



News Release

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U of G invention helping blind see through touch

Two University of Guelph engineers are developing a seeing-eye glove to communicate surroundings to the visually impaired through touch.

Prof. John Zelek and PhD candidate Sam Bromley wanted to develop technology to aid the visually impaired with a system that is almost as intuitive as seeing. The system they've developed consists of cameras that process information to a computer that sends an array of vibrations to a form-fitting glove worn by the user.

Two small cameras that act as eyes are worn chest height and communicate upcoming obstacles through the glove's vibrating motors. Images from the cameras are processed in a computer the size of a Palm Pilot, which provides tactile feedback about obstacles up to 30 feet away.

The glove is worn on the non-dominant hand and has motors strategically placed on the fingers and hand. For example, if the glove is worn on the left hand, an obstruction lying straight ahead would trigger a vibration - similar to a pager or cell phone vibration - on the middle finger. If the obstacle is to the right of centre, the index finger's motor would vibrate.

Zelek said traditional navigation systems provide auditory feedback and tend to burden users with an overload of noise. When they're trying to navigate their way through a busy intersection, for example, they cannot hear the beeps indicating obstacles before them. In addition, audible systems usually have a steep learning curve, he said. "We wanted our system to be intuitive for the user."

Because the hand is so sensitive and people respond to touch so naturally, the user reacts automatically to the glove's vibrations.

For Zelek, the ultimate test will come this fall when his research team will begin trials with people who are visually impaired. "In the end, it's the user who decides whether or not this system will work," he said. The Waterloo office of the Canadian National Institute for the Blind has a group of people eager to try out the prototype device.

The entire system is discreet and portable. The cameras can be mounted on shirt buttons, and the whole unit can be sewn into a jacket. "If it isn't comfortable, no one is going to want to use it," said Zelek.

“The system can’t intrude on the user’s daily activities.”

The glove is also far less expensive than other systems on the market. The total cost of the prototype is under \$500 because it is built from off-the-shelf components. If the system were to be mass-produced, it would be far cheaper to make.

The next challenge for the research team is to find an effective way to indicate slope. “We want to convey the gradient somehow,” said Zelek. “Very little information has been done in this area.” The researchers will experiment with the patterns, frequency and strength of the vibrations to convey the information of depth and terrain.

Their goal is to duplicate the pattern of walking, he added. “If you had steps coming, you’d feel a pulsating sensation . . . boom, boom, boom, boom . . . almost mimicking the walking action that you’re about to initiate.” This will be the focus of the research for the next year or so.

Once the researchers fine-tune the glove, it could have other applications for conveying information through touch. It could, for example, alert truck drivers if they’re steering off the road, or it could convey information to people working in plants when they’re wearing headphones and can’t hear. Other applications include virtual reality.

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