

Scientists aim to give paralytics freedom of movement

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A volunteer at RRI attempts to control the robotic arm using an indigenously designed Brain Computer Interface, which allows paralyzed individuals an ability to manipulate their surroundings using visual commands. Credit: RRI

Movements such as walking a few steps or pressing a light switch may be activities that ordinary people take for granted, but for paralytics, they are almost out of this world. An ongoing project in the city could change that.

Since 2017, researchers from the Raman Research Institute (RRI), with neurosurgeons at Aster CMI hospital have been working to develop a home-grown brain interface capable of deciphering the complex neuromotor brain patterns of people and using the signals to manipulate robotic arms or an exoskeleton.

“The aim is to give people who have become paralysed a sense of mobility they would not otherwise have,” explained Prof B Ramesh of the RRI.

Originally the brainchild of Prof Hema Ramachandran, the former head of research facilities at RRI who died of medical complications in November 2020, the project which has been dubbed the brain computer interface (BCI) seeks to indigenise and infuse new ideas into existing brain interface technologies.

“Home-grown technology can help lakhs of paralysed Indians reclaim some measure of independence and mobility,” explained Prof Ramesh, adding that while international brain interface technologies cost up to Rs 20 lakh per unit, the RRI invention would eventually cost between Rs 30,000 and 40,000.

According to Prof Ramesh, the device, which does not require invasive electrodes to be implanted in the brain, uses sensors attached to the surface of the skull.

“It is not possible for us to read what a person wants through neurological signals, but we are able to read signals prompted by a specific neural action, such as a person seeking to clench a fist or extending a hand to touch or grab something,” he said.

The device, which incorporates a visual control system, using LEDs, will allow paraplegics to access motor services through eye movement.

Sujatha S, research assistant for the project, said that the system had been successfully tested, but that clinical trials which had started in February 2020 were brought to a halt due to Covid-19 outbreak in March 2020.

Dr Ravi Gopal Varma, chief of neurosciences at Aster CMI, said that the BCI had been trialed using three individuals.

One had been paralysed due a brain disorder, while two had suffered accidents.

“There was an immediate period of three days of training of the subjects to get used to the system, but further inroads into the trial was interrupted by the pandemic. We are now trying to restart trials,” Dr Varma said.

He said the research team seeks to integrate the BCI with exoskeletons to help give paraplegics a wide range of movement. “Currently, we do not have the technology in India to do this,” he said.

According to Prof Ramesh, the team is also working on measures to suppress a larger degree of biosignal noise to more efficiently “read” motor neuron signals.