

BLUE BRAIN TECHNOLOGY

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Abstract: Famously known as the world's first virtual brain, "BLUE BRAIN" is a very appropriate application of an artificial intelligence human brain. That means a machine can function as human brain. It's a known fact that human does not live for a decade but the information contained in his mind could certainly be stored for a decade with this technology. So with advancement in technology, even after a person is dead, the virtual brain will serve as the man. Therefore, the main idea behind this is uploading human brain into machine. Hence this research paper consists of the concepts of Blue Brain, its requirements, why and how it works, applications, and experiments.

Keywords: *Blue brain, Artificial intelligence, Virtual brain*

I. INTRODUCTION

Brain of humans are the most valuable creation of God. A person is called intelligent because of his brain. The brain translates the information delivered by the impulses, which then enables the person to react. But we loss the knowledge of a brain when the body is destroyed after the death of man. That knowledge might have been used for the development of the human society.

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II. WHAT IS BLUE BRAIN

The Blue Brain Project is assumed to be the first one to explore about a true "Artificial Intelligence" via the process of reverse engineering and also the effort to reverse engineering a human brain. The vision behind Virtual Brain will help shed some light on some aspects of human recognition. The Blue Brain Project aims to build a full computer model of a functioning brain to simulate drug

treatments or any other brain related problems. Blue gene supercomputer constructed by IBM was a machine first used by Blue Brain Project and then a term Blue Brain was introduced. It can be implemented by using supercomputer, the fastest type but quite expensive and are assist for special tasks which require abundant amount of mathematical computations, like weather forecasting employs a supercomputer. The back pane of Blue Brain is Artificial Intelligence, a technology which builds intelligent machines and imparts intelligent agents. Knowledge, learning, reasoning, planning, communication and perception are the main goals of its research.

III. WHY WE NEED BLUE BRAIN

Today we are developed because of our intelligence. Intelligence is the inborn quality that can't be created. Some people have this quality, so that they can think up to such an extent where other can't reach. Human society is always need of such intelligence and such an intelligent brain to have with. But the intelligence is lost along with the body after the death. The brain and intelligence will alive even after the death. We often face difficulties in remembering things such as people's names, their birthdays, and the spellings of words, proper grammar, important dates, history, facts etc... In the busy life every one want to be relaxed.

IV. HOW BLUE BRAIN WILL WORK

- Visualization of Result
- Simulation
- Data Acquisition

➤ Data Acquisition

We need to study different types of neurons and catalogue them. In involves taking brain slices and placing them under a microscope, measuring the shape and electrical activity of individual neurons.

Morphology (A branch of biology dealing with the study of form and structure of organisms and their specific structural features, Comparative morphology, Functional morphology and Experimental morphology are different branches of morphology)

Electrophysiology behaviour (A minimally invasive procedure which test the electrical conduction system of the heart to assess the electrical activity and conduction pathways of the heart, it enables twelve living neurons to be concurrently patched and their electrical activity recorded), location within the cortex and their population density are the different factors by which neurons are typed. Form, function and positioning of neurons are obtained by translating these observations into mathematical algorithms. By the help of these algorithms, biologically-realistic virtual neurons ready for simulation are generated.

➤ **Simulation**

Input:

In the nervous system of our body, neurons are responsible for message passing. Sensory cells convey the input to our body. Electric impulses are produced by sensory cells which are received by the neurons. Further, electric impulses (through the silicon chips of artificial neurons) are transferred to the brain by neurons.

Interpretation:

Brain receives the electric impulses from the neurons which are interpreted by means of registers. Different states of brain can be accomplished by the different values in these registers.

Output:

On the basis of the states of the registers, the electric impulses are sending by the brain representing the responses which are then received by the sensory cells to respond .The sensory cells of which part of our body is going to receive that, it depends on the state of the neurons in the brain at that time.

Memory:

We can store certain information (states) permanently in our brain by certain neurons .On the basis of our requirement, the brain interprets those states and thus past things can be gathered. To do so we demand the neurons, to permanently show the clear vision of the Brain's States.

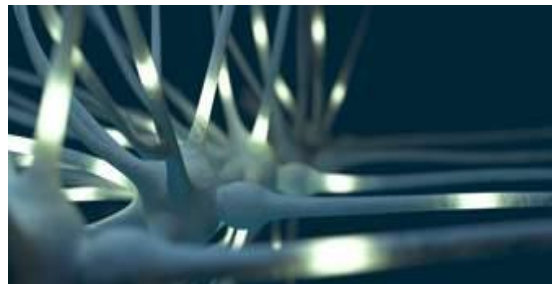
Processing:

By the use of some stored states, computation will be performed by the computer. Logical and arithmetic calculations are done in our neural circuitry. To produce the output stored past experiences and current input received are used.



➤ **Visualization Of Results:**

Huge amount of data are generated by running the Blue Brain simulation. Thousands of times analyses of individual neurons must be repeated. Data can be analysed by using massively parallel computers where it is created (server-side analysis for experimental data, online analysis during simulation).



V. REQUIREMENTS

- A supercomputer with high processing power processor
- A very large storing capacity
- A very wide interconnection network.
- A program to map electric impulses from human brain to input signal that can be received by the computer.

VI. APPLICATIONS

• **Gathering And Testing 100 Years Of Data :**

The most immediate benefit is to provide a working model into which the past 100 years knowledge about the microstructure and workings of the neocortical column can be gathered and tested. The Blue Column will therefore also produce a virtual library to explore in 3D the microarchitecture of the neo-cortex and access all key research relating to its structure and function.

• **Cracking The Neural Code:**

The Neural Code refers to how the brain builds objects using electrical patterns. In the same way that the neuron is the elementary cell for computing in the brain, the NCC is the elementary network for computing in the Neo-cortex. Creating an accurate replica of the NCC which faithfully reproduces the emergent electrical dynamics of the real microcircuit, is an absolute requirement to revealing how the neo-cortex processes, stores and retrieves information.

• **Understanding Neocortical Information Processing:**

The power of an accurate simulation lies in the predictions that can be generated about the neo-cortex. Indeed, iterations between simulations and experiments are essential to build an accurate copy of the NCC. These iterations are therefore expected to reveal the function of individual elements (neurons, synapses, ion channels, and receptors), pathways (mono-synaptic, di-synaptic, multi synaptic loops) and physiological processes (functional properties, learning, reward, and goal oriented behaviour).

VII. EXPERIMENTS

As of August 2012 the largest simulations are of microcircuits containing around 100 cortical columns. Such simulations involve approximately 1 million neurons and 1 billion synapses. This is about the same scale as that of a honey bee brain. A rat brain neocortical simulation (~21 million neurons) achieved in the end of 2014. A full human brain simulation (86 billion neurons) should be possible by 2023 provided sufficient funding is received.

VIII. ADVANTAGES & DISADVANTAGES

Advantages:

- We can remember things without any effort.
- Decision can be made without the presence of a person.
- Even after the death of a man his intelligence can be used.
- The activity of different animals can be understood.
- It would allow the deaf to hear via direct nerve stimulation, and also be helpful for many psychological diseases. By downloading the contents of the brain that was uploaded into the computer, the man can get rid from the madness.

Disadvantages:

- There are many new dangers these technologies will open. We will be susceptible to new forms of harm.
- We become dependent upon the computer systems.
- Others may use technical knowledge against us.
- Computer viruses will pose an increasingly critical threat.
- The real threat, however, is the fear that people will have of new technologies. That fear may culminate in a large resistance. Clear evidence of this type of fear is found today with respect to human cloning.

IX. CONCLUSION

Thus blue brain's fact that human does not live for a decade but the information contained in his mind could certainly be stored for a decade with this technology. So with advancement in technology, even after a person is dead, the virtual brain will serve as the man.

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