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Blue Brain Technology

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ABSTRACT

After death, the human body gets destroyed, brain stops working and human eventually loses his/her knowledge of the brain. But this knowledge and information can be preserved and used for thousands of years. The Blue Brain Project is an attempt to reverse engineer the human brain and recreate it at the cellular level inside a computer simulation.

At present scientists are trying to make a brain that can think, store information, respond and make decisions. The object of this project is to use the brain of the people even after death. The blue brain is based on reverse engineering. Reverse engineering is used to know how brain functions work through detailed supercomputer-based reconstructions and simulations. Blue brain project is used to create a digital reconstruction of the brain. This project can help in memorizing the things which we often forget.

The name of the first artificial brain. It means that machine can perform a function as human brain. . The aim is that examine human brain into machine. that way human will think, take decision do not take any effort. when destroy the body, the knowledgeable person destroy all intelligence. artificial brain will be act as man society. No one has ever understood the complexity of human brain. It is difficult than any circuitry in the world. So, question may rays “Is it really possible to create a human brain?” The answer is “Yes”. Because whatever person has created today always he has followed the nature. When man does not have any device called computer, it was a big question to all human society. But today it is possible due to the vast technology. Technology is growing faster than other. IBM is now in research to create a artificial brain. It is called “Blue brain.

Keywords - Blue-brain, Brain, Neurons, artificial neurons, Sensory system Nanobots

I. INTRODUCTION

Blue Gens supercomputer is used in the blue brain project which is developed by IBM. At present scientists are trying to make a brain that can think, store information, respond and make decisions. The object of this project is to use the brain of the people even after death. When a person dies at that time the brain stops working so we cannot use his/her brain but we can use his/her brain after his/her death by

using blue brain technology. In this technology, a person's brain is uploaded into the computer. It makes computer able to think and take decisions [1]. This project aim is to reuse the knowledge and intelligence of the person. This technology can help a lot in continue the pending work.

The human brain is a very complex system in this world. It is a system with more than trillion of neurons (nerve cells) and synapses. The work of neuron is to transmit information to other neurons or cells. The work of synapses is to help neurons to speak with one another. Is it really possible to reuse the brain of the person even after death? Yes, it is possible with the help of the blue brain project.[1]

1.1 Glimpse of Blue Brain

Blue Brain Project is a Swiss brain research Initiative led by Founder and Director Professor Henry Markram. It is been developed by IBM. Within the span of 30 years we will be able to scan ourselves into the computer.[2]

1.2 What is Blue Brain

It is a Virtual Brain. A virtual brain is a brain which can think just like the natural human brain. It can make decisions and store information like a natural brain. A virtual brain can be created by using supercomputers, with the large amount of processing power, storage capacity. Also, an interface is required between the artificial brain and human brain. By using this interface, the information stored in the human brain is uploaded in the personal computers.[3]

Fig 1.1 Blue Brain

II. LITERATURE SURVEY

Human Brain is the most complicated creature on earth that will be demolished after certain decay of years. This research paper is based on the theoretical concept. How its intelligence can be preserved for future use and what methodology is used for preserving it. It also discussed about its merits, demerits and lots of other things that we can do with it.

This research paper also states the future scope of Blue Brain Technology. The actual need of this technology has been mentioned in this paper.

III. NEED OF BLUE BRAIN

Intelligence is something that we cannot create, it is an inborn quality. Some people born with intelligence and they can think up to such an extent where other cannot reach. Intelligence is required for development. Human always require such intelligence. But after the death, intelligence is lost along with the body. Blue brain is solution to it. It makes sure that intelligence will be alive even after the death. We can upload the knowledge of a person on a computer with the help of blue brain. We often forget things such as people names, spellings of words, important dates. Can't we use machine to remember things? Blue brain may be a better solution. [2]

2.1. Basic Steps of Blue Brain

2.1.1. Information Collection

It is the process of collection of brain portions. The neurons are captured by their physiological, electrical activity and their shape. This information is converted into algorithms. It defines function, method and position methods of neurons. Algorithms generate virtual neurons that look biologically-real and ready for simulation.[2]

2.1.2. Information Simulation

It is used to deal with two major aspects.

i. Simulation workflow

ii. Simulation speed

BBP-SDK allows the researchers to use simulations and prototypes. BBP-SDK is a C++ library that is wrapped in python and java. The primary software is NEURON for neural simulations. It is developed by john Moore and Michael Hines at the starting of the 1990s. It uses Fortran, C++, and C. It is a free open source software that is freely available. The website provides the code and therefore the binary data freely.[2]

2.1.3. Visualization of Results

This Project uses RT Neuron which helps in visualization of neural simulations. This software is developed by the BBP team. It is coded using OpenGL, C, and C++. Mostly this software is used for neural simulations. RT Neuron delivers the output in 3D. This software help programmers to analyse things between neurons. Many times, these animations are, stopped, started, paused and zoomed. So that it can allow researchers to interact with the model. Generally, visualizations are multi-scale.[2]

IV. UPLOADING HUMAN BRAIN

Artificial brain makes use of small size robots also known as Nanobots. These robots travel throughout our cardiovascular system. These robots monitor the activity and structure of the nervous system. These robots used to provide an interface which will close to our mind. Nanobots are used to scan the structure of our brain so that it can readout the entire connections. Thus, entire information which is stored within the brain, are uploaded into the pc.[4]

V. HARDWARE AND SOFTWARE REQUIREMENTS

- A high speed Super computer
- Large storing capacity Memory
- Processor
- Large Community (network)
- A program that can understand the function of human brain.
- Powerful Nanobots.[3]

VI. RT NEURON

RT Neuron is the main application that Blue Brain Project uses for visualization of neural simulations. The BBP team developed this software internally. It is coded using C++ and OpenGL. RT Neuron is an ad-hoc software written specifically for neural simulations, i.e. it cannot generalized to other kinds of simulation.[5]

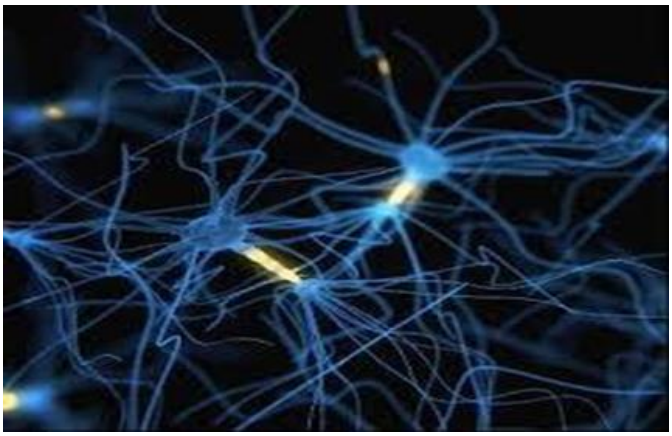

Fig 5.1 RT Neuron

VII. ADVANTAGES OF BLUE BRAIN TECHNOLOGY

- We can use a person's intelligent even after his death.
- This project can help a deaf to get information directly via nerve stimulation.
- The information of the brain can be used to provide a solution to mental disorder.
- This machine will be able to think and make self-decision. [3]

VIII. DISADVANTAGES OF BLUE BRAIN TECHNOLOGY

- This will increase the dependency on the computer

- Computer virus can be a critical threat
- This requires a large amount of memory and processing power to create a virtual brain that could act as a natural
- The machine can conduct war against humans as we are making machines intelligent. [3]

IX. FUTURE SCOPE

- In future this technology will be useful in diagnosis of malfunction of human brain as well as development of treatments for neurological disorders.
- A start to a Digital Era in Neuroscience.
- No more struggles for disabled people to communicate.
- An artificial brain comes to a life in Switzerland. A simulation was created with the piece of hardware that consists of 10,000 computer chips that act like real nerve cells.[2]
- Since blue brain technology takes a lot memory to store the information and the state that will be helpful in remembering the state to take decisions.
- In future this problem can be solved by the new technology that would take less space and store the large amount of data that will be useful in remembering and taking decisions.
- One of the technique that we think about is the brain based chip or the DNA based chip that has the capability to store a very large amount of memory.[3]

X. APPLICATIONS

- Cracking the Neural Code
- Foundation for Whole Brain Simulations
- Understanding Neocortical Information Processing
- Drug Discovery for human brain disorders.

XI. CURRENT ACHIEVEMENTS

In current achievements, The EPFL scientist had completed their first draft of computer reconstruction of a piece of neocortex. Neocortex is that part of brain where different type of neurons is located having different functionalities like storing, transferring, sensing and etc. these neurons are useful for researchers to study the behaviour of the brain and also the flow of the signals through the neurons from brain to sensory cell and vice versa. The electrical behaviour of the virtual brain tissue was simulated on supercomputer and found to match the no of behaviour in the human brain. The researchers performed tens of thousands of experiments on neurons and synapses in the neocortex of young rat and collected and studied each type of neurons and synapses present in the neocortex [5]

XII.CONCLUSION

This project success can change the world and technology which we are using at present. There is a lot of research that takes decades, in these cases intelligence and efforts of the scientist can be used even after their death. It is a complex task to create duplicate brain into a system and it may take decades to complete but this project has the potential to change the entire world.

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