Researchers study how to use mind-controlled robots in manufacturing, medicine (w/ Video)

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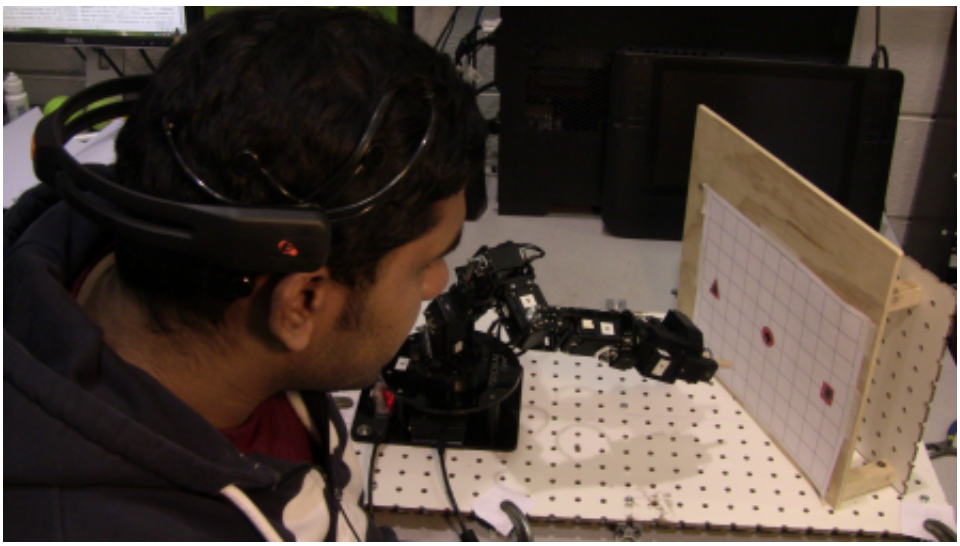

Habib Mohd Younus, a master's student in Thenkurussi "Kesh" Kesavadas' Virtual Reality Laboratory, uses a mind-controlled robot to place a peg in a hole.

(Phys.org) —Worried that machines will someday control the human race? If so, relax.

Researchers at the University at Buffalo and elsewhere are helping to advance technology that allows people to control robots with their minds. UB isn't focused on world domination, but rather applying these brain-computer interface (BCI) devices to manufacturing, medicine and other

fields.

"The technology has practical applications that we're only beginning to explore," said Thenkurussi "Kesh" Kesavadas, PhD, UB professor of mechanical and aerospace engineering and director of UB's Virtual Reality Laboratory. "For example, it could help paraplegic patients to control assistive devices, or it could help factory workers perform advanced manufacturing tasks."

While it sounds like something from X-Men and other science fiction stories, BCI technology has been available to the public for a few years. Devices range from relatively inexpensive novelty items to sophisticated instruments that sell for tens of thousands of dollars.

Products vary but they generally include a helmet equipped with many sensors. The sensors read electrical signals – electroencephalograms – from brain activity and transmit them wirelessly to a computer. The computer then sends signals to the robot to control the robot's movement.

Thus far, most research has involved more expensive BCI devices that, unlike what's described above, are inserted into the brain. They have been used mostly to help disabled people.

UB research differs because it relies on a relatively inexpensive, non-invasive instrument (it retails for $750) that fits on the head like a hat and is outfitted with only 14 sensors.

Kesavadas recently demonstrated the technology with Pramod Chembrammel, a doctoral student in his lab. Chembrammel, who trained with the instrument for a few days, used the device to control a robotic arm. He used the arm to insert a wood peg into a hole and rotate the peg.

"It was incredible to see the robot respond to my thoughts," Chembrammel said. "On top of that, it wasn't even that difficult to learn how to use the device."

The video shows that a simple set of instructions can be combined to execute more complex robotic actions, Kesavadas said. Such robots could be used by factory workers to perform hands-free assembly of products, or carry out tasks like drilling or welding.

The potential advantage, Kesavadas said, is that BCI-controlled devices could reduce the tedium of repetitious tasks and improve worker safety and productivity. The devices can also leverage the worker's decision-making skills, such as identifying a faulty part in an automated assembly line.

Kesavadas, a leader in developing virtual reality tools, plans to continue studying BCI technology. The research could lead to the first, extensive instructional guides for using BCI-controlled devices.

Provided by University at Buffalo

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