

# ARTIFICIAL INTELLIGENCE AND QUANTUM COMPUTING

J. VISHAAL KUMARAN<sup>1</sup>Dr. RESHMI. S<sup>2</sup>  
kumaranvishaal@gmail.com

D.JITHESH<sup>3</sup>  
reshmismca@gmail.com

jitheshd17bcc021@skasc.ac.in

Student<sup>1,3</sup>, Assistant Professor<sup>2</sup>, Department of Computer Science and Application

SRI KRISHNA ARTS AND SCIENCE COLLEGE  
COIMBATORE, TAMILNADU, INDIA

## ABSTRACT:

Our paper deals in brief with artificial intelligence and quantum computing technology. Being the most valiant technology of the present era, the Artificial intelligence (A.I) and the Quantum computing are considered to be the emerging concept of the late 21<sup>st</sup> century. Global companies like Google, Tesla, Apple rolled-out ground-breaking updates and revolutionary changes to how we interact with machine learning technology and many of us are still clueless on how A.I is being used by businesses both big and small. However, a true artificially-intelligent system is one that can learn and observe things on its own. There are different classifications of A.I such as ‘Weak A.I or Narrow A.I’ and based on functionalities there is A.I with ‘Theory of mind’ and also with ‘Limited Memory concepts’.

There is also a basic form of A.I which is a ‘Reactive machine’ that has unique ways and means of carrying out a specific task. On the other hand, the Framing of Quantum computers has marked its existence in a very large scale. The Number crunching method is considered to be foremost idea behind the invention of the quantum computers. The truth is that A.I is out there and there’s no stopping its evolution and also, there is no barrier to stop the evolution of the Quantum computers led by the determined party without a solid QRC. Beyond our Quantum computing conundrum, today’s so called A.I systems are merely advanced machine learning software with extensive behavioral algorithms that adapt themselves to our likes and dislikes.

**KEYWORDS:** *Artificial Intelligence (A.I), Quantum Law, Quantum Randi Challenge(Qrc), Reactive Machines, Weak A.I, Narrow A.I, Quantum Law, Machine Learning, Qubits, Gpu’s (Graphic Processing Units), Big Data, Number Crunching.*

**INTRODUCTION:**

For nearly 60 years the computer experts kept saying that the future of A.I technology is coming. This proves that the people had a distant vision on how technology could take different forms in the mere future and the several inventions and evolutions that took place in these years had led to the outbreak of this efficient technology. With the concept of Quantum law of physics and the relation between Bits and Qubits had marked the rage of Quantum computers. A computer that performs fast numerical calculations especially on large amounts of data is said to undergo Number crunching process. This technical process related with numerical calculations ignited the idea of framing Quantum computers. Moreover, there came a conclusion that the Number crunching can be thermodynamically reversible. However, the history of A.I had made its mark in the year 1955 at the Dartmouth conference. The A.I was officially coined by 'John McCarthy'. From then computer experts and scientists started working on it. The A.I is also called as Machine intelligence.

**A.I AND ITS APPLICATIONS:**

When humans are employed to do certain assigned works there came machines which can able to do the assigned works more efficiently. In fact, the machine intelligence has conquered the space of man power in certain fields which shows that people are invoking the machine-based intelligence. However movies do own a special tag of appreciation for provoking the minds of the people and clearly depicting the concepts of A.I and explaining them via big screen. Irrespective of fields we could see people are welcoming the idea of A.I and considering it to be the ease way to carry out their required process. Speech assistant in your smart phones, UAV (Unmanned Artificial Vehicle) and Drones, Robots, Video games with high level graphics are some common examples that uses A.I optimized technology. From these examples we would be convinced of the fact that A.I is impacting our lives on a daily basis. However, if there are still some skeptics out there let us take a few more examples. In the navigation and travel industry A.I plays a unique role. Both Google and Apple along with the other navigation services use A.I technology to interpret hundreds of thousands of data point that they receive you to give a real time traffic data. Hence there involves a certain transmitting and receiving of signals that carries out a required process.

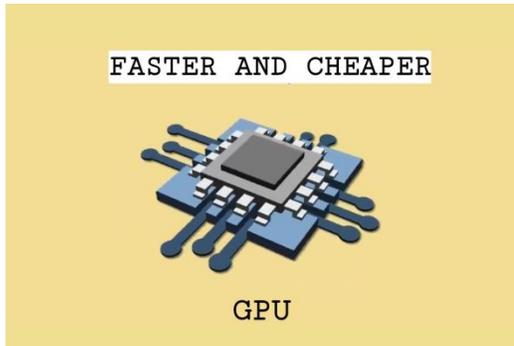
**3 KEY BREAKTHROUGHS OF A.I:**

Though the concept of A.I was officially framed 60 years before, the computer evolution that took place between in this period of time had led to the invention of A.I. To be more specific and precise let me conclude that there are 3 key breakthroughs that led to the A.I invention. Those key breakthroughs are,

1. Better and cheaper Graphic processing units
2. Big data
3. Algorithms

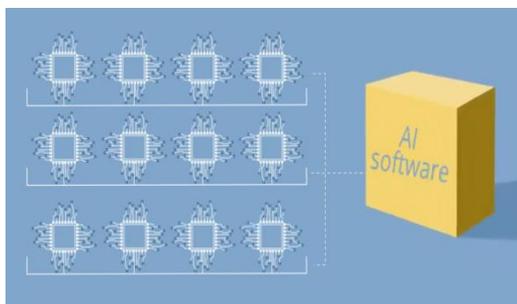
### BETTER AND CHEAPER GPU'S:

A GPU (fig: 1.1) expands as Graphic processing unit. With its abbreviation we could get to know the function of GPU is to render and display a high level of graphic system. At first the GPU was popularized by Nvidia in the year 1999. Till now Nvidia holds a unique place in producing a high class GPU'S enhancing the system graphics.



(Fig:1.1)

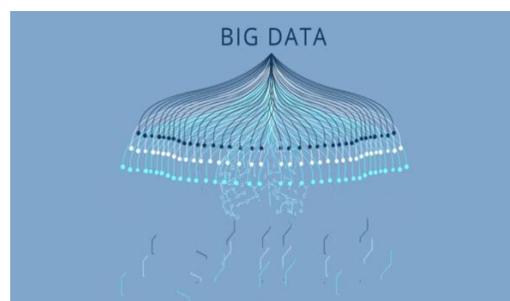
A.I software needs lots of processors running at the same time. Thus these GPU'S can be clustered together to build a A.I software and this is shown in(fig:1.2) .



(Fig:1.2)

### BIG DATA:

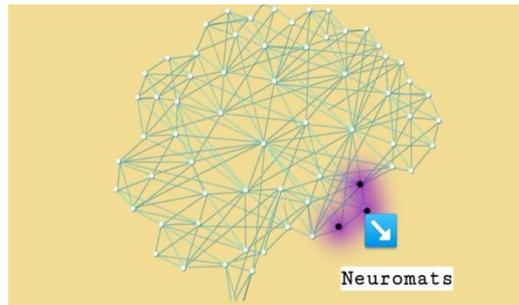
Big data also plays a major role making A.I a reality. A big data is nothing but a large sets of data that is analysed to reveal patterns, associations computationally and relating to human behaviour and their interactions. For example, let us take a scenario that in order to make A.I live it needs education. Moreover a big data is like a university where A.I can study and grow by collecting and absorbing the data.



(Fig:2.1)

**ALGORITHMS:**

The final key to the A.I is the use of Algorithm. Generally an algorithm refers to a step by step process or procedure to carry out any functions. In order for A.I to learn and react more quickly neuromats (fig:3.1) had to be stacked into layers.



(fig:3.1)

For example, in order to recognize that a face a particular program is designed in such a way for a face recognition. This A.I method is processed nowadays in most of the smartphones to unlock a device through face recognition.

Normally for a device to recognize a facial features such as eyes, nose, mouth which all includes a different layered patterns. (fig:3.2) Moreover a face could be of 15 layered patterns high. Hence by optimizing the results those patterns could be earned more quickly making A.I more faster and quicker.



(fig:3.2)

With these three breakthroughs A.I technology remains more phenomenal.

**QUANTUM COMPUTING:**

The Quantum theory's development began in the late 1900's with the presentation by Max Planck. But the essential elements of Quantum computing originated with Paul Benioff who worked at Argonne National Labs, in the year 1981. By taking the case of classical computers you have only bits and bytes. This shows that a classical computer has only a 0 or 1. Whereas in a Quantum computing we have 'Qubits' which is also known

as a quantum bit. Therefore, in the case of Quantum computers it can have a 0, 1 or both zeroes and ones at the same time.

A Quantum computer runs with a concept of Number crunching. The inevitable raise of these Quantum computers had led to the phenomenal development in the field of advanced technology. To bring out the concept of Quantum computing in a nutshell let me explain it with a perfect stereo of example. There are four cards in a deck. There is a queen card and the other three are identical cards. We shuffle the cards and put them down and the problem is to pick the queen card from the deck. To solve this problem, we use two computers where one is a classical computer and the other one is a Quantum computer. The cards which are identical is marked as '0' and the one which is a queen is marked as '1'. Now we turn them down and load them into a memory using a four memory slots.

Normally the basic way for finding the solution for this problem is by checking out the memory slot one by one and picking up the cards in a random. When you pick a random card with the number value '0' you next go for another pick and make out until you get a queen card with a value '1'. So, in an average it takes two and a half turns to pick a queen. Moreover, with the help of a Quantum computer you could solve it in a single pick by using Qubits. Thus, this is the phenomenal use of Quantum computers leaving a benchmark that they are not only faster and smarter but making themselves more unique from the classical computers.

Hence this is the Quantum computing technique carried with the help of Quantum computers making them significantly imperial in terms of current generation techniques.

#### **REFERENCE:**

- [1] R.L. Adams article- '10 powerful Examples of Artificial intelligence in use of today' published in the Forbes magazine.
- [2] Rachit Agarwal's 'Artificial Intelligence techniques', Beebom article.
- [3] Bernard Marr's - 'A.I and Machine learning' [www.linkedin.com](http://www.linkedin.com)
- [4] Publisher -Margaret Rouse, Contributor(s) - Boyrs pawliw. [www.whatis.com](http://www.whatis.com)
- [5] Dario Gill, IBM Research Magazine, explaining Quantum computing concept. [www.reserch.ibm.com](http://www.reserch.ibm.com)
- [6] Abigail Beall and Matt Reynolds , Working of Quantum computers. [www.wired.com](http://www.wired.com)