“Eye Robot”
Tigra scientifica column
The Tiger Newspaper, Clemson University
April 10, 2009
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Descriptions of human cognition often use vocabulary and concepts related to the most popular current style of media. People used to be 'read like a book' and have encyclopedic knowledge, but modern society often compares the brain to a computer. Now, the emerging field of prosthetic robotics is directly connecting brains to computers through research into what's called the “brain-computer interface”.

Although prosthetics cannot yet fully restore sight it is possible to have a prosthetic eye wired to electrodes on the scalp. Impulses from the wearer's brain cause the eye to move in a natural manner, something that could never be achieved with glass eyes. And the prototype “Argus II system” is a video camera which sends wireless signals to a receiver on the eye's surface. The receiver sends electrical signals to a processor on the retina. In this way images from the camera are turned into electrical impulses sent to the brain, allowing people who have lost their sight to acquire partial vision. For some forms of hearing loss, including congenital deafness, hearing can be restored with a device known as the cochlear implant. This surgically implanted “bionic ear” transmits sounds electronically to auditory nerves, which then relay the signals to the brain.

Recently, great advances have been made in robotic prosthetic arms. The goal is to have prostheses that can communicate with a microchip implanted directly in the motor cortex of the brain. One prominent developer of this technology is inventor Dean Kamen, who is most well-known for designing the Segway. Under a two year grant from US Defense Advanced

Research Projects Agency (DARPA), he and his team developed an arm dubbed “Luke” (after a Star Wars movie hero who has a robotic hand) to meet the goals of being modular, lightweight, agile, and controllable. Unlike current prosthetics “Luke” has an opposable thumb and four fingers, can move through all the angles of a natural arm, and pick up objects as delicate as a grape.

Dr. Todd Kuiken at the Rehabilitation Institute of Chicago developed a neural interface and now “Luke” can connect to motor nerves, be controlled by the brain, and send sensory signals (such as grip strength) back to the brain. Current research with primates on similar prosthesis-brain interfaces has shown a high degree of success. Lead researcher Dr. Andrew Schwartz, at the University of Pittsburgh School of Medicine, told the BBC news that monkeys learned to feed themselves using brain-controlled prosthetic arms, and the research “moves the day when patients disabled after spinal cord injuries or amputations can use brain-controlled bionic limbs from the realm of science fiction towards science fact.”

One day arms and hands could be bypassed altogether. The “BrainGate” is a surgically-implanted neural microchip (smaller than an aspirin) that allows paralyzed human patients to send signals to a computer. With this technology a quadriplegic patient was able to turn on lights, change TV channels and volume, and use the internet through the power of his mind. Research on the “brain-computer interface” is advancing so fast that modern vocabulary will have a tough time catching up.