One of the most noteworthy ongoing projects is the Project Blue Brain. This revolutionary finding has the potential to shape the future to enormous extents.

IBM in partnership with scientists at Ecole Polytechnique Federal De Lausanne's (EPFL) Brain and Mind Institute, will begin simulating the brain's biological system. It was founded by Henry Markram at the EPFL in May 2005 and is expected to near completion around 2023.

**What is Blue Brain?**

It is the name of the world's first virtual brain, which means a machine that can function entirely as a human brain. The scientists are in research to create an artificial brain that can think, respond, take decision and keep anything in the memory. After the death of the body the virtual brain can act as a man. Therefore, we will never lose the intelligence, knowledge, personality, feelings and memories of the person. The simulations of human brain in this project are carried out on a Blue Gene supercomputer built by IBM. Hence the name "Blue Brain".

This is an attempt to reverse engineer the human brain and recreate it at the cellular level inside a computer simulation. The human brain can be mapped to the computer and referred later for reactions and decisions. The research involves studying slices of the brain using microscopes and patch clamp electrodes. Data is collected about different neuron types, which is used to build biologically realistic models of neurons and networks of neurons in the cerebral cortex. Such simulations scaling to
the size of a honey bee brain and rat brain have been obtained in accordance with the scheduled timeline. Human brain simulations will take nearly a decade more!

There are three main steps to building the virtual brain:

1) Data acquisition- involves taking brain slices, placing them under a microscope and measuring the shape and electrical activity of individual neurons.
2) Simulation- The simulation step involves synthesising virtual cells using the algorithms that were found to describe real neurons. The algorithms and parameters are adjusted for the age, species, and disease stage of the animal being simulated.
3) Visualisation of results- RTNeuron is the primary application used by the BBP for visualisation of neural simulations. The software was developed internally by the BBP team. It is written in C++ and OpenGL.

**What is the importance of this project?**

One of the major goals of the project are to gain a complete understanding of the brain and to enable better and faster development of brain disease treatments. Making decisions in the absence of a person, using the skills and intelligence of a person after death, understanding the activities of the animals, allowing the deaf to hear through direct nerve simulation are few of the things that can be achieved. The most important factors that lead to the development of this project are:

- **Brain disease treatments** - There are about 560 brain diseases. The success of this project can help cure diseases like Parkinson's, Alzheimers.
- **Scientific curiosity about consciousness and the human mind** - the study of the conscious and subconscious mind.
- **Integration of all neuroscientific research results worldwide** - the different results and developments can be added and summed up to reach several important conclusions.
- **Progress towards building thinking machines** - This is the bottom up approach. This will help to ease the human time and efforts.

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