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# CYBERNETICS & CYBORGS

DR.RUPNATHJI( DR.RUPAK NATH )

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DR. RUPNATHJI ( DR. RUPAK NATH )

# INTRODUCTION

Cybernetics is the interdisciplinary study of the structure of the regulatory system. Cybernetics is closely related to control theory and system theory. Contemporary cybernetics began as an interdisciplinary study connecting the fields of control systems, electrical network theory, mechanical engineering, logic model, evolutionary biology, neuroscience etc.,

Cyborgs are originated from the concept of cybernetics, which is referred as a mixture of both organism and the technology. When an organism is half human and half machine then we call them CYBORG. The whole process of becoming a Cyborg is known as Cyborgation.

Among the Cyborgs living today *Dr. Kevin Warwick* heads the Cybernetics Department at the University of Reading in the United Kingdom and has taken the first steps on this path, using himself as a guinea pig test subject receiving, by surgical operation, technological implants connected to his central nervous system.

The world's first cyborg was a white lab rat, part of an experimental program at New York's Rockland State Hospital in the late 1950s. The rat had implanted in its body a tiny osmotic pump that injected precisely controlled doses of chemicals, altering several of its physiological parameters. It was part animal, part machine.

DR. RUPNATHJI (DR. RUPAK NATH)

# REAL LIFE CYBORGS

Cyborgs are **Cybernetic Organisms**. The term was coined in 1960's when Manfred Clynes and Nathan used it in an article about the advantages of self-regulating human-machine systems in outer space. The Cyborgs got there fame mainly through the super talented characters in the fiction stories.

A cyborg can be defined as the human being who is technologically complemented by external or internal devices that compliment or regulate various human body functions. Cyborgology is a technical and socio-philosophical study which deals with the development and spreading of the technology to the society.

# ROBOTS & CYBORGS

All of them, to some degree, are programmed; they're basically computers that move. A robot, however, doesn't necessarily have to resemble a human. It can be in the shape of a dog, or a lunar Lander, or one of those giant arms in a car factory.

But cyborgs are beings that are part mechanical and part organic. In fact, some theorists consider anyone whose body relies on a form of machinery in order to survive - such as a pacemaker or an insulin pump - to be a cyborg.

# CYBORGS



## Convenient Cyborgs

## Conditional Cyborgs

Cyborgs are categorized into two types based on their structural and functional role play. Structurally cyborgation can take place either internally or Externally. The former Convenient cyborgs may refer to any external provision of an exoskeleton for the satisfying the altered fancy needs of body, and the latter Conditional cyborgation includes bionic implants replanting the lost or damaged body part for the normal living in the present environment. There is also different types of cyborgs differentiated as per their body working.

# HYBROTS

A **Hybrot** (short for "hybrid robot") is a cybernetic organism in the form of a robot controlled by a computer consisting of both electronic and biological elements. The biological elements are rat neurons connected to a computer chip. This feat was first accomplished by Dr. Steve Potter, a professor of biomedical engineering at the Georgia Institute of Technology. What separates a hybrot from a cyborg is that the latter term is commonly used to refer to a cybernetically enhanced human or animal; while a hybrot is an entirely new type of creature constructed from organic and artificial materials. It is perhaps helpful to think of the hybrot as "semi-living," a term also used by the hybrot's inventors.

Another interesting feature of the hybrot is its longevity. Neurons separated from a living brain usually die after a short period of time; however, due to a specially designed incubator utilizing a new sealed-dish culture system, a hybrot may live as long as two years.

# LATEST DEVELOPMENTS

Cybernetics is one of the scientific field in which continuous researches and studies are taking place and spontaneous developments are derived by it's dedicated scientists. Kevin Warwick, the famous Scientists who implanted a series of 100 electrodes in to his nerves system and controlled his complete lab with the implant and he also developed a mechanical hand which works as per his neural stimulations.

# LATEST TECHNOLOGY

At present Cyborgology concentrates on the development of Conditional cyborgs. That is living being with a mechanical body part which is replaced for the damaged or lost body part. Among them **C-LEG** has prime importance, it has functioning similar to our leg. These external mechanical parts works by the stimulations received generated from our neural system.

# APPLICATIONS

## ◆ IN MEDICAL FIELD:

In medicine, there are two important and different types of cyborgs: these are the restorative and the enhanced. Restorative technologies “restore lost functions, organs and limbs”. The key aspect of restorative cyborgization is the repair of broken or lost processes to revert to a healthy or average level of function. There is no enhancement to the original faculty and processes that were lost.

The enhancement cyborgation follows the Principle of Optimal performance: maximizing the output with a minimized input. Thus, the enhanced cyborg intend to exceed normal processes or even gain new functions that were not originally present.

➤ **IN MILITARY:**

In defensive applications the Cybernetics and Cyborgological experiences are held for the development of “Cyborg soldier”. The cyborg soldier often refers to a soldier whose weapons as well as the survival systems are integrated into the self, creating a human-machine interface. Military organizations research has recently focused on the utilization of cyborg animal. DARPA has announced it’s interest in developing “cyborg insects” to transmit data from sensors implanted into the insect during it’s pupal stage. The insects motion would be controlled from a Micro-Electro-Mechanical-System for detecting the presence explosives and Gas. DARPA is also developing neural implant to remotely control the movement of sharks.

Powered Exoskeleton is another proposed product from Cyborgology for military purpose, which combines a human control system with robotic muscle.

➤ **IN SPORTS:**

Prosthetic legs and feet are not advanced enough to give the athlete the edge, and people with these prosthetics are allowed to compete, possibly only because they are not actually competitive in such -athlons. Some prosthetic leg and feet allow for runners to adjust the length of their stride which could potentially improve run times and in time actually allow a runner with prosthetic leg to be fastest in the world.

➤ **IN ART:**

The concept of cyborgation to associate to most people with science fiction, they tend to believe cyborgs exist only in imaginations of writers and artists. Cyborgs get famed through mainly science fiction films and through stories of writers.

➤ **IN POPULAR CULTURE:**

Cyborgs are become a well-known part of science through fiction literature and other media.

Examples of famous organic –based fictional cyborgs include *Terminator*, *Star war's* etc. Mechanical based models include *Replicants* and *Cylons*.

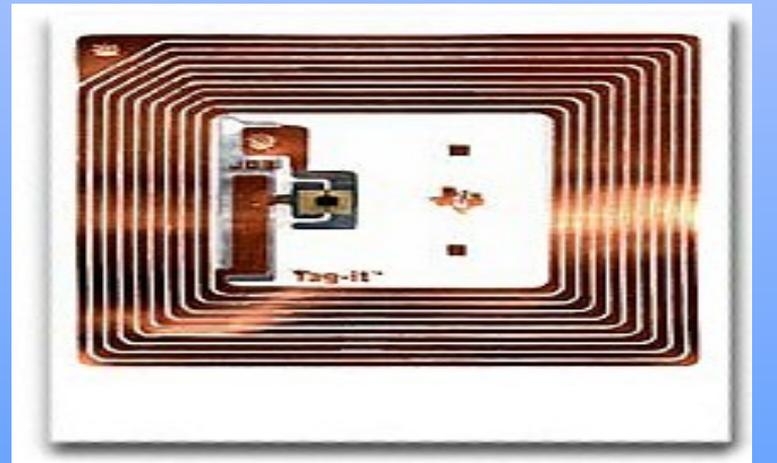
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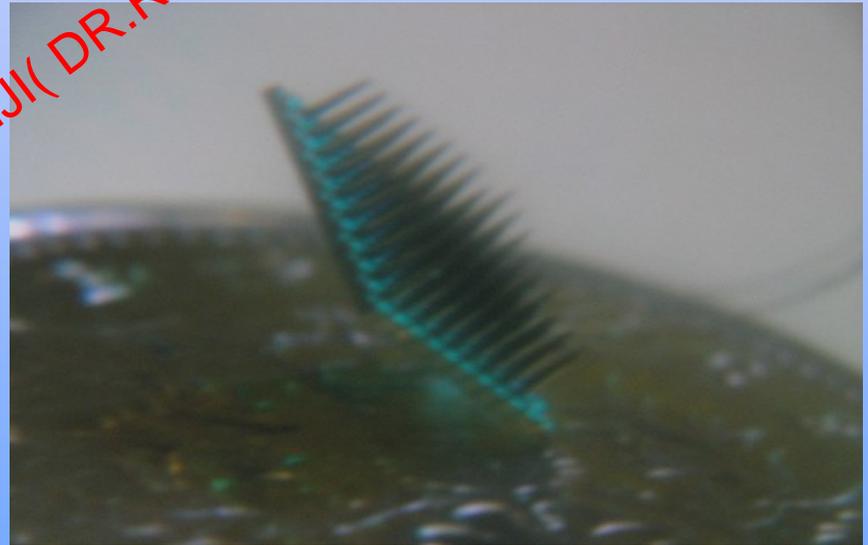
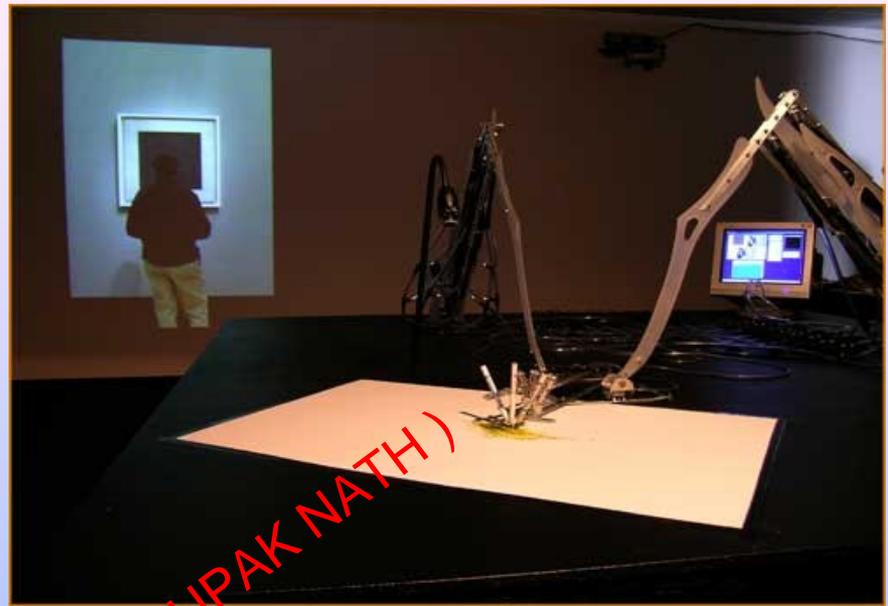
# PHOTO GALLERY





DR. RUPNATHJI ( DR. RUPAK NATH )





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VeriChip's implantable RFID device.

DR. RUPNATHJI ( DR. RUPAK NATH )





# CONCLUSION

Humans have limited capabilities. Humans sense the world in a restricted way, vision being the best of the senses. Humans understand the world in only 3 dimensions and communicate in a very slow, serial fashion called speech. But it must get improved for the human beings to exist in this competitive world. Only technology can make it possible. And Cyborgology is the future technology for the purpose to be get real. Even it has some major defects and wrong sides as like any technologies evolving now days.

DR. RUPNATHU (DR. RUPAK NATH)