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Anticipated Impacts of Virtual Brain Adoption on Humanity

Idah Vincent[1], Ogake Lorna[2]

[1, 2]Laikipia University, School of Science and Applied Technology, P.O Box 1100-20300, Nyahururu, Kenya

Abstract: ***Human beings are intelligent because of the brain and therefore can think and do what other animals cannot .However, we lose the knowledge that would have been used for the development of the human society when we die due to the destruction of the body. Today scientists are in research to create an artificial brain known as virtual brain that is a mirror of natural human brain and can think, respond, make decision, and keep anything in memory of the natural brain. That means creating a machine that can function as human brain. The main aim is to upload human brain into the machine so that man can think and take decision without any effort and consequently enhance memory. After the death of the body, the virtual brain will act as the man. So, even after human death one will not lose the knowledge, intelligence, personalities, feelings and memories of that person and therefore can be used for the development of the human society. With this kind of technology, scientists believe that it will be possible to cure and diagnose brain diseases early as well as cure madness and even deafness. Human brain is complex than any circuitry in the world and none has ever understood its complexity. So, "Is it really possible to create a human brain?" The answer is "Yes". Because whatever man has created today always he has followed the nature. When man did not have a device called computer, it was a big question for all .But today with technology growing exponentially it is possible. IBM and Cajal Project in Spain are currently in research to create a virtual brain using brain simulation. The IBM virtual brain is called Blue brain .If possible, this would be the first virtual brain of the world. This paper examines the possible impacts that would result from adopting the use of virtual brain on humanity by carrying out a desk research.***

Keywords: Virtual brain, artificial brain, supercomputer, neuron, blue brain, simulation, nanotechnology, nanobots, robots

1. Introduction

With the advancement in technology, human, the ultimate source of information and discovery should also be preserved. In other words, human does not live forever but the information in his mind could be saved and used for several thousands of years. The technology helpful in this activity is virtual brain. This research paper consists of the information on virtual Brain project, concepts of virtual Brain, and its anticipated impacts.

2. Research problem

There is a problem in loss of expertise as a result of death of an individual, high cost of medication due to late diagnosis of fatal brain diseases as well as increase in individuals with short memory in humanity.

Research questions: This research aims at answering the following questions:

a) What is virtual brain adoption?
b) Why is the virtual brain necessary?
c) What are the anticipated impacts of virtual brain adoption?

2.1 Blue Brain Project

IBM, in partnership with scientists at Switzerland's Ecole Polytechnique Federale de Lausanne's (EPFL) Brain and Mind Institute initiated a project to simulate the brain's biological systems and output the data as a working 3-dimensional model that will recreate a high-speed electro-chemical relations that take place within the brain's interior. These include cognitive functions such as language, learning, perception and memory in addition to brain malfunction such as psychiatric disorders like depression and autism. From there, the modeling will expand to other regions of the brain and, if successful, shed light on the relationships between genetic, molecular and cognitive functions of the brain (Blue Brain Project, 2012).

2.2 MyLifeBits

Researchers at Microsoft's Media Presence Lab are developing a "virtual brain," a PC-based database that holds a record of an individual's complete life experience known as MyLifeBits, the project wishes to make this database of human memories searchable in the mode of a conventional search engine. "By 2047, almost all information will be in cyberspace as well as all knowledge and creative works, said one of the project's leaders, Gordon Bell (Jim, Bell, Lueder, Drucker, & Wong, December 1-6, 2002).

2.3 The Physics of Birdsong

According to the new scientist Magazine report Rodrigo Laje and Gabriel Mindlin of the University of Buenos Aires in Argentina have developed a computer model of a region of the brain called the RA nucleus which controls muscles in the lungs and vocal folds. The model brain can accurately echo the song of a South American sparrow. The bird sing by forcing air from their lungs past folds of tissue in the voice box. The electric impulses from the brain that force the lungs had been recorded and when the equivalent impulses were dispatched to the computer model of the lungs of the bird it begins to sing like the bird.Mr. Mindlin told the weekly science magazine he was amazed that simple instructions from the brain change a constant signal into a complex series of bursts to produce the intricacies of birdsong. He plans to add more brain power to his model which might reveal how birds improve their songs and learn them from other birds. He hopes it might one day be feasible to use similar models to map the neural [brain] circuitry of animals without

distressing lab experiments - just by recording their calls and movements, the magazine said (Mindlin & Laje, 2005).

3. Methodology

To identify relevant research and other brain simulated projects, the search was conducted using the key words "virtual brain"," artificial brain", "blue brain", "simulation". Only articles with the combined key words "blue brain", "virtual brain" and "Brain simulation" were selected. This tactic resulted in identification of key research papers, technical reports, journals and literature related to virtual brain activities. A critical review of the selected literature addressing the study area was then conducted to identify the anticipated impacts of virtual brain adoption on humanity.

4. Findings and Discussions

4.1 Virtual brain adoption

Virtual brain
Virtual brain is an artificial brain, which is a mirror of the natural brain and can act as the brain. It can think, make decisions based on the past experience, and respond similar to the natural brain. It is possible by using a super computer, with an enormous amount of storage capacity, high processing power and an interface between the human brain and the artificial one. Through this interface the data stored in the natural brain can be up transferred into the computer. So the brain, the knowledge and intelligence of anyone can be kept and used for ever, even after their death.

4.2 Technological readiness for adoption

Virtual brain adoption refers to the use of a computer simulated replica of a human brain to enhance short memory term in human beings including the use in robotic machines.

There is already a technology in place to accelerate the implementation of the virtual brain project. Presence of supercomputer has accelerated the pace of creating a virtual brain. The Cajal Blue Brain in Spain uses the facilities of Supercomputing to pursue research in neurological experiments and computer simulations. (Cajal Blue Brain Project, 2011). Also the Blue brain project found by Dr. Henry Markram in Switzerland uses blue Gene Supercomputing to create a synthetic brain by reverse engineering a mammalian brain. (Seed Magazine, March 2008)

Nanotechnology comes handy by enabling scientists to create nanobots which are microscopic in size and can move with Nano scale precision. They act as interface with computer that is as close as our mind, thus they will be able to monitor all the activities and structure of our central nervous system by traveling into the brain and spine. This information, when entered into a computer, could then continue to function as us. Thus the data stored in the entire brain will be uploaded into the computer. ("Nanotechnology Microscope for Brain Studies". Retrieved 2011-01-07.)The presence of psychological experts and psychiatrists also makes it possible for the project to succeed by providing their expertise concerning the brain structure and its activities. This will make it possible to diagnose and treat brain infirmities such as the Parkinson's disease.

4.3 Necessity of virtual brain

Human beings are mortal and they all have to quite one day. However, their feelings, insights and mind views are immortal and always there forever. With the help of a virtual brain Great Inventory Brains like Einstein, Newton, and Nicola Tesla and so on can be reused for further inventions and expansion of technology in terms of thinking only by uploading the contents of the natural brain into it. The uploading is made possible by nanobots. These are robots tiny enough to travel throughout our circulatory system. They act as an interface between the natural brain and the comuter.In addition the nanobots can carefully scan the structure of our brain and provide a complete readout of the connection. Traveling into the spine and brain, they will be able to monitor the activity and structure of our central nervous system. They will be able to provide an interface with computer that is as close as our mind can be while we still reside in our biological form. This information, when entered into a computer, could then continue to function as us. Thus the data stored in the entire brain will be uploaded into the computer. This will keep the intelligence, knowledge and skill of any person forever. This is all possible with the help of technology known as the blue brain which will aid scientists to proceed further with an imaginary ideal speed. We often face difficulties in remembering things such as people‟s names, their birthdays, and the spellings of words, proper grammar, important dates, history, facts etc... In the busy life every one want to be relaxed. Can‟t we use any machine to assist for all these? Virtual brain may be the solution to it.

5. Anticipated impacts of virtual brain adoption

5.1 Positive impacts

Memory Enhancement
A good utilization of the virtual brain is in the case of short term memory and situations such as when a person gets old and starts forgetting or take more time to recognize an individual. Here a simple chip is installed into the human brain for which the short term memory and the volatile memory at old age is avoided. Therefore humans will be able to remember things with minimal effort (Farah, Cook-Deegan, & et , 2004).

Improvements in healthcare
The cost of brain disease to the European economy has been estimated at nearly Euro 800 billion per year. Given the huge figures involved, even small improvements would produce large benefits for the European economy. If the Virtual brain adoption led, directly or indirectly, to effective prevention or cures for common neurological or psychiatric diseases, the economic implications would be enormous (Gustavsson & et, 2011). Many neurological and mental disorders e.g. schizophrenia, Alzheimer‟s and the Parkinson's disease are progressive diseases that cause severe, possibly irreversible damage, before they are diagnosed (Beach & al, 2012).and also scientists have found that one in four people will suffer

from one of around 560 brain diseases during their lifetime. Therefore it is important to have a good strategy in place for understanding these diseases and finding suitable treatments. The living brain is very difficult to study both from a technical and moral perspective. A virtual model, however, makes direct observations possible. Experiments on models are also more efficient and limit the need for laboratory animals. The Blue Brain Project, by including molecular-level simulations, could be used to study the effect of new pharmaceutical compounds on virtual brains of any species, age, and stage of disease. According to Dr. Henry Markram a meticulous virtual copy of the human brain, would enable basic research on brain cells and computer-based drug trials by performing virtual experiments (The New York Times, 2013).In addition Technologies generated by the virtual Brain Project and other similar projects offer several possibilities to other fields of research. The brain model can be used to investigate disease signatures, the impact of certain drugs and test treatment strategies for neurological diseases. The discovery of biological signatures for a disease would inevitably suggest hypotheses of disease causation. Brain Simulation Platform would allow researchers to test these hypotheses. This kind of research could provide fundamental insights into the role of different levels of biological organization in brain disease, suggesting potential targets and strategies for treatment, leading to better and earlier diagnostic and treatment methods. Ultimately, these developments will lead to more advanced medical options available to patients at a lower cost. (Ailamaki A., 2012) It is also possible for man to get rid of madness by downloading the contents of the brain that was uploaded into the computer. The deaf can also be able to hear via direct nerve stimulation.

Integration of all neuroscientific research results worldwide and bringing scientists all over the world together

In 2009, Dr. Markram conceived of the Human Brain Project, a sprawling and controversial initiative of more than 150 institutions around the world that he hopes will bring scientists together to realize his dream. (The New York Times, 2013)The Virtual Brain Project will provide a centrally coordinated resource for the 200,000 active neuroscientists in the world. Previously each researcher has focused on their own specialist field without the results being shared and easily available to all. The virtual brain project hopes to build a bigger, better platform for neuroscientists to experiment on. The project is becoming a brain simulation facility that is accessible to all. This will eventually lead to Integration of all neuroscientific+ research results worldwide.

Engineering of computer chips and Development of New Breed of supercomputers

Design of the artificial human brain will also lead to developments in the Engineering of computer chips and in developing new Supercomputing and energy efficiency techniques modeled with the human brain as an example. The project's platforms include those on Neurorobotics, Neuromorphic Computing, and High Performance Computing. Computational developments can be extended into realms such as data mining, telecommunications, appliances, and other industrial uses. ("How to build a human brain", n.d.)The brain circuitry is in a complex state of flux, the brain rewiring itself every moment of its existence. If the scientists can crack open the secret of how and why the brain does it, the knowledge could lead to new breed of supercomputers which operates at inconceivable speeds. (HBP flagship report)

Self-decision making by the computer on absence of individual

Virtual brain which is an actual „computer brain" may eventually have the ability to think for itself thereby making decisions. Researchers at Microsoft's Media Presence Lab are developing a "virtual brain," a PC-based Database that holds a record of an individual's complete life experience Called MyLifeBits, the Project aims at making this database of human memories searchable in the manner of a Conventional search engine. "By 2047, almost all information will be in cyberspace including all knowledge and creative Works", said one of the project's leaders, Gordon Bell. Through that record and use of virtual brain chip, the pattern of connectivity and reasoning of the human brain can be deduced. The facts and the patterns are then stored on the database of the chip. This comprises the expertise and the intelligence of an individual, hence after death the chip can be extracted and inserted in the supercomputer to extract the networks and patterns which constitutes the expertise. This can then be used to draw conclusions and make decisions without the presence of the individual. Also a robot fitted with a virtual brain (intelligent machine) would do very significant functions such as Business analysis, attending conferences, reporting, etc. consistently. (IFR Statistical department, 2010)

5.2 Negative impacts

Technological errors

The adoption of virtual brain will likely lead to development of machines able to mimic or surpass human thoughts. The advent of artificial intelligence may become one of mankind"s greatest achievements, but as renowned physicist Stephen Hawking put it might also be the last unless we learn to avoid the risks (Rory Cellan-Jones, 2014).Since it"s an approach to make machines intelligent and thoughtful it increases the risk of machines conducting war against human like we have been watching in the movies like Terminator, Universal soldier, Transformers etc.

Cyber Crimes

Malware and Computer viruses will pose an increasingly critical threat to the virtual brain, in addition others may use technical knowledge against us. Once a Blue Brain related to a particular person"s neural schema is hacked, the brain could be used against the very person and result to financial loss, information disclosure and even identity theft or impersonation (Kizza, 2014).

6. Conclusion

In conclusion the anticipated adoption of the virtual brain will results to benefits as well as harm to the human race. We will be able to transfer ourselves into computers at some point and maybe live as programs. This will result to immortality. Most arguments against this outcome are

seemingly easy to circumvent. They are either simple minded, or simply require further time for technology to increase. The only serious threats raised are also overcome as we note the combination of biological and digital technologies.

With this technology in place it will be easy to cure metal infirmities at a lower cost and have a platform to perform basic research on brain cells and circuits or computer-based drug trials. We may also become over dependent upon the computer systems which incase it fails will lead us into serious peril.

The Human Brain Project, responsible for developing a virtual brain and devoted to creating a new breed of intelligent robots with "neuromorphic" microchips designed like neurons in the human brain, will provide a unifying principle for scientists to rally around. Data from laboratories around the world will be in one place, henceforth, we will have a new model for neuroscience, where everyone works together. Trying to build a simulation will drive advances in fields like computing and robotics.

7. Recommendation

By creating a mirror of a person‟s brain, there will be no privacy and secrecy of information. If a blue brain related to a particular persons‟ neural schema is hacked this could lead to disclosure of vital information such as personal information and financial information thereby causing financial loses and identity theft. This needs to be prevented by taking precautions and protection measures.

Creating intelligent machines than can match or surpass human intelligence could spell an end to humanity since they could wage war against humankind. It would take off on its own, and redesign itself at an ever increasing rate, humans who are limited by slow biological evolution could not compete and would be superseded. Therefore more must be done by the internet and technological companies to ensure such a catastrophe never occurs.

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Author Profile

Mr. Ida Vincent Majanga received his Msc. in Computer Science and Bsc. in computer science from University of Nairobi, Kenya in 2014, Kabarak University in 2011, respectively. His research interests are in GIS mapping, simulation and intelligent transport systems, where he undertook his Master‟s research. He is currently an assistant lecturer at Laikipia University.

Mrs. Lorna Ogake Nyabuti received her Msc. in Computer Science from Periyar University, India in 2014 and Bsc. In Computer Science from Bharathiar University, India in 2012. Her research interest is in information security where she undertook her Master‟s research. She is currently an assistant lecturer at Laikipia University.