

Simulation of Motor Neuron's Recall Functions with Blue Brain using

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Abstract— Human brain is the most valuable and unique creation of God. The man is intellectual because of the fact that describes well and makes human fall in the category far different and upgraded from other species. "Blue brain" is the name of the world's first virtually created brain. That means a machine that will function as a substitute of human brain. Scientists are consistently looking to create an artificial brain that can think, respond, take decision, and keep everything in its memory. There is certain difference in a real memory and the blue brain concepts. Our memory does not store all the data permanently that it acquires previously, even though it has a capacity of 2.5 petabytes. Rather it recalls the previously occurred instances from the traces of those left in our memory. But Blue brain stores every data in it permanently. Our paper is all about to state the possible chances of making this feature of blue brain similar to the real Brain using cloud.

Index Terms — Blue Brain, Human Brain, Hippocampus, Frontal Cortex, Cloud, Binary Search, Motor Neuron, Merge Sort, Recall.

1 INTRODUCTION

Brain has always been a matter of interest for scientist. Everyone is curious to understand and crack the nut shell of a real human brain. So, question that came out "Is it really possible to create a human brain?" was answered by IBM with the foundation of project Blue brain at EPFL in Switzerland back in 2005 .[1] and in 2008 10,000cells were built and it is predicted to have a cellular human brain by 2023. But till now it has not been able to discover the simulation of motor neurons to recall the old memory, like our brain does than to store every data permanently even after having a huge storage capacity. This made us think about creating a similar type of simulation using cloud. This may make the blue brain be quicker in analysis than present like the human brain can. After thoroughly studying about the recalling ability of human brain and also about blue brain, we came out with this concept.[1][2][3]

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2 OVERVIEW ON BLUE BRAIN

IBM has developed an artificial brain known as the Blue brain. It is world's first virtual brain. Within 30 years, we will be able to scan ourselves into the computers. It can think like brain, take important and reflex decisions based on the past experience, and respond just as a natural brain. A super computer, with a huge amount of storage capacity, will be used with high speed processing power, expected 250mbps per processor and will act as an interface between the human brain and artificial one. Through this interface the data stored in the natural brain will be uploaded into the source computer. So brain and its consisting knowledge, intelligence of a person will be kept and used for ever, even after the person is no more. Blue brain is a concept which allows to copy or to transfer all the contents of a human brain into a simulated virtual brain that resides inside a Super computer. The Super computer used in this is Blue Gene as of the current information revealed. It is like uploading a mind in a computer.[4] But unlike the human brain keeps the trace of older memories on frontal cortex only, the blue brain stores the entire file in its storage like a normal hard drive. Which lacks it in comparison with real Brain at vast. It is

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expected that by 2023, a cellular human brain would be ready but it is still not confirmed.



Fig:Blue Brain [5]

3 MEMORY STORAGE IN A REAL BRAIN

In the 1920s the behavioral psychologist Karl Lashley conducted a now famous series of experiments in an attempt to identify the part of the brain in which memories are stored. He trained rats to find their way through a maze, then made lesions in different parts of the cerebral cortex in an attempt to erase what he called the "engram," or the original memory trace. Lashley failed to find the engram—his experimental animals were still able to find their way through the maze, no matter where he put lesions on their brains. He therefore concluded that memories are not stored in any single area of the brain, but are instead distributed throughout it. Subsequent work on amnesics—most notably the studies of the recently deceased patient known only as H.M. carried out by Brenda Milner—implicated a part of the brain called the **hippocampus** as being crucial for memory formation. More recently, it was established that the frontal cortex is also involved; current thinking holds that new memories are encoded in the hippocampus and then eventually transferred to the frontal lobes for long-term storage. A new study, led by Christine Smith and Larry Squire at the University of California at San Diego, now provides evidence that the age of a memory determines the extent to which we are dependent on the frontal cortex and hippocampus for recalling it. In other words, the location of a recollection in the brain varies based on how old that recollection is.[2] This is till now not being made possible

through blue brain. Those old memories are retrieved on facing questions or instances in future based on the pattern matching of the past matching and thus the retrieved past that appears as a jigsaw puzzle accumulates together and gives a vivid idea about the past.[3]

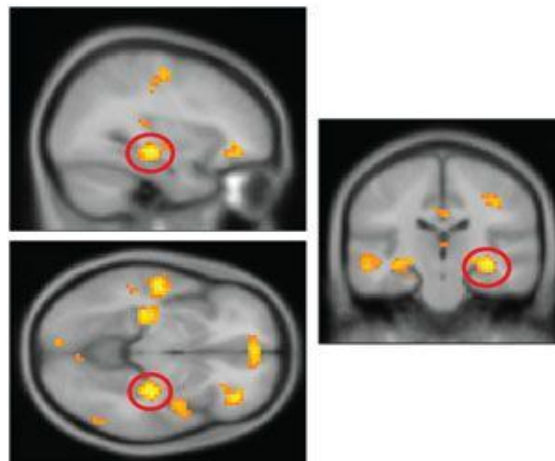


Fig: Memory relocation sites in Human Brain [3]

4 OVERVIEW OF OUR PROPOSED CONCEPT

After studying about the blue brain and having concept about cloud, we found that though blue brain is cellular and also neurons are being developed in it, but till now motor neuron is not properly implemented in it and neither it is having the function to trace the imprints of old memory from frontal cortex and hippocampus like a real brain posses. Thus we proposed the idea to link the blue brain with cloud in order to simulate the recall function of motor neuron from the site as described above. In this concept we are putting cloud as a simulation of frontal cortex and a concept of **aqueue/ priority queue** with a loop of certain limit, after which with an entry of new bit of data in the queue, the oldest data bit will be automatically uploaded to cloud. This will help the blue brain to have more free space and less space complexity like a human brain holds less and most recent data only and leaves traces of previous data in frontal cortex [Paragraph 3],[2] even after having a storage of 2.5 petabytes which is expected to be 1.5 petabytes more than the blue brain till now. This will help provide the blue brain the capacity to

do more analytical thinking and that too will be quicker like a normal human brain. This concept will implicitly include the property to recall in blue brain in a less complex way.

5 DETAILS ABOUT THE PROPOSED CONCEPT

When the blue brain starts scanning data the data will be stored in the priority queue or a queue with a limited loop that can prove a portion of the entire storage capacity to do permanent storage. As soon as the queue reaches its rare end and a new data is scanned in it, the rare element gets relocated to the cloud by a bridge of automation program.

Queue is Full



Fig: Queue full of elements[6]

Whenever the brain gets clue about any situation a **binary search** program will run first on the blue brain system storage and if the pattern do not match the situation or certain bits of the pattern are missing it will start running over the cloud storage. And after all the matching patterns are obtained in the form of jigsaw another program will take all the patterns and perform a **merge sort** which will give a grid idea of the past memory in a vivid way, like real brain does. [3]

Thus the left over free spaces will be able enough to make quick and sharp analytical thinking and other tasks, more or less like a human brain .

In this entire process the queue will be denoting hippocampus and cloud will denote frontal cortex.

6 ADVANTAGES OF THIS CONCEPT

- This may result in an evolutionary simulation of recall function of **motor neuron** in real human brain in order to recall past memories.
- This will make the blue brain faster for multi taking.

- This will draw a more clear idea about the functioning of memory call from hippocampus and frontal cortex.

7 DISADVANTAGES OF THE CONCEPT

- Every time access to internet will be required.
- The concept will add little more cost in the project of blue brain.

8 FUTURE ASPECTS

It can be very helpful in coming future to simulate an artificial human brain that have the capacity of recall like real brain. This can make more intelligent robots in future that can behave as a human brain exactly.

9 CONCLUSION

The concept has been brought forward in a sense to make the blue brain capable of recalling past. This can make a reliable brain that can be as intelligent as a human brain. Further studies can be made on it to make the concept more affective for simulation of human brain. Blue brain is projected to be finally accomplished as a human brain by 2023. So, this is a little effort to make it more effective with a new concept on which till now less progress have been made. We human always run for new ideas, by this concept it can be proved as a new as well as simple process of technology.

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