

## New Leap in Quantum: Prosthetic Brain

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### Abstract

*The world is facing a new era of technological influence today. It is our creativity that has done wonders. Knowledge today has given us some great theories while invention gives us some best tools for anticipating the creativity out of our minds. Fields like Artificial Intelligence and theories like quantum mechanics are incredible on their part; they prove to be the best invention of the mankind. The science of creating thoughts and analyzing ability simply, we can say Artificial intelligence and Quantum mechanics, theory of intermolecular world of atoms, the view of matter inside, how things work. They always demand inquisitive approach of ones, since the day ones understand it, it always results in some creative approach. Integration of such fields can give us machines that are beyond our thinking. We realize that the best use of these disciplines can be only by implementing it in a prosthetic artificial brain that works on quantum mechanics, which takes decisions in Fermi seconds, never lose anything from their memory and will serve as a prosthetic brain for "brain dead" people. Whatever it would do will change the theory of machines, the unique machines that will be ever built on planet earth. Nothing would be much accurate then it in terms of analyzing, getting solutions and process logics.*

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### INTRODUCTION

Machines will now have their own self-brain and decisive power. An idea of beginning of such machines started earlier in centuries; scientist developed to make chain reaction machining in which manual or digital input was needed once and rest of the work was done like in a nuclear chain reaction's fission and fusion process. Each technology is not a fruit of today's efforts, it consists of a long series of hard work. Honda's Asimo, Pepper and many other robots are the remarkable examples of artificial intelligence machinery [1, 2]. They are inspired from man's way of thinking, analyzing and solving things. Quantum mechanics is the base of theory on which your mobile, computers and other electronic devices are running. It had also created wonders in the field of medical technology. The surgical-bots and nano-bots that can go inside human body, work on problematic part without tearing your whole body. It reduces errors and increases accuracy.

Programming of single and multiple movement of human body from running to walking was a tough task; it has taken years for it. Nowadays, Kansei Engineering is also improvising which is emotional embodiment along with sense making robots that have sense and emotion [3]. They can generate coding as the demands generate, like, they can open bottles, make tea and cure diseases inside the human body and the best part is that now they can entertain you. We have built an artificial heart [4]. That is something which is implanted artificially and which adapts well with patients. Success of this paved the way for other organs in our body where one's damage cannot be recovered, then it is possible to create a "prosthetic quantum brain" for the patients who have brain diseases or something that is un-recoverable. We will name that discovery a "New leap in Quantum" that works on principle of quantum mechanics. I prefer quantum mechanics because nearly 90% of the world's machinery in this world

works on this theory. This will be a breathtaking revolution in medical technology, robotic and coder world. This will be possibly the best use of the quantum mechanics that had ever done. A newly developed prosthetic brain can solve problems better than current brain. Your memory will be in mass numbers of thousands of terra-bytes. You will not slip anything from your memory and always be in your control. You will be more analytic and accurate than earlier. If scientists and researchers of NASA can build quantum computer D-wave [5], Honda can manufacture humanoid robot like Asimo [1] with artificial intelligence, therefore we can implement quantum brain. All we need for this is a highly intellectual and intelligent group of programmers, physicists and neuroscientists. Then there will be a new generation where no one will be a dumb. A paper published by Kikuchi and Kobayashi has strongly evidenced that in near future [6].

The emotional intelligence will be adapted by technological systems. Machines showing common sense will become social. We are now in the era of affective computing, trying to trigger the emotions in our machinery; exactly which will be the up-gradation of our project. We are working on devices which are based on VLSI (Very large scale integration) techniques used for integrating thousands of gate transistors on a single chip, I would simply say creating an electrical brain on a single chip but due to recent developments in VLSI, we will be able to integrate so many more gates, transistors on a single chip, which have given power of creating such type of huge multirole machine in small level. It gives us possibilities of exactly having same size as real brain ha. Brain is the most complex machinery, researches failed in exactly knowing the complexity of neurons. There is continuous work going on in this field but creating resemblance with it is seaming impossible, therefore why I have decided to make it for nearly million neurons. Neurons will be artificially made from the material showing similarity with real neurons because the real blood will flow from it. Traditionally, in robotics, artificial intelligence, and neuroscience, there has been a frequent focus

on the study of the control on the neural system itself. Recently there has been an increasing interest into the field of merging emotions in all tech-savvy machines dealing with artificial behavior, including cognitive science, psychology, philosophy, and literature. Pfeiffer *et al.*, who had once connected their work on robot's emotion to Toda's fungus eater robots, will reflect on his own and Toda's work, to foresee the future of cognitive sciences. These works show that we are moving to an era of technological and social balance, people will now enjoy the company of someone, who does not know the meaning of company exactly [7]. Now I can say that the Turing test for distinguishing robots will fail.

The rest of the paper is organized as follows: basic integrated hypothesis of quantum mechanism, artificial intelligence and neuroscience is discussed in the next part. Then the paper discusses about design and composition of quantum brain and the practical evidences and finally, the paper concludes.

## HYPOTHESIS

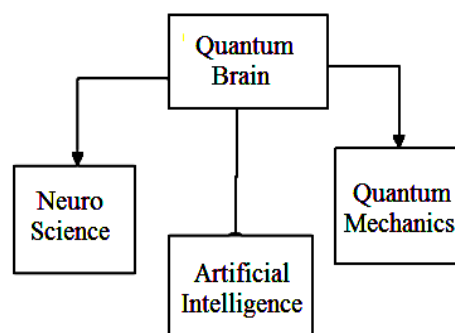
This is multi-directional research area. It requires artificial intelligence for developing thinking pattern just like in humanoids, use of quantum mechanics fundamentals, especially quantum entanglement, and advanced electronic neuroscience like artificial neurons. Artificial intelligence gives its power to develop its own logics like any other human. Figure 1 shows the necessary field which will be the basic requirement, as we know, this concept is diverse.

The processors which will act as a quantum brain will work on the principles of quantum entanglement- wave is currently working on that, same process is here. We need to create proper quantum processors that will merge in organs like a real brain. It will command kidneys, exercise blood and perform all other things what a real brain does. Artificial Intelligence, the science of creating solutions of problems automatically like a real human brain is required, especially the real challenge will be when it is required in generating solution for critical problems of organ failure, like heart and kidney failure.

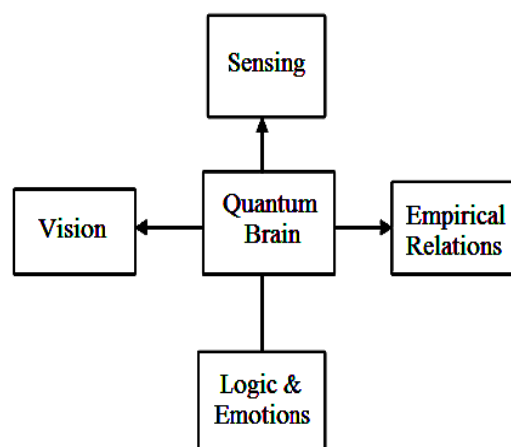
Last of the three components is the natural web of information. Neurons will require the advancement in nanotechnology so that such huge complexity can be put in one machine, if we are able to put it half then it will also be a great achievement. We want to create an abstract intelligence [8]. The functioning of brain cannot be traced with current technology. We have little access to that area. We cannot fully map the cognitive functions of brain. The techniques of making relations, creating pathways and logics, the mystery is yet to be unveiled. Cognitive psychology and medical science are used to explain that the brain works in a certain way based on empirical observations of corresponding activities in usually overlapped brain areas. However, the lack of precise prototypes and complex causality in brain studies has dissatisfied the estimated expectations of researchers in computational science and mathematics, because a computer, the logical counterpart of the brain might not be explained in such a simple layout. It requires the advancement in magnetic resonance techniques which detects brain tumor [9]. It is a challenge for medical image processing discipline to map the whole neural system. There is still less accuracy in tracing the field of waves, we cannot trace the main source of brain that causes such generation of waves. Affective sciences, the adaptation of emotion with technology on such a large level will be quiet a big challenge, recent works of researchers have discussed an emergence of artificial emotion into pet robots, and especially, I would call it artificial emotional creature that will have visual, auditory and tactile sensors [10]. It is a tough challenge for artificial intelligence to create harmony between the artificial brain and real body. We know that some type of fluid prevails in the brain which helps in keeping the person conscious and balancing creation of natural fluids will never be easy; along with creating parts like medulla, cerebellum, prosthetically. It is a dream for me till the discovery of such material that has resemblance to natural one becomes a reality.

The problems are not over yet as it is known that there is no machine in this universe which can give full efficiency; that is the same case with our brain and then; the waste will be go

in form of heat. We have cooling systems in our machinery, like fans in laptop, can you imagine the size of cooling system for such multirole machine doing tasks like listening, viewing and solving critical problems. Transfer of data is possible in less time than a computer. We can easily estimate the size of such cooling system. Figure 2 shows the purpose of quantum brain; the roles which it has to play after its completion. These were the mandatory things for a machinery to call itself a brain. This is what humans do in their daily routine; thing which is missing here is dreaming. We will have to develop an artificial consciousness for that, where it can revive its all memories and create scenes like nightmare. It is far ahead but the thing is ‘thinking out of the box’. It is a hope for the person who is having severe brain diseases which become incurable at certain stage, or accidents, because sometimes there are lots of blood clots in brain. It is more pathetic in case of tumor; the best option we will have “New leap in Quantum”. It will give new life to them but with some defects, that can be emotional, psychological and it can be unknown.



**Fig. 1: Integration of Fields.**



**Fig. 2: The Purpose of Quantum Brain.**

## DESIGN AND COMPOSITION

It is time for a revolution in our thinking; it should be according to our generation. It will have pace, control, better neural connectivity, better information transfer and creativity than ever. It is the power of new quantum brain. Possibly it will be given shape like a real brain because, it is prosthetic. Things would be different as compared to earlier. There will be less complexity in neurons structure because we have no options left but for imitating and imitating something complex is always hard. Transmission of electrochemical signals will be faster as we are moving into generation of quantum mechanics. Neuro-transmitter chemicals will be remaining as it is, until we find some alternative of it. We have to implant in real human body so that interface should be like real one. The appearance of the brain will be different as compared to earlier. I cannot estimate exactly but it will be slightly different than real one. An article published by Savage depicts that artificial neuron mesh can be manufactured by silicon chips which is our breakthrough in neural world, but now the problem of projecting such bigger neural network is solved to some extent [11]. The neurons can be penetrated in brain to control prosthetic or artificial limbs, or building an artificial eye and repairing the brain damage, for every role what a real neuron does. It can also become an option for us. Firing action of neuron should also be kept in mind. Transmission properties like rigidity and stiffness will also be present for stopping from failure in car accidents, according to situation's demand. Otherwise it will be like movies in which all mechanical parts collapse. It would lead to sudden death in case of accident where things strike with high velocity and momentum. For prosthetic sciences, it would be a challenge to design cerebellum and cerebrum. They have highly dense structure with neurons. It would be advancement in prosthetic engineering. Each neuron will be made of same biological materials as it but there will be change in neuro-transmission. The amount of neurons will be less as we are making prototype of this. Basic processing concepts would be same like real brain, input of information from retina neuron in eyes, processing the information and making appropriate decision on it. It will affect the consciousness. You will be more conscious than ever. Your brainwaves would

be much higher now as compared to earlier brainwaves, because it will be like some machinery running on electrical battery. The electric and magnetic field would be higher around it. This invention will pave the way for image processing sector to take its best as the brain waves are produced in large amplitude which is in trackable limits. The programming will be in quantum algorithm in q-bits (quantum). It is like quite in the same way of processing as in D-wave, simultaneously holding 0 or 1 at the same time.

## PRACTICAL EVIDENCES

The most authentic argument in support of this is a D-wave quantum computer, made by NASA in which coders have written the codes in quantum algorithm. The size of bits changes to q-bits, faster, more accurate. Now it will be called as quantum artificial intelligence. We have come to the conclusion that our brain has got some discrete similarities related to computer in terms of working like taking input and processing the information. We are the best machines but what is separating us from other is our self-thinking capability, our feelings, hormones and physiology of our body. An article published by Furber states a research, under which he used an ARM processor for picturing brain neural network containing a single chip having 18 ARM9 cores and each chip middle connected with routers [12]. They have designed the prototype to show 1 billion neurons. We have a vision that if we use nano-technology as a tool at highest level, then we can increase the core parts in it. If it happened as we planned then we can use this neural network in quantum brain. ULSI (Ultra Large Scale Integration) can be a game changer. We know that we are in a capacity to develop a quantum algorithm which works on quantum entanglement principle. Quantum computer can grasp only on 0 or 1 simultaneously. This will be incremental in the processing speed and power of brain and making it will become the greatest thinkers of all the time. We have an artificial heart, humanoids, planes, drones and many other artificial things. These things are the evidences of our capability of making artificial artifacts using artificial intelligence. Here the questions will be little bit complex because programmers require programming transmissiting pathways, time controlling

programs for hormones, intensity of electrochemical signals and many other things related to neurons and the most important aspects of making sensory neurons for brain and also for retina. It is like sketching your body technically, but here you have the eye of quantum mechanics. Everything has a result, whether it can be positive or negative depending on your efforts that are undeniable. We will check and analyze our work for getting higher accuracy, design and then start again if failure occurs. This is the basic fundamental of our research, not to run before success but to move for getting higher accuracy in your works.

## CONCLUSION

We have proposed this idea although it is not possible because such types of things will be feasible in real world in present scenario. The works from researchers conclude that such type of technology will not be possible in near future. We realize that this is the best use of quantum mechanics, artificial intelligence and neuroscience for designing and implementation of a prosthetic artificial quantum brain.

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