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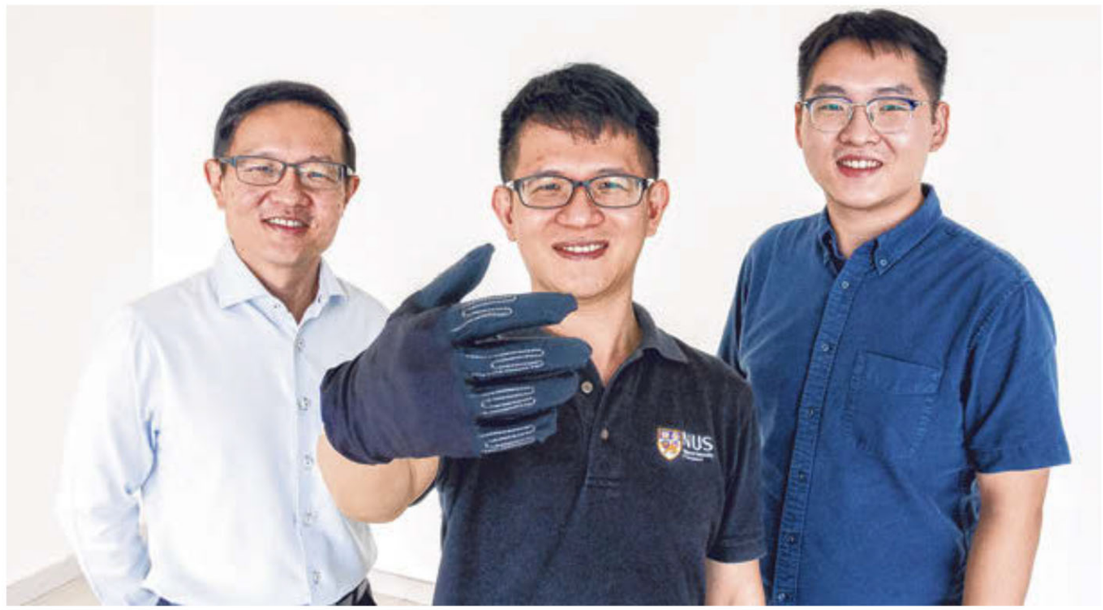
NUS team working on wireless glove for work, play

Researchers use sensor tech developed for biomedical purposes to find new applications



The smart glove was developed by an NUS research team led by Professor Lim Chwee Teck (left). With him are two team members, Dr Yeo Joo Chuan (wearing the glove) and Dr Yu Longteng. PHOTO: NATIONAL UNIVERSITY OF SINGAPORE

Lester Wong

At a work meeting, you flex your index finger in a horizontal direction to change a presentation slide to the next one on a screen metres away without using a keyboard or a remote clicker, and you rotate your wrist to go back to previous slides when needed.

Back at home, you boot up your favourite video game and flex that same finger to fire your in-game weapon, rotating your wrist to move your character forward.

Doing all these and more could one day be possible with a smart glove developed by a team of researchers from the National University of Singapore (NUS).

The wireless glove has highly sensitive microfibre sensors woven into the fabric, one for each finger. Finger and wrist gestures are mapped to various functions traditionally done with a keyboard or a gaming controller, such as the changing of presentation slides and the firing of weapons or moving of characters in video games.

The sensors are about twice the thickness of a strand of hair and are filled with a conductive liquid metal that creates a signal when a small electric current is run through the sensor.

The signal changes when the user bends a finger and the sensor's fibres, which is how the glove detects motion.

Because of the lightweight and stretchable microfibre material the sensors are made of, the glove weighs just 40g, compared with a game controller, which weighs around 250g.

The glove connects wirelessly to a computer or gaming console via Bluetooth and has a battery life of about eight hours, which the team is working to improve on.

The liquid metal in the sensors is not toxic and is made up of materials that have been used in tooth fillings and vitamin pills. The glove has also stood up to being washed up to seven times in the washing machine during lab tests, according to team leader Lim Chwee Teck.

Professor Lim, who is director of the NUS Institute for Health Innovation and Technology, said the sensor technology was originally developed in 2017 for biomedical purposes such as measuring the pulse of a patient or bandage pressure.

"But commercialising biomedical products takes a long time and involves a lot of regulatory approval before the product can actually be used," said Prof Lim in a video conference on Thursday.

"Through some discussions and brainstorming sessions for other applications, we found that we could weave (the microfibre sensors) into a glove, and so we decided to explore what could be done gaming-wise."

The NUS team has so far mapped gestures to 11 inputs and commands for performing a variety of in-game actions usually accomplished by pressing buttons on regular game controllers such as the firing of weapons, and tested the glove on games such as first-person shooter title Battlefield V.

But many more gestures can still be added, and the glove could have the potential even beyond gaming as a general input device to accomplish everyday tasks currently done with a mouse and a keyboard.

"So right now, for example, we have 10 fingers, each of which can activate one function. But we can also have another (gesture) using two fingers. So the permutations are there," said Prof Lim. "In fact, I wanted to ask the team to work on one (control scheme) for me to operate my PowerPoint presentations, moving from one slide to another."

Prof Lim said the goal is to go commercial with the glove in a year's time through an NUS start-up called Microtube Technologies that he founded with two team members, Dr Yeo Joo Chuan and Dr Yu Longteng. He estimated the glove could cost between $200 and $300.

"We are looking at developing different versions for different users, such as a simpler one for the mass market and a more advanced one for serious gamers," Prof Lim said.

"The gloves really have to be customised for individual use so we are also looking at different sizes for children and adults."

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