



## BLUE BRAIN

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## Abstract

The Blue Brain Project was started and successfully carrying over IBM (International Business Machines) and the main objective of this project is to create a virtual brain. BLUE BRAIN-world's first virtual Brain which means a machine that can function as human brain. The research involve in the study of slices of living brain tissue using microscopes. Full brain stimulation (86 billion neurons) should be possible by 2023 provided sufficient funding is received. It is estimated to be completed around 2025 A.C. It has been used for many applications and mainly to gain better development in the field of medical science.

**Index Terms:** Virtual brain, Brain simulation, Neurons, Nanobots, etc.

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## 1. THE BLUE BRAIN



The blue brain project is the first comprehensive attempt to reverse-engineer the mammalian brain, in order to understand brain function and dysfunction through detailed super-computer based reconstruction and simultaneous. the project aims to build comprehensive digital reconstruction of the brain which can be used to study the nature of the brain. this, in turn, help in understanding how human beings process emotions, though, and gives us deeper insight into the decision making power of the human brain.

## 2. INTRODUCTION

The blue brain project [BBP] makes use of the blue gene supercomputer developed by IBM to carry out simultaneous. hence the project is named the "BLUE BRAIN". the project was founded by HENRY MARKRAM at the Ecole Polytechnique Federale de Lausanne [EPFL] in Lausanne, Switzerland way back in May 2005. Today scientists are carrying out research to create an artificial brain. The main aim is to upload a human brain into the computer, so that it can think, and make decisions without the presence of human body. After death, this virtual brain can act as the man. So even after the death of a person, we will not lose the, knowledge, intelligence, emotions, and this can be used for various situations like to continue the pending work, to decide on something based on the her area

of expertise etc. the human brain is a complex system consisting of recursive connectors. It is more complex than any circuitry in the world. The human brain is a multi-level system with 100 billion neuron [nerve cells] and 100 trillion synapses. Help neurons to communication with each other. So, the question is it really possible to create a human brain? The answer is yes. Today it is possible because of advancement in technology the world of technology has expanded in area like humanoid robot, computing, virtual reality, wearable devices, artificial intelligence, digital jewelry, blur eyes technology, brain gate technology and so much more at a rapid rate. A full human brain simulation [100 billion neurons] is [lined to be complete by 2023 if everything goes well. so, this would be the first virtual brain of the world.

## 3. WHAT IS THE VIRTUAL BRAIN?



A virtual brain is an artificial brain. It can think like the natural brain, take decisions based on the past experience, and respond as the natural brain can. It is possible to do by using supercomputers, with a huge amount of storage capacity, processing power and an interface between the human brain and this artificial one. Through this interface, the data stored in the natural brain the knowledge, intelligence of anyone can be preserved and used forever, even after the death of the person. There are three main steps to building

the virtual brain: 1) data acquisition, 2) simulation, 3) visualization of results.

#### 4. WHY DO WE NEED VIRTUAL BRAIN?

Today we are developed because of our intelligence. Intelligence is the inborn quality that not in sell. Some people have this quality so that they can think to such an extent where others cannot reach. Human society would always need such intelligence and such an intelligent brain. But the intelligence is lost along with the person after death. Virtual brain is a solution to it. The brain and its intelligence can be save even after the body get destroy.

#### 5. HOW DOES THE NATURAL BRAIN WORKS?

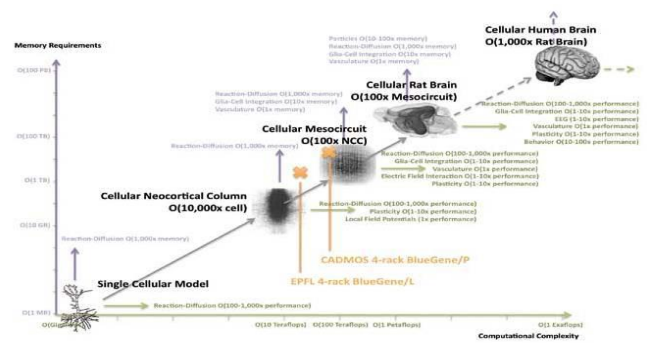


Fig. Neurons

The human brain is multi-level complex system with 100 billion neurons and 100 trillion synapses. Not even engineers have come close to making circuit boards and computers are delicate and precise as the nervous system. To understand the system, one has to know following three simple function.

- Sensory input:** When our eyes see somethings or when our hands touch a warm surface, the sensory cells, also known as Neurons, send a message straight to our brain. We are putting things into our brain by way of senses is called as sensory input.
- Integration:** Integration is best known as the interpretation of things like taste, touch, and sense which is possible because of our sensory cells, known as neurons. Billions of neurons work together to understand the changes in our surrounding.
- Motor output:**The word motor output is easily remembered if one should think that our putting something out into the environment through the use of a motor, like a muscles which does the work for our body.

#### 6. IDEA OF BRAIN SIMULATION

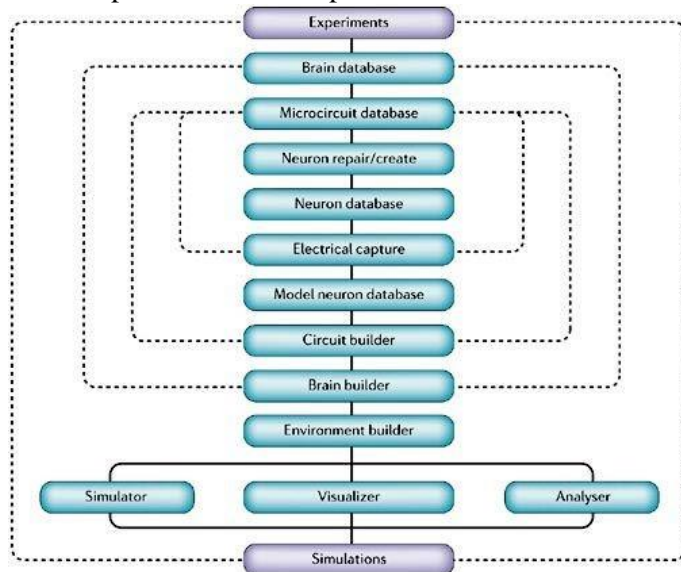


The following table compares the working procedure of the natural and simulated brain. This is possible propose solution. As per EPFL, development is still in progress:

- INPUT-**In the nervous system of our body, the neurons are responsible for transmitting information. The body receives the input by the sensory cells. Here neurons can be replaced by silicon chip. So, the electric impulses from the sensory can be received through these artificial neurons and sends to a supercomputer for the interpretation.
- INTERPRETATION-**The electric impulses received the brain from the neurons are interpreted in the brain. The interpretation in the brain is accomplished by the means of certain states of many neurons. The interpretation the electric impulses received by the artificial neuron can be done by means of set of registers.
- OUTPUT-**Based on the states of the neurons the brain sends the electric impulses representing the responses which are further received by a sensory cell of our body to respond to neurons in the brain at that time. Similarly, states of the register, the output signal can be given to the artificial neurons in the body which will be received by the sensory cell.
- MEMORY-**Certain neurons in our brain, represent some states permanently. When required, this state is represent by our brain and we can remember things we force the neurons to represent certain states of the brain permanently or for any interesting or serious matter, this happens implicitly. In the similar way the required states of the resistors can be stored permanently and when required this information can be retrieved and used.
- PROCESSING-** When we think about something or make some calculation, logical and arithmetic calculations are done in our neural circuitry and are stored as states. Based on the new requests, states of certain neurons are change to give the output. In a similar way, the decision making can be done by the computer by performing arithmetic and logical calculations on the stored states and the new inputs.

## 7. IS IT POSSIBLE TO COPY FROM THE BRAIN TO THE COMPUTER

The uploading is possible by the use of small robot known as the Nano robot. These robots are small enough to travel throughout our circulatory system. Travelling into the spine and brain, they will be able to monitor the activity and structure of our central nervous system. They will be able to provide an interface with computers. Nanobots could also carefully scan the structure of our brain, providing a complete readout of the connections. This information, when entered into a computer, could then continue to function as us. Thus, the data stored in the entire brain will be upload into the computer.



**Fig: Flowchart of experimental arrangement.**

## 8. ADVANTAGES-

- Even after the death of person his intelligence can be used.
- This could boost study of animal behavior. That means by interpretation of the electric impulses from the brain of the animals, their thought process can be understood easily.
- It would allow the deaf to hear via direct nerve stimulation, and also be helpful for many psychological diseases.
- We could make use of the information of the brain that was uploaded in the computer and use it to provide a solution to mental disorder.

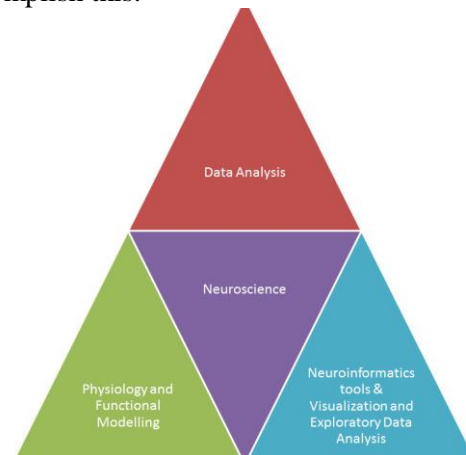
## 9. DISADVANTAGES-

There could be new types of threats, this technology would bring.

- Increases the dependency on computer systems.
- Computer viruses will pose an increasingly critical threat. Data could be manipulated and used in wrong way. Read more about cybercrime.

- This may lead to human cloning and we cannot imagine how big this threat would be against nature.

**CONCLUSION-** The blue brain project, if implemented successfully, would indeed change many things around us and it will boost the area of research and technology. Certain research and development take decades or even centuries to complete, so the knowledge and efforts of a scientist can be preserved and used further in his absence. At the same time, it is not easy task to replicate the convoluted brain system into a computer. It may take several years to decades to accomplish this.



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