



e-ISSN: 2319-8753 | p-ISSN: 2347-6710

IJRSET

International Journal of Innovative Research in
SCIENCE | ENGINEERING | TECHNOLOGY

INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

Volume 10, Issue 11, November 2021

ISSN INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA

Impact Factor: 7.569

9940 572 462

6381 907 438

ijrset@gmail.com

www.ijrset.com



Study of Blue Brain Technology

Rasika Jadhav¹, Dr.Prakash M Kene²

P.G. Student, Department of Computer Application, P.E.S Modern College of Engineering, Shivajinagar, Pune, India¹

Associate Professor, Department of Computer Application, P.E.S Modern College of Engineering, Shivajinagar,
Pune, India²

ABSTRACT: IBM is now in research to make a virtual brain, called “Blue brain”. If possible, this is able to be the primary virtual brain of the planet. The objective is to upload human brain into machine for future use. So that man can think, take decision with none effort. After the human death, the virtual brain will act as human. So, even after the death of an individual we'll not lose the knowledge, intelligence, personalities, feelings and memories of that man. That can be used for the event of the human society. Technology is growing faster than everything.

I. INTRODUCTION

Human Brain is the result of millenia’s of evolution and is by far the most complicated organ in the world. It makes us intelligent by translating impulses from the nerves causing a response to the corresponding stimulus. Unfortunately, all the information stored in the brain is lost when the person dies. The knowledge that could have been important for the betterment of humanity is lost. Thus we see a room for improvement and question ourselves on whether and how could we harness the data in the brain.

The answer to it is what's called as "Blue Brain". It is a machine that functions like a virtual human brain. What was the most complex machinery in the world suddenly seems to have lost it's vigour. But is it so? The answer is Yes! Everything that man has ever invented has been an extension or a rendition of nature.

II. BLUE BRAIN

As we know, the IBM is now developing a virtual brain referred to as the Blue brain. We can say that it would be the world’s first virtual brain. Within 30 years, we'll be ready to scan ourselves into the computers. We can say it as an artificial brain, which isn't actually a natural brain, but can act as a brain. It can think like brain, take decisions supported the past experience, and respond as a natural brain. It is possible by employing a super computer, with an enormous amount of storage capacity, processing power and an interface between the human brain and artificial one. Through this interface the info stored within the natural brain are often up loaded into the pc. So the brain and therefore the knowledge, intelligence of anyone are often kept and used for ever, even after the death of the person.

III. WHAT IS BLUE BRAIN?

Blue Brain is an artificial Brain which is an initiative by The Brain Research Institute of Switzerland. It aims to accomplish this feat by doing reverse engineering on neural pathways inside a brain. The main focus is to retrieve data from the human brain and store it successfully on a computer.



IV. HOW IS THIS POSSIBLE

The information transfer from the brain to the computer is done using miniaturized robots called "Nano-bots". The bots are so small that they penetrate through the central nervous system and scan the system while monitoring its structure. The transfer of information from the bots to the computer takes place through a specially designed interface software called as "BBP-SDK". It is a software development kit written in C++ including a library wrapped around Java & Python. This collected data from the bots is further visualized using another data visualization software called "RT Neuron" written in C++. It was specially created for three dimensional visualization of the neuron schema in a human brain. The final data is then stored in databases for further use.

V. STEPS FOR BUILDING A BLUE BRAIN

A. Data Collection

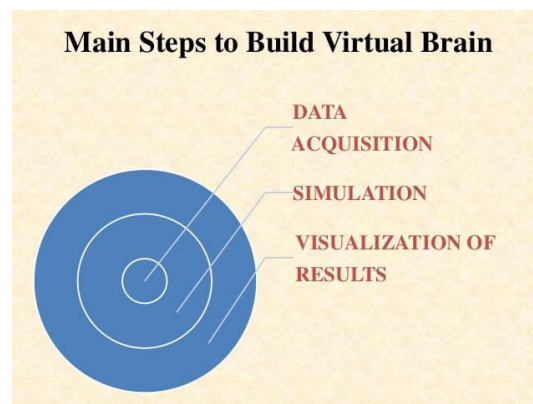
This process is prior to making algorithms that work identical to neurons for simulation purposes. It involves collecting parts of the brain and gauging their shape and electrical behaviour under a microscope, individually. This is the prominent and familiar method that is used around the world. The neurons are identified by their shape, electrical and physiological activity, location in the brain and their population density. When identified the structures are translated into precise algorithms which describe the process, function and the positioning of neurons.

B. Data Simulation

It consists of simulation speed and simulation workflow. Simulation of just one column of the cortex (a.k.a. 10000+ neurons) requires two hundred times more run time than real time. Simulation workflow is the process of designing the algorithms that will make up and behave as different types of neurons i.e. virtual cells. The crux of achieving this is in identifying the various types of neurons as well as the functions performed by them and translating this into algorithms with the required constraints.

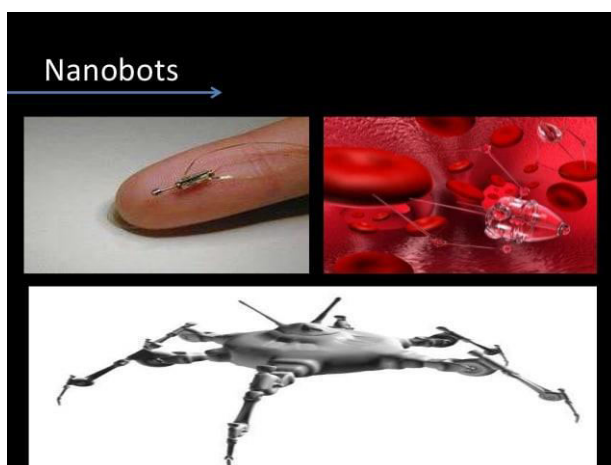
C. Visualization of results

RT Neuron is an ad-hoc software, coded with C++ and OpenGL and is the main tool that the Blue Brain Project uses for visualization. The project team made this software exclusively for this purpose and thus can be used for neural simulations alone. It takes the outputs of Hodgkin-Huxley simulations as inputs and outputs a 3-dimensional structure which is scalable from one neuron upto an entire cortical column and has all the features of a Virtual-Reality interface.



VI. UPLOADING HUMAN BRAIN

Since the connections in the brain are precisely mapped, the uploading of the brain is a very simple task and is similar to coding logical pathways, giving every branch that carries information in the form of action potentials a value and a destination to conclude the result.



VII. ADVANTAGES OF A BLUE BRAIN

- It is a way of preserving & utilizing human intelligence & information even after human demise and thus is capable of all that a human brain is.
- An animal behavioural studies and Human Sensory Extensors/Disability Assistance are some interesting and talked over topics which will be possible through this project.
- It is an important step towards World Automation & a significant milestone in the advancement of Artificial Intelligence, Machine Learning and Deep Learning.

VIII. DISADVANTAGES OF BLUE BRAIN

The only major disadvantage of this technology is that not unlike other computer systems, this too is equally vulnerable to security breaches and information theft. Just that, in this case, the power attained by the hacker is of a much, much higher capability.

IX. CONCLUSION

This field is still a few decades away from coming out of the fictional realm and into reality. But it is inevitable. The progress in other technologies will and are even currently contributing to this idea unknowingly in ways unimagined. And even if people does not succeed in creating a virtual brain, they will sure stumble upon things previously in the dark about not only the brain, but the whole life around us.

REFERENCES

- [1] Engineering in Medicine and Biology Society”, 2008. EMBS 2008. 30th Annual International Conference of the IEEE
- [2] Henry Markram, “The Blue Brain Project”, Nature Reviews Neuroscience 2006 February.
- [3] Simulated brain closer to thought BBC News 22 April 2009.
- [4] Graham-Rowe, Duncan. “Mission to build a simulated brain begins”, NewSci-entist, June 2005. pp. 1879-85. Special issue on brain-computer interface technology: The third international meeting. IEEE Transactions on Neural System Rehabilitation Engineering, 2006.
- [5] E. Bart and S. Ullman. Cross-generalization: Learning novel classes from a single example by feature



replacement. In CVPR, 2005.

- [6] L. Fei-Fei, R. Fergus, and P. Perona. Learning generative visual models from few training examples: an incremental bayesian Approach Tested on 101 Object Categories. In Workshop on Generative Model Based Vision, 2004.
- [7] Joha Johansson C & Lansner A. Towards cortex sized artificial neural systems. Neural Networks nsson C and Lansner A., Towards cortex sized artificial neural systems. Neural Networks, 2007
- [8] Henry Markram, "The Blue Brain Project".
- [9] Henry Markram builds a brain in supercomputer, TED conference July 2009.
- [10] The Blue brain project, Hil, sean: Markram Henry, International conference of IEEE 2008
- [11] Reconstructing the Heart of Mammalian Intelligence, Henry Markram's lecture, March 4 2008.
- [12] K. Grill-Spector. The neural basis of object perception. Current opinion in neurobiology, 13:1–8, 2003



**Impact Factor:
7.569**



INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

 9940 572 462  6381 907 438  ijirset@gmail.com



www.ijirset.com

Scan to save the contact details