

Cyborgs-Human + Machine= the Future Man

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Abstract

Neural control/interfacing/interaction is a powerful means, which can develop a robust bridge between humans and machines. In this paper we emphasize on neural interfacing as an evolving trend in wireless communications by taking into account one of its important application i.e. cyborgs. A cyborg is a cybernetic organism (i.e. an organism that is a self-regulating integration of artificial and natural systems). In the next half of the paper we discuss the operational features of cyborgs. In an attempt to promote greater interaction between humans and computers, companies that develop (cybernetic) robotics technologies participate in a variety of seductive strategies that embody the cyborg discourse. Some of these strategies persuade individuals to concede to particular philosophies, such as the argument that technical artifacts and instrumental reasoning are necessary for effective social development. With the experiments conducted and proposed to be conducted in future and in the process give a brief description of the advantages and disadvantages of this technology.

1. Introduction

Since the late 1980s, virtual reality has been heralded as the next technology that will revolutionize the way we use our computers in the future^[3]. Many experts in the virtual reality field were convinced that the technology would rapidly overcome the physical barriers it faced. Their enthusiasm for future possibilities created expectations from fields as diverse as the entertainment industry and the United States government. Many of the potential users were persuaded by the hype to invest significant resources into this next great technology.

But the return on their investments has been slow to be realized. Although virtual reality has been able to gain a foothold in specific applications and industries, it has not been widely accepted as a means for interacting with your computer. The problems that have plagued virtual reality technology vary widely from extremely limiting and cumbersome interfaces to a lack of applications that are able to take advantage of the medium^[5]. The early hype and resulting failure to deliver has created an environment where the mention of virtual reality future elicits responses that are ex-

tremely skeptical about its usefulness for anything but esoteric applications. This skepticism is not without merit, but in order to explore the future of virtual reality technology, we must push aside skepticism based on past failures and extend our understanding of the fundamental problems with the current technology and its ability to deliver in the future. We must be able to cut through the baseless hype surrounding this technology and discover where the real issues lie and analyze them to realize what promise virtual reality holds for the future. This will allow us to make better resource decisions that will enable us to take advantage of the gains promised by virtual reality, while remaining grounded by its limitations.

2. Research

2.1 Research project on cyborg

“This project is based on the experiment conducted by cyborg Steve Mann “

The silicon chip implant is inserted into the upper inside of the left arm, beneath the Inner layer of skin and on top of the muscle^[3,5]. And the device is connected to the Nerve fibers in the left arm,

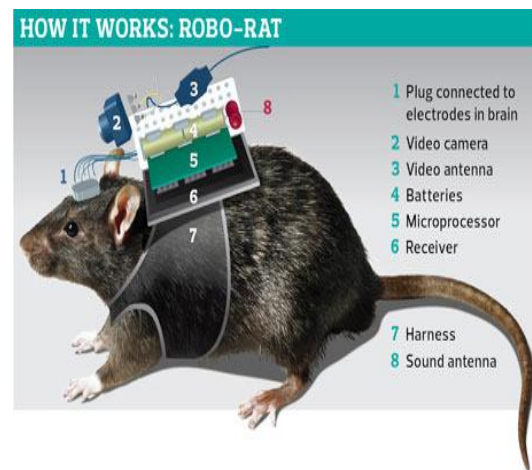
positioned electronic impulses that control dexterity, feeling, even emotions. This nerve center carries more information than any other part of the anatomy, aside from the spine and the head and so is large and quite strong. This chip is made of receive the signals from the nerve fibers and the signals are then transmitted to the computer. The computer is programmed to receive the signals, store them in a data base and execute the tasks such as opening the doors switching on and off of lights and giving vocal messages to the cyborg depending on his locomotions and actions.

2.2 Experiments Proposed by cyborg Steve Mann

As discussed earlier The chip in the implant will receive signals from the nerve fibers and send them to a computer instantaneously. For example, when we move a finger, an electronic Signal travels from the brain to activate the muscles and tendons that operate the hand. These Nerve impulses will reach the finger. The implanted silicon chip receives these nerve pulses and it sends the signal of impulses to a computer through wireless path. The signal from the implant will be analog, so we'll have to convert it to digital in order to store it in the computer. The computer receives the signal and sends it back to the implant. This ensures whether the same response of moving the finger will be by sending same impulse signal to the implant^[1,2]. When we waggle the left index finger, it will send a corresponding signal via the implant to the computer; here it will be recorded and stored. Next, we can transmit this signal to the implant, hoping to generate an action similar to the original. No processing will be done inside the implant.

2.3 Experiment conducted by other scientists

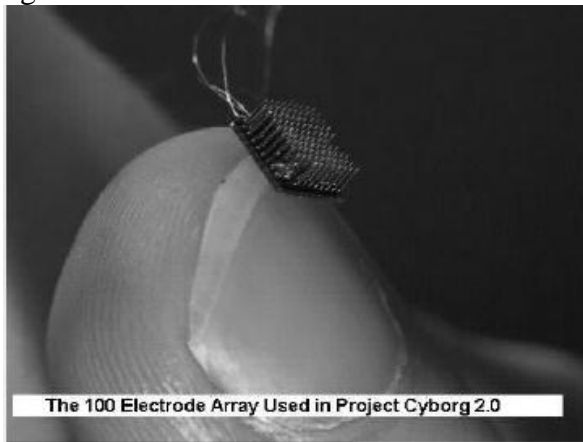
In an experiment conducted by team at Emory University in Atlanta, which to great international interest has planted a transmitting device into the brain of a stroke patient^[4]. After the motor neurons were linked to silicon, the patient was able to move a cursor on a Computer monitor just by thinking about it. That means thought signals were directly transmitted to a computer and used to operate it, albeit in a rudimentary way. The Emory team is looking to gradually extend the range of controls carried out.



3. The next step towards true Cyborgs

On the 14th of March 2002, a one hundred electrode array was surgically implanted into the median nerve fibres of the left arm of Professor Kevin Warwick^[4]. The operation was carried out at Radcliffe Infirmary, Oxford, by a medical team headed by the neurosurgeons Amjad Shad and Peter teddy. The procedure, which took a little over two hours, involved inserting a guiding tube into a two inch incision made above the wrist, inserting the micro electrode array into this tube and firing it into the median nerve fibres below the elbow joint. The purpose of this experiment was to link the nervous system in the left arm, to a radio transmitter receiver; to send signals from nervous system to a computer and vice versa. The main part of the silicon chip consisted of a battery, radio transmitter/receiver and processing unit. Pins connected to the chip pierced the membrane surrounding Warwick's nerve fibres. The interface to Professor Warwick's nervous system was a micro electrode array consisting of 100 individual electrodes implanted in the median nerve of the left arm. A 25-channel neural signal amplifier amplifies the signals from each electrode by a factor of 5000 and filters signals with corner frequencies of 250Hz and 7.5 KHz. The amplified and filtered electrode signals are then delivered to the neural signal processor where they are digitized at 30,000 samples/second/electrode and scanned online for neural spike events^[6]. This means that only 25 of the total 100 channels can be viewed at any one time. Neural spike events are detected by comparing the instantaneous electrode signal to

level thresholds set for each data channel. When a supra-threshold event occurs, the signal window surrounding the event is time stamped and stored for later, offline analysis. The neural stimulator allows for any of the 25 monitored channels to be electrically stimulated with a chosen repetition frequency at any one time. Once the chip was activated, scientists experimented with signals associated with motion and pain. When Warwick moved a body part, the signal was sent to the computer. The computer recorded and successfully replicated the movement by sending a signal back to Warwick.



4. Conclusion

Though bioelectronics has many advantages it may lead to negative arguments with the invention of biological machines called “Cyborgs”. As many scientists have eloquently argued, once a technology is out there, you cannot make it go away. There never was a technology that the human race ever abandoned wholesale, even the hydrogen bomb or other weapons of mass destruction with the power to wipe out all life on Earth. When human beings are offered the chance to utilize computers and electronic technologies within their bodies to achieve the same results, it is almost certain they will embrace them regardless of the risks. Based on this, it

would be unrealistic to try and ban such technologies, however one might worry about their ethical and social consequences. A ban would only probably force them into a large, criminal black market, as illegal drugs and weapons already have been. It is probably imperative for society to assert that the scientists and engineers charged with creating this new technology exert the proper amount of social responsibility.

Safeguards will have to be insisted on to prevent the possible negative impacts discussed above, and many of these things will have to be built in at the instrumental level, since they probably cannot be achieved only through policy and regulation.

5. Acknowledgement

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