Certain glove postures are associated with certain areas in the audio spectrum.

The right-hand glove has sensors to detect bending so when a user closes her hand, it creates consonant sounds. Opening the right hand produces vowel sounds in the same fashion as a vocal tract does when the tongue moves. The left glove controls stop sounds – like the consonant 'B'.

The researchers developed a set collection of gestures that are mapped to consonant sounds. The right glove controls vowels by its location in space horizontally and also controls pitch by its location in space vertically.

"Other possible applications for this discovery are interfaces to make certain tasks easier such as controlling cranes or other heavy machinery," says Fels, whose research interests include human-computer interaction, biomechanical modeling of the upper airway, speech synthesis, and neural networks.

Co-investigators for this project are UBC School of Music Asst. Prof. Robert Pritchard and Johnty Wang, a UBC electrical and computer engineering masters student and concert pianist.

To date, there have been seven international performances with musicians playing a set of pieces written specifically for the expressive capacities of this particular instrument. "It takes about 100 hours for a performer to learn how to speak and use the system," says Fels.

Provided by University of British Columbia