IEEE Brainwaves

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IEEE Brainwaves Feature Events :

Seminar by Dr. P.S.V. Natraj from GPU Center of Excellence IIT-B

IEEE Brainwaves organizing committee started the academic year 2014-2015 with the Honourable Speaker from IIT Bombay Prof. PSV Nataraj interacting with the students on topics such as Parallel Computing. Approximately 120 students attended the talk conducted in the seminar hall. making it the brand with the densest network in the luxury segment. In the plant the members first learnt all about the history regarding the introduction of the brand in India and how the plant was setup in Pune, also about the other different plants and assembly units present all over the world. All the information about various Mercedes-Benz products, materials required, and places from where they are imported, painting and all other jobs was given through a digital presentation in the 'Centre of Excellence' area by the events in charge present there.

· As an additional part to this, we had several other attractions for the students such as Frozen Wave, Virtual Reality and Ferro magnetic fluid demonstration all of which were prepared by the organizing committee members. The students also got a hands-on experience of working with various DIY projects such as Electronic Die, Stylus and Intrusion alarm. The event concluded with a small cake cutting ceremony.

IEEE Spectrum Article :

How to Catch Brain Waves in a Net

A mesh of electrodes draped over the cortex could be the future of brain-machine interfaces

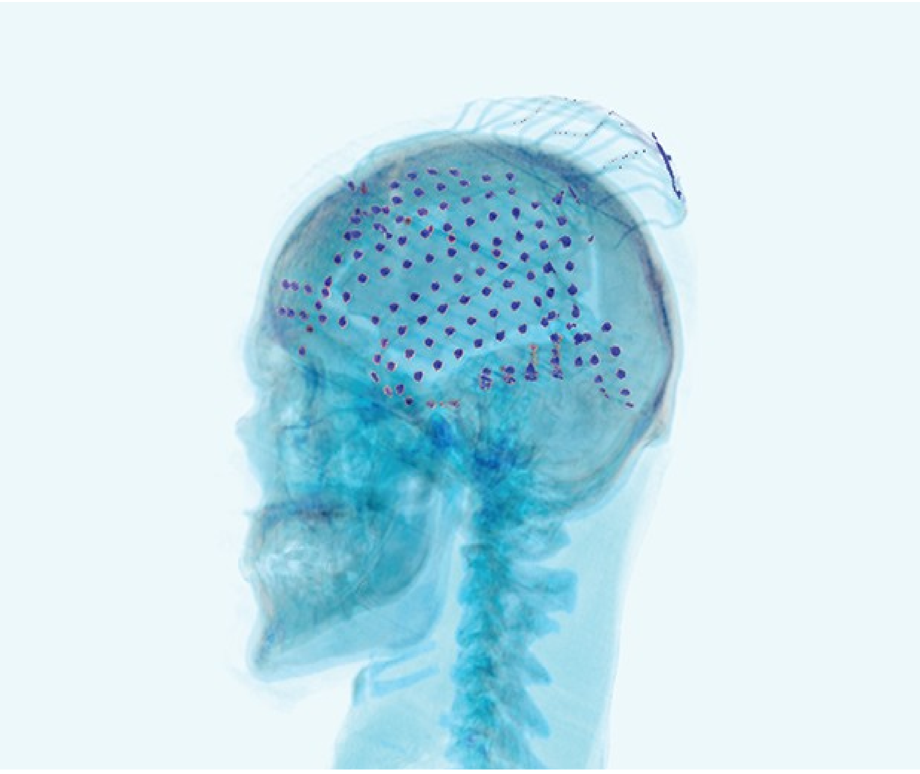
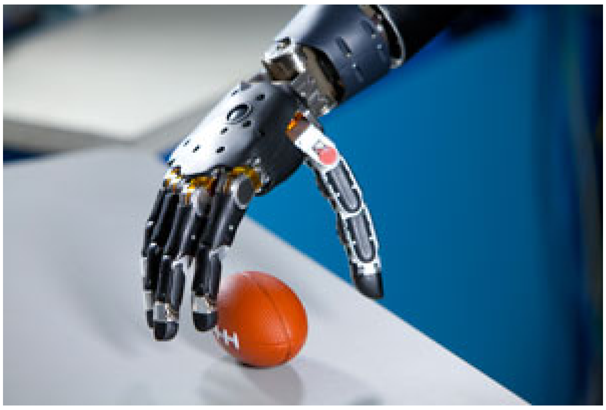


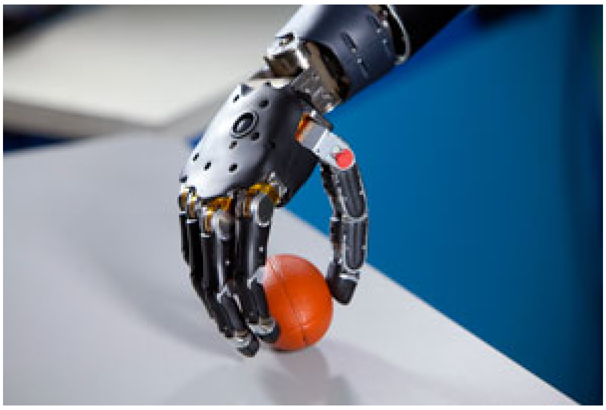
Illustration 1: This photo-illustration shows the electrodes placed over the surface of a patient's brain to record an electrocorticogram (ECoG).

Last year, an epilepsy patient awaiting brain surgery at the renowned Johns Hopkins Hospital occupied her time with an unusual activity. While doctors and neuroscientists clustered around, she repeatedly reached toward a video screen, which showed a small orange ball on a table. As she extended her hand, a robotic arm across the room also reached forward and grasped the actual orange ball on the actual table. In terms of robotics, this was nothing fancy. What made the accomplishment remarkable was that the woman was controlling the mechanical limb with her brain waves.

The experiment in that Baltimore hospital room demonstrated a new approach in brain-machine interfaces (BMIs), which measure electrical activity from the brain and use the signal to control something. BMIs come in many shapes and sizes, but they all work fundamentally the same way: They detect the tiny voltage changes in the brain that occur when neurons fire to trigger a thought or an action, and they translate those signals into digital information that is conveyed to the machine.

To sense what's going on in the brain, some systems use electrodes that are simply attached to the scalp to record the electroencephalographic signal. These EEG systems record from broad swaths of the brain, and the signal is hard to decipher. Other BMIs require surgically implanted electrodes that penetrate the cerebral cortex to capture the activity of individual neurons. These invasive systems provide much clearer signals, but they are obviously warranted only in extreme situations where doctors need precise information. The patient in the hospital room that day was demonstrating a third strategy that offers a compromise between those two methods. The gear in her head provided good signal quality at a lower risk by contacting—but not penetrating—the brain tissue.





High-tech hand: Engineers at Johns Hopkins University designed the Modular Prosthetic Limb for use as a brain-controlled prosthesis.

The patient had a mesh of electrodes inserted beneath her skull and draped over the surface of her brain. These electrodes produced an electrocorticogram (ECoG), a record of her brain's activity. The doctors hadn't placed those electrodes over her cerebral cortex just to experiment with robotic arms and balls, of course. They were trying to address her recurrent epileptic seizures, which hadn't been quelled by medication. Her physicians were preparing for a last-resort treatment: surgically removing the patch of brain tissue that was causing her seizures.

Seizures result from abnormal patterns of activity in a faulty part of the brain. If doctors can precisely locate the place where those patterns originate, they can remove the responsible brain tissue and bring the seizures under control. To prepare for this woman's surgery, doctors had cut through her scalp, her skull, and the tough membrane called the dura mater to insert a flexible grid of electrodes on the surface of her brain. By recording the electrical activity those electrodes registered over several days, the neurologists would identify the trouble spot.

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