

Mind Reading Technologies.

By Bradut DIMA, 03 November 2011

Emotiv [www.emotiv.com]

“Specific brain areas have different functions. When particular types of processing are happening you see characteristic patterns of activity distributed over the brain, and also distributed in different frequency bands (faster or slower waves of activity pass across different structures in the brain). We map this and look for characteristic patterns that can be recognized, then convert them into useful outputs so you can develop weird and wonderful applications and games.”



EPOC neuroheadset **\$299.00**

- **Developer Edition SDK \$500.00** (includes a headset and software development kit)
- **SDKLite FREE**
- **Education Edition SDK \$2,500.00**

The Emotiv Software Development Kit includes a high resolution, neuro-signal acquisition and processing wireless neuroheadset and our proprietary software toolkit that exposes our APIs and detection libraries.

Three detection suites that are incorporated into the Emotiv SDK:

Expressiv™ Suite

The Expressiv suite uses the signals measured by the neuroheadset **to interpret player facial expressions in real-time**

Affectiv™ Suite

The Affectiv suite **monitors player emotional states in real-time**. used to monitor player state of mind and allow developers to adjust difficulty to suit each situation.

Cognitiv™ Suite

The Cognitiv suite **reads and interprets a player's conscious thoughts and intent**. Gamers can manipulate virtual objects using only the power of their thought! For the first time, the fantasy of magic and supernatural power can be experienced.

www.emotiv.com

Amazing 'brain cap' lets stroke patients move their limbs using the power of thought

- Scientists track brain signals of healthy patients as they walk along then use the data to 'retrain' the minds of those unable to move on their own

By DANIEL BATES

Last updated at 3:58 PM on 2nd August 2011



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All in the mind: University of Maryland student Harsha Agashe wears the 'brain cap', a non-invasive, sensor-lined piece of headwear that scientists claim lets stroke patients move parts of their body using just the power of thought

UMD biomedical doctoral student Steve Graff, who is working on the project, added that a good way of doing this is to show a patient an avatar on a computer screen who is walking properly and get them to copy it.

Graff, who has congenital muscular dystrophy and is in a wheelchair, said he hopes that the technology will one day allow him to use a mobile phone or throw a football - with just the power of his mind.

'It gives us a way to train someone to think the right thoughts to generate movement from digital avatars. If they can do that, then they can generate thoughts to move a device,' he told Gizmag.

The UMD team had previously got a patient to recreate 3D hand movements and move a computer cursor with their mind.

Their aim is to help the disabled achieve a full return of motor functions following injury, paralysis or stroke.

<http://www.dailymail.co.uk/sciencetech/article-2021579/Brain-cap-lets-disabled-limbs-using-power-thought.html>

Artificial limbs controlled by mind power

Brain implants offer hope to the severely disabled

Ian Sample, science correspondent
Tuesday October 14, 2003
The Guardian

Brain implants that could allow severely disabled people to control prosthetic limbs with their minds could be ready for use within two years, according to a team of scientists. Their claim comes after tests with monkeys showed that the animals could control a robotic arm using just their thoughts.

The brain implants could have a wider use, enabling people to operate machinery if they are unable to do so by any other means.

The scientists from Duke University in North Carolina implanted hundreds of fine electrodes into the brains of rhesus monkeys. They then got the monkeys to play a simple video game.

Using a joystick, the monkeys had to steer a cursor towards a circle on a computer screen. When the cursor was positioned over the circle, they had to squeeze the joystick until the cursor grew in size to cover the circle.

By reading the electrical signals from the monkeys' brains, the scientists were able to work out what thoughts gave rise to different movements, whether it was up, down, side to side or gripping. To make the task more difficult, the scientists wired up the joystick so that it controlled a robot arm in another room.

This time, the movements of the robot arm, rather than the joystick, controlled where the cursor moved on the screen. The point was to see how the monkeys coped with the time delay that the robot arm introduced - an issue someone with a real robotic arm would have to learn to deal with.

After a period of training on the game, the researchers took away the joystick to see if the monkeys could still play the game.

For a while, the monkeys continued trying to play the game with their arms flailing around. But then, the monkeys suddenly realised that they were trying too hard.

"The most stunning thing is that the monkey realised he didn't have to move his arm at all; he stopped moving his arm, but could still play the game," said Professor Miguel Nicolelis, who led the team.

The monkey had realised that just thinking about moving its arms was enough to control the robot arm and the cursor on the screen. The computer linked up to the electrodes in the monkey's brain could work out what movements the monkey was trying to do and turn them into actions.

"I thought it would take a decade to achieve something like this," said Prof Nicolelis, whose study is published in the new Public Library of Science biology journal. "Today I'm much more optimistic about the possibility of using signals from the brain to control robotic arms for people who have lost limbs or are severely paralysed.

"We already have preliminary clinical data suggesting this works in humans."

The results of tests on humans will be announced in the next few months.

Professor Mandayam Srinivasan, an expert in biorobotics at **MIT in Massachusetts**, said: "This is a very important step towards our ultimate goal, which is **for paralysed people to have brain implants to control prostheses** or any other kind of device with their minds.

"If we can do it, it would improve their quality of life immeasurably."

Guardian Unlimited © Guardian Newspapers Limited 2003

http://touchlab.mit.edu/news/Guardian_Artificiallimbscontrolledbymindpower.htm

The next step in bionics

CBS NEWS, October 9, 2011



eLegs is the creation of Berkeley Bionics [<http://berkeleybionics.com/>]

This particular **exo-skeleton** includes a number of sensors that participate in the decision to instantiate a stride, to take a step," said John Fogelin, vice president of engineering.

[...] But **the science of prosthetics** is, increasingly, not just about improving the body as we know it, but bypassing OUR BODIES altogether - and **connecting our brains to computers**.

<http://www.cbsnews.com/stories/2011/10/09/sunday/main20117796.shtml>

'Mind-reading machine' can convert thoughts into speech

The Telegraph, By [Richard Alleyne](#), Science Correspondent

08 Sep 2010



Researchers have been able to translate brain signals into speech using sensors attached to the surface of the brain for the first time.

The breakthrough, which is up to **90 per cent accurate**, offers a way to communicate for paralyzed patients who cannot speak and could eventually lead to being able to read anyone thoughts.

"We were beside ourselves with excitement when it started working," said Professor Bradley Greger, a bioengineer at **Utah University** who led the team of researchers.

<http://www.telegraph.co.uk/science/science-news/7987821/Mind-reading-machine-can-convert-thoughts-into-speech.html>

Power of the Mind: Breakthrough To Give the Disabled Access to Chinese Language Computing

JANUARY 11, 2011
By Adrian Wong

Hong Kong scientists have developed a Chinese language computer system powered purely by thought waves, a breakthrough that puts computing within the reach of the physically disabled.



The first traditional Chinese character Brain Computer Interface (BCI) system, developed by researchers at The Chinese University of Hong Kong (HKCU), **measures brain waves and converts them to Chinese characters on a computer monitor.**

"The best speed we've been able to get so far is about one character per minute ... But for people who are totally paralyzed, that's still useful," said Dr James Minett of HKCU's Electronic Engineering Department and Deputy Project Coordinator.

BCI systems -- in English -- have been around for decades and allow people who are paralyzed or suffering from diseases such as multiple sclerosis and motor neuron disease to communicate with others.

Chinese, with the need to construct complicated characters, however, poses particular problems.

Inspiration:

The project was inspired by a research paper entitled, *Taking off the top of your head: toward a mental prosthesis utilizing event-related brain potentials*, published in April **1988** by Dr. Lawrence Farwell and Dr. Emanuel Donchin.

<http://www.hkstories.net/fall2010/?p=9272>

Emergency brake could be a force of will

01 August 2011



German scientists from **Technical University of Berlin** have developed a new system pre-prototype **emergency brake**, which is **based on the principle of reading the brain and muscle activity driver**.

Research has proven the theoretical possibility of creating controlled by the brain systems that improve driving safety. The essence of the experiment was as follows: the subjects with electrodes on the head (for EEG) and on the right foot drove the car in a computer simulator Open Source Racing Car Simulator. The task of participants was 100 km / h stay at 18 meters behind the vehicle traveling ahead. When he started to brake, subjects were also inhibited. Scientists with the

recorded electrical activity in the brain and muscles, says "Computerra-line."

It was found that activity in the brain when you press the brake pedal itself is not specific to this situation, but its combination with the start of leg muscle contractions to determine that emergency braking is necessary.

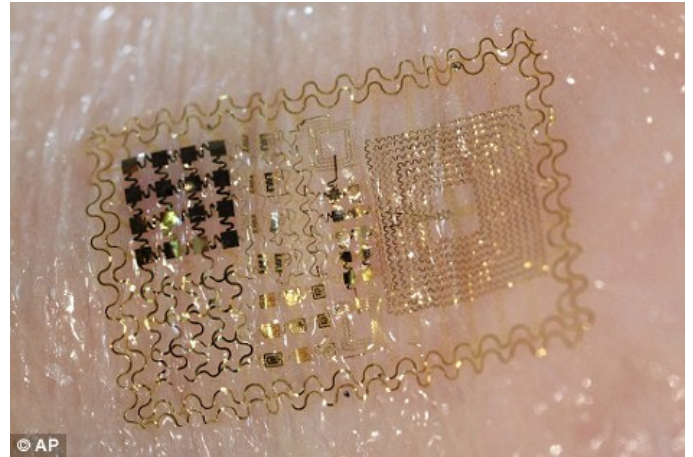
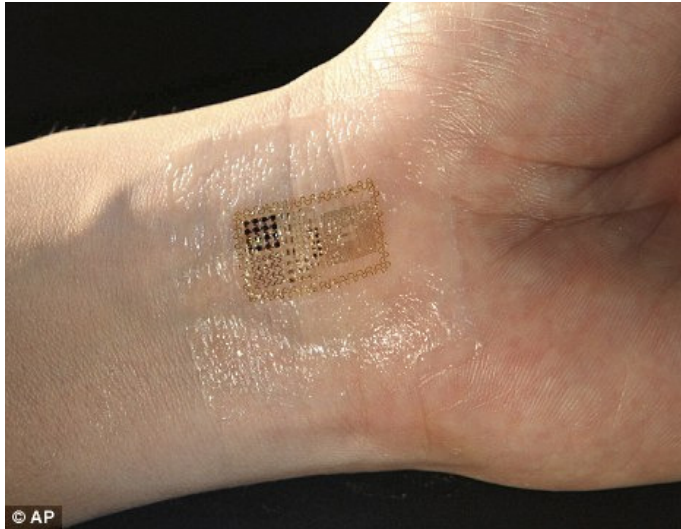
Scientists have found that mental retardation can begin at 0.13 seconds before the actual and at 100 km / h the driver to add more than 3.5 meters braking distance. Unfortunately, before the introduction of design in mass production will be another few years – the experimenters admitted that it was too difficult to separate the signals of individual muscles of the human body, so that participants, in particular, were asked to sit quietly in their seats without making any unnecessary movements.

<http://www.autonewslines.com/auto-news/2011/08/01/emergency-brake-could-be-a-force-of-will.html>

Chip and skin: How hi-tech 'tattoo' will monitor patients' vital signs

By [DAILY MAIL REPORTER](#)

Last updated at 1:00 PM on 12th August 2011



Skin deep: The sensor is so thin it can be worn comfortably on the skin without the patient noticing it

Monitoring a patient's vital signs - such as temperature and heart rate - could soon be as simple as sticking on a tiny, wireless patch similar to a temporary tattoo.

Eliminating the bulky wiring and electrodes used in current monitors would make the devices more comfortable for patients, according to an international team of researchers who report their findings in today's edition of the journal *Science*.

The researchers embedded electronic sensors in a film thinner than the diameter of a human hair, which was placed on a polyester backing like those used for the temporary tattoos popular with children.

[...]

Although normal shedding of skin cells would eventually cause the monitors to come off, the team believe the new device could remain in place for as long as two weeks.

In addition to monitoring patients in hospitals, **other uses for the devices could include monitoring brain waves, muscle movement, sensing the larynx for speech, emitting heat to help heal wounds and perhaps even being made touch sensitive and placed on artificial limbs.**

The device will help fill the need for equipment that is more convenient and less stressful for patients, permitting easier and more reliable monitoring, said Zhenqiang Ma, an engineering professor at the **University of Wisconsin**, who was not part of the research team

<http://www.dailymail.co.uk/sciencetech/article-2025102/Electronic-skin-How-hi-tech-tattoo-monitor-patients-vital-signs.html#ixzz1cb2xh4oR>