Thinking about moving? Let brain waves do the walking

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Using brain waves to control screen cursor movements, rather than moving a mouse by hand, seems like science fiction! Yet such direct control over our environment is an integral part of the development work being undertaken by participants in the Presencia project.
The IST project Presencia is not due for completion until October 2005, yet project researchers have already developed a working brain/computer interface able to provide direct control of computers. The method is primitive as yet, but has been demonstrated to work.

Users experiencing the system have a cap of electroencephalogram (EEG) electrodes placed upon their head. These electrodes are then connected to a pocket PC that records the EEG data or brain waves in real-time. Sat in front of the PC screen, users imagine moving the cursor to the left and then to the right, without actually moving their hands.

The whole procedure is repeated 20 times for each different movement while the PC records the volunteer's brain wave data throughout.

With the Presencia software trained to recognise the volunteer's brain wave patterns, activation of a control signal then allows the user to move the on-screen cursor either to the left or to the right, simply by imagining the movement!

Explaining that the computer can be trained in the same way for foot movements and up/down control of the cursor, Christoph Guger (of Austria's Guger Technologies) stresses that such training is not difficult.

“We estimate that about six per cent of people, on average, can learn to control such simple cursor movements within around thirty minutes, with an accuracy of around ninety per cent. Almost everyone could train themselves to do it within a day.”

Presencia project participants are developing the technology to navigate ‘caves’, or virtual environments. Here VR (virtual reality) gloves and the brain/computer interface enable participants to move around within an environment and interact with others present. However, the technology also has obvious potential for patient rehabilitation applications. Here the brain/computer interface could be used to control prosthetic limbs or drive a wheelchair.

Guger admits that in its present form the technology is experimental. In theory, the interface could be developed to help patients suffering from the neuro-muscular disease ALS (Amyotrophic Lateral Sclerosis) for example, helping them to write complete sentences. However, the present rate of production of one minute per character will need much more development before reaching commercial reality.

Yet he believes that such direct brain control of our surrounding is only a matter of time. “In 1999, there were just twenty-one labs in the world working on this area – now there are over one hundred.” As he says, “Thirty years ago, pacemaker implants into the human heart were unusual – now we take them for granted.”

Source: IST Results