



BLUE BRAIN TECHNOLOGY

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ABSTRACT:

The brain is the most complex organ in human body. The aim of blue brain technology is to upload the complete information in the brain into a computer. We can achieve this even after the death of a human body. In this way, preserve the knowledge and intelligence. The Blue Brain technology is the latest invention in the field of neural networks. This technology will open doors in the field of artificial intelligence. The blue brain technology provides a comprehensive simulation of internal connectivity of the cerebral parts with the external artificial intelligent network. This study of human brain will lead to a total outline of the flow of the electrical signals through the brain. The intelligent neurons are a part of cortex accessible in the human brain. This new technology has made way for considerable improvement in supercomputing, also known as high performance computers.

Keywords- Blue Brain, Virtual, Artificial Intelligence, Connectivity.

[1] INTRODUCTION

Blue brain is the name of the world's first virtual brain. It means a machine that can work as a human brain. Computer simulations in neuroscience hold the pledge of radically enhancing the scientific method by providing a means to test hypotheses using predictive models of complex, biological processes where experiments are not practical-Of course, simulations are just as fine as the quality of the data and the accuracy of the mathematical abstraction of the biological processes. The first stage of the Blue Brain Project was in

progress after 15 years of systematically dissecting the genetic, micro anatomical and electrical property of the elementary unit of the neocortex, a solitary neocortical column, which is slight larger than the head of a pin. Today scientists are in the process of creating an artificial brain that can imagine, reply, take decision, and keep everything in memory. The main plan is to upload human brain into machine, so that man can think, take judgment without any effort. After the death of the body, the virtual brain will continue working as the man. So; still after the person passes way, we can use the knowledge, intelligence, memories, and personalities of that man for the progress of the human society.

The human brain is very complex than any creativity in the world. When man did not have a machine called computer, it was a big question for all .But today it is feasible due to the technology. Technology is developing quickly.

[2] NATURAL BRAIN AND SIMULATED BRAIN

A. Functions of Natural Brain:

Before getting to know about the building and functions of Blue Brain, it is important to grasp information regarding the working of the human brain. The human ability to observe, clarify and respond is controlled by the nervous system. The nervous system is quite a magical one which works through electric impulses from the human brain.

The following are the steps of working the natural brain.

Input: The action of obtaining information from the atmosphere through sensory cells is named Sensory input (i.e.) when the human eye sees something (or) the hands touch something, the sensory cell sends associated information to the brain.

Integration: Understanding the acquired input with the help of the brain is called Interpretation. During this process, billions of neurons work along to recognize the environment.

Output: As soon as the things get interpreted, the brain sends messages to effector cells, muscles or glands via neurons which respond to the environment.

Processing: The decision making is completed by arithmetic and logical calculations in neural circuitry. The beyond experience stored and present inputs acquired are used to make decisions.

Memory: With the help of certain neurons in the brain, we can remember things.

B. Functions of Simulated Brain:

The following are the steps of working of simulated brain.

Input: The scientists have created artificial neurons with silicon chips in the similar manner as actual neurons. These artificial neurons will receive input from secondary cells and also

the electrical impulses from secondary cells are sent to supercomputers via artificial neurons for interpretation.

Interpretation: The electric impulses that are obtained from synthetic neurons are interpreted by the way of a set of registers. The various values in the register represent different states of the brain.

Output: After being interpreted, the output signals are given to sensory cells present within the artificial neuron.

Memory: It is possible to store the records permanently with the help of secondary memory [Hardware] By this way, the sets of registers will be stored permanently and the information in it could be retrieved and used when it is needed.

Processing: The processing is done by computer by some stored information and by the inputs received. Artificial brain will perform some arithmetic and logical calculations as performed by our human brain using the concept of artificial intelligence.

[3] HARDWARE USED

The primary hardware utilized by the Blue Brain project is the Blue Gene supercomputer, engineered by IBM. It had been installed on the EPEL campus in Lausanne, Switzerland and was managed by CADMOS.

A. Requirement:

- 1) A large amount of memory (i.e.) 16 terabytes is required as there are billions and billions of neurons. The storage needed for such a massive simulation is terribly huge.
- 2) A high-speed processor of 256 MB to 512 MB memory per processor to simulate billions of neurons.
- 3) A program that converts the electric impulses from the brain into an input signal to be obtained by the Supercomputer and vice versa.
- 4) A nanorobot to act as the interface medium between the supercomputer and natural brain.

B. List of Supercomputers used since 2005:

- 1) Blue Gene/L was used till 2009.
- 2) Blue Gene/P , an upgraded version from Blue Gene/L was used till 2011.
- 3) JuQUEEN [Blue Gene/Q] as shown in figure 10, an upgraded version from Blue Gene/P in 2012 was ranked 8th in the world in terms of speed.
- 4) Blue Brain 5 , installed in 2018 will take over from the predecessor.

Brain chip: Mathew Nagle designed a brain chip that provided the balance among safety, durability and functionality. The chip was small enough that it didn't hinder normal brain function. Using integrated

CMOS circuitry [an array of recording electrodes]; Nagle' s chip recorded the brain signals. He improved the reliability of the recorded data using multiple electrodes.

[4] CONCLUSION

Using Blue gene supercomputers, as much as one hundred cortical columns, I million neurons and I billion synapses [20] may be simulated right away. This is roughly similar to the brain power of a human bee. Humans have 2 million Columns within the cortices. In conclusion, we will be able to convert ourselves into computers some time in the future. The vision behind this virtual brain will shed some light on the aspects of Human recognition. Very quickly, this technology can be common everywhere in the world.

REFERENCES

- [1] Suryanshu Bakshi, Shravan Das, Rishabh Mishra: A Research Study on Blue Brain- International Journal Of Advanced Research in Computer Engineering & Technology (IJARCET)-Volume 06, Issue 05, ISSN: 2278 - 1323, May (2017)
- [2] Kowshalya.G. MCA: Review on Blue Brain for Novice- ISSN XXXX xxxx 0 2017 IJESC- Volume 7 Issue No.8.
- [3] Priya Babel: Blue Brain - The Future Generation Research Journal of Computer and Information Technology Sciences-ISSN 2320 - 6527 Vol. 3(2), 15, May (2015)
- [4] Saurav Poonia: A Study on Blue Brain Modeling, Applications and its Challenges – International Journal of Research in Engineering,
- [5] Science and Management Volume-2, Issue-2, February (2019) Ojaswini Ghodkhande, Gajanan Patie: REVIEW ON BLUE BRAIN: AN ARTIFICIAL BRAIN- International Journal of Advanced Computational Engineering and Networking, ISSN: 2320-2106, Volume-3, Issue-12, and Dec (2015)
- [6] Devendra Nagal and Swati Sharma: AN OVERVIEW ON DISCOVERY OF REALITY- BLUE BRAIN - Proc. of the Intl. Conf. on Recent Trends in Computing and Communication Engineering RTCCE - ISBN: 978- 981-07-6184-4, (2013)