Blue Brain: A New Frontier for Neuroscience

In 2011, a team of researchers led by Japanese computer scientist Masashi Sugiyama conducted an experiment in which they are asked the K computer ,one of the fastest supercomputers in the world to simulate one second of human brain activity. The K computer took 40 minutes to complete the task . Which highlights how powerful the human brains are. While the K computer experiment aimed to simulate a single second brain activity ,the blue brain project is a much more ambitious effort to create a comprehensive model of the human brain, which includes the cellular and molecular levels of the brain function.

The human brain is the most complex and mysterious object in the known universe. For decades researchers have been trying to unravel the brain to understand its workings and develop treatments for neurological disorders. Blue Brain is a project was initiated in 2005 by École Polytechnique Fédérale de Lausanne (EPFL) in Switzerland ,under scientist Henry Markram. The Blue Brain system is attempted to reverse engineering of human brain and recreate it at cellular level inside the computer simulation.

WHAT IS BLUE BRAIN TECHNOLOGY?

The main aim of the artificial brain is to connect human brain and artificial brain .So that machine can work like a human brain ,a essential information about a person especially their knowledge ,feelings and memories, can be downloaded to an artificial brain using high level computational algorithms and supercomputers with a lot of storage space and energy.

When a person dies all their knowledge and intelligence will be gone. However, before a person dies ,all the information preserved using a artificial brain forever. We can also analyse and study about various activities of human brain and develop the treatment for various neural diseases like, Alzheimer's ,Epilepsy and Parkinson diseases.

HOW DOES IT WORKS ?

Small robots called "nanobots" send information from the brain to supercomputers .They are too small to get into the spine and nerves in the brain .Then, when the nanobots get into the brain they start to scanning and watching structure of neurons. The final data will be store in databases and make more models of how the brain works ,it will be possible to keep and look at information about the brain. To create a simulation the blue brain team is a technique called "whole-cell modelling", which involves reconstructing an individual neuron and simulating their electrical and chemical activity.

ADVANTAGES AND MILESTONES

One of the key benefits of this approach is that it allows researchers to manipulate the experiment with different aspects of the brain in ways that would be impossible in living organism. The researchers can study how different drugs and therapies affect the human brain, without the need for animal or human testing. This could lead to a more effective treatment and fewer side affects.

The Blue Brain Project has already produced some remarkable results. In 2015, researchers from the project published a paper in the journal cell that described how they were able to simulate the neocortex of a rat brain in unprecedented detail. This simulation allowed to gain new insights into how the processes information and could have implications for the development of new treatments for neurological disorders.

The Blue Brain project also lead in advances in Artificial Intelligence and Robotics. By studying the behaviour of brain researchers can develop more sophisticated algorithms for machine learning and robotics leading to smarter machines that can learn and adapt to their environment.

CHALLENGES

The human brain is incredibly complex and creating a complete simulation of it is a monumental task. Processing power is one of the major challenges to overcome. Simulating the human brain would require a supercomputer with processing power far beyond what is currently available .Additionally these process requires significant computing power ,which can be expensive and difficult to obtain. There are many ethical considerations to be taken into the account, as the creation of a virtual human brain raises many complex ethical issues.

The development of Blue Brain Technology represents an exciting new frontier in our quest to understand the human brain. While the project is still in its early stages, the potential implications for neuro science and artificial intelligence enormous. By creating the virtual replica of the brain, researchers could gain new insights into how it works and develop new treatments for neurological disorders .As the project continues to evolve, it will be fascinating to see what new discoveries and breakthroughs it will unlock.

REFERENCES

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