A Review Study on Blue Brain Technology

Jaskaran Singh[1], Dr.Raman Chadha[2]

[1]B.Tech Student (CSE), [2]Professor, HOD (CSE),

[12]CGC Technical Campus, Jhanjeri, Mohali

[1]jaskarans880@gmail.com, [2]dr.ramanchadha@gmail.com

Abstract: Brain is one of the most significant and intellectual gift given by the GOD. It is one of the most crucial part in our body that needs serious care handling and nutrition. It is the brain with help of which we have developed computers, machines and all sorts of comforts that we are using in our day to day life. Today we are living in a world where everything can be manufactured on artificial level i.e. we are living in virtual kind of world. Brain has invented the computer, but computer doesn't it. The Blue Brain is an attempt to reverse engineer the human brain and recreate it at the cellular level inside a computer simulation. The main goals of the project are to gain a complete concerned of the brain and to enable better and faster development of brain disease treatments. We can say that blue brain is the brain, which is virtually instructing the functions in terms of artificial intelligent. The mission is undertaking the Blue Brain technology is to gather all existing knowledge of the brain, raise the global research efficiency of reverse engineering and to build a complete theoretical framework. The main aim is to upload human brain into machine due to more thinking power. After the death of human being, brain neurons can work virtually, so their knowledge, intelligence, personalities, feelings and memories of that man can be used for the development of the human society.

Keywords: Neurons, Nerves, Sensory System.

I. INTRODUCTION

The **Blue Brain** is an attempt to reverse engineer the human brain and recreate it at the cellular level inside a computer imitation.[5] Data is collected about all the many different neuron. The goal of the Blue Brain Project is to construct biologically meticulous digital reconstructions and simulations of the rodent, and ultimately the human brain. The supercomputer-based reconstructions and simulations built by the project offer a radically new approach for understanding the multilevel structure and function of the brain. [2]The project's novel research strategy exploits interdependencies in the experimental data to obtain dense maps of the brain, without measuring every detail of its multiple levels of organization.. This strategy allows the project to build digital reconstructions (computer models) of the brain at an unparalleled level of biological detail. Supercomputer-based simulation of their behavior turns understanding the brain into a tractable problem, providing a new tool to study the complex interactions within different levels of brain organization and to investigate the cross-level links leading from genes to cognition. Today with the speedy advancement in technical as well as medical filed, a very important part in our daily life is virtually controlled brain. Virtual brain is called as Blue Brain and this technology is known as Blue Brain Technology.

II. HISTORY OF VIRTUAL BRAIN

The Virtual Brain Initiative is one of the best known trials to understand and organize brain data in a useful way. It is a neuroinformatics platform that tries to simulate the brain organization on the macroscopic level of detail. This tool is based on the idea of taking advantage of available functional and structural brain data generated by imaging techniques such as MRI, functional MRI and trans-cranial magnetic stimulation. The virtual brain will try to gather important information related to neuronal connectivity and structure of the brain. It will inform us about activated groups of neurons, their connections, their respective distances, the time and the speed of their communications. This software will also collect data related to the structure of the brain like 3D cortex geometry and the exact location of neuron groups.

After identifying the involved population of neurons, they will be assembled in large neuronal networks to finally construct a brain model. The Virtual Brain Initiative is one of the best known trials to understand and organize brain data in a useful way. It is a neuron informatics platform that tries to simulate the brain organization on the macroscopic level of detail. This tool is based on the idea of taking benefits of available functional and structural brain data generated by imaging techniques such as MRI, functional MRI and trans-cranial magnetic stimulation. The virtual brain will try to gather important information related to neuronal connectivity and structure of the brain. It will inform us about activated groups of neurons, their connections, their respective distances, the time and the speed of their communications. This software will also collect data related to the structure of the brain like 3D cortex geometry and the exact location of neuron groups. After identifying the involved population of neurons, they will be assembled in large neuronal networks to finally construct a brain mode brain shown in fig: A.

Fig A: Blue Brain

Blue brain is an artificial brain which is capable of performing all sorts of brain functions (similar to real brain). It is capable of taking and manipulating decision which is similar any other normal human brain. At present this program (of developing Blue Brain) is handled by IBM with some well-known scientists.

III. REQUIRE OF BLUE BRAIN

In order to develop a blue-brain, super computer paired up with large amount of memory capacity will be required. Human society is always in 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 virtual brain is a solution to it [1]. The brain and intelligence will be alive even after the death. We often face difficulties in remembering things such as people names, their birthdays, and the spellings of words, proper grammar, important dates, history facts, and etcetera. In the busy life everyone wants to be relaxed. Virtual brain may be a better solution for it. Biological structure of Blue Brain is represented in fig B.
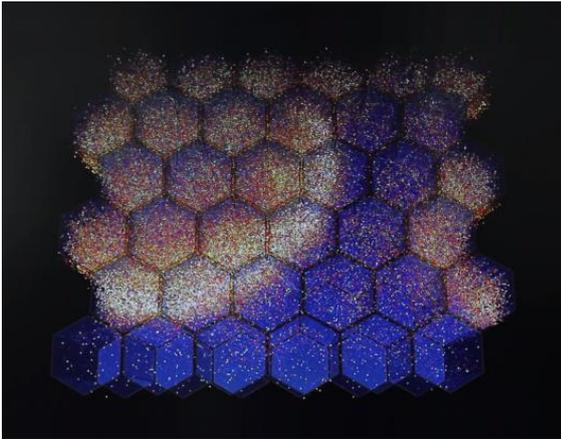

Fig B: Biological structure of Blue Brain

The main and important concept of blue brain is that life is too short and we cannot share our feelings with our colleagues, parents, siblings etc. in so hectic and busy life. Memories will still alive, even a death of human being. Fortunately or unfortunately human life is not immortal and has to end after some time and sleep in peace. However after many researches it has been found that feelings and mind views are there forever even after death. The normal human brain is about 1500 grams i.e. around 3 pounds and constitutes about 2% of total body weight.

IV. WORKING OF BLUE BRAIN TECHNOLOGY

Blue Brain is a technology which will be there in front of everyone in future. For doing it we will first have to upload human brain to the targeted super computer with more memory capacity. We can do it easily with help of small robots called " Nano robots ".These robots can travel through inner parts of our body without damaging them. They can monitor the whole human body immune system and connectivity with the neurons just to store the information for blue brain virtual technology system.

V. ADVANTAGES OF BLUE BRAIN TECHNOLOGY

Blue Brain can make us grow in each and every field of human kind. Be it engineering, medical or any other field, we can easily get guidance with master blue brains of respective fields. Following are the some imperative points related with advantages:

- We can remember lot of things without any efforts.

- Decision can be taken without the physical presence of a person.

- After the death of a person, his brainpower can be used.

- Gathering and testing of 100 years data. It can be used for cracking the code.

- It has global capacity.

- The activity of different animal can be understandable easily.

- Blue brains will be able to treat mental disorders related to human brains also.

- With this technology we can use someone's brain even after his/her death. As a result the person's memory would not be lost and his/her creative ideas may be a changing part in our life.

- This technology will help deaf to hear via direct nerve stimulation and can also be helpful in many physiological diseases.

VI. DISADVANTAGES OF BLUE BRAIN TECHNOLOGY

If a technology holds an advantage it holds disadvantage too. Let us now discuss de-merits of this technology:-

- Viruses may pose critical thread to this technology.

- One may be fully dependent on this technology.

- An expensive approach towards daily life.

- Some people may use technical knowledge against the society.

VII. LIMITATIONS

1. We become dependent upon the computer systems.

2. Others may use technical knowledge against us.

3. Computer viruses will pose an increasingly critical threat.

VIII. FUTURE PERSPECTIVE

The synthesis era in neuroscience started with the launch of human brain project and is inevitable phase triggered by a critical amount of elementary data. The data set does not

Need to be complete before such a phase can begin. Detailed models will probably become the final form of databases that are used to organize all knowledge of the brain and allow hypothesis testing, rapid diagnoses of brain malfunction as well as development of treatments for neurological disorders. In short, we can hope to learn a great deal about brain function and dysfunction from accurate models of the brain. A model of the entire human brain at the cellular level will probably take the next decade. As with deep blue, Blue Brain will allow us to challenge the foundations of our understanding of intelligence and generate new theories of consciousness.

IX. CONCLUSION

In conclusion, we will be able to transfer ourselves into computers at some point. Most arguments against this outcome are seemingly easy to circumvent. They are either simple minded, or simply require further time for technology to increase. The only serious threats raised are also overcome as we note the combination of biological and

digital technologies. While the road ahead is long, already researches have been gaining great insights from their model. Using the Blue Gene supercomputers, up to 100 cortical columns, 1 million neurons, and 1 billion synapses can be simulated at once. This is roughly equivalent to the brain power of a honey bee. Humans, by contrast, have about 2 million columns in their cortices. Despite the sheer complexity of such an endeavor, it is predicted that the project will be capable of this by the year 2023.

REFERENCES

[1]. http://bluebrainproject.epfl.ch

[2]. http://research.ibm.com/bluebrain

[3]. http://thebeutifulbrain.com/2010/02/bluebrain-film-preview/

[4]. Henry Markram, "The Blue Brain Project", Nature Reviews Neuroscience.

[5]. www.gripinit.com/2015/03/18/blue-brain-human-brain-in-a-supercomputer

[6]. brainblogger.com/2016/02/05/a-virtual-brain-the-benefits-of-brain-modelling

[7]. https://www.researchgate.net