Enhancement using Quantum Computing in Medical Science

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Abstract: **Quantum theory is one of the most successful theories that can have influence in medical Science progress during twentieth century. The main purpose of this paper is to examine some applications of Quantum Computation in Medical Science. A quantum computing already solved many problems by using many algorithms. Through this technology we can solve many problems in medical Sciences. A quantum computer may have solved a problem in minutes that would take the fastest conventional supercomputer more than 10,000 years. Over the last two decades, advancements in medicine and biomedical research have been vastly. As we begin to enter an age of personalised healthcare, dependent on genomics, individual physiology and pharmacokinetics the need to take huge amounts of data and process it in a format for clinical use will become more urgent. By using Quantum computing in medical science we enhanced the working in this fields which can help us to solve many problems. Quantum computing may be our best tool for achieving this.**

Keywords: Quantum Computing, qubit, bit, medical science, quantum mechanics

Quantum Computing: - Quantum computing is the use of quantum- mechanical phenomena such as superposition and entanglement to perform computation. A quantum computer is used to perform
such computation, which can be implemented theoretically or physically.
Qubits: - A qubit is a two – state (or two –level) quantum mechanical system one of the simplest quantum systems displaying the peculiarity of quantum mechanics. Examples include: the spin
of the electron in which the two levels can be taken as spin up and spin down; or
the polarization of a single photon in which the two states can be taken to be the vertical
polarization and the horizontal polarization.

Bit: - A bit (short for binary digit) is the smallest unit of data in a computer.
A bit has a single binary value, either 0 or
1. ... Half a byte (four **bits**) is called a nibble.
Medical Science: - Medical science covers many subjects which try to explain how
the human body works. Starting with basic biology it is generally divided into areas of specialisation such as anatomy, physiology and pathology with some biochemistry, microbiology, molecular biology and genetics.
Quantum Mechanics: - Quantum mechanics, science dealing with the behaviour of matter and light on the atomic and subatomic scale. It attempts to describe and account for the properties of molecules and atoms and their constituents—electrons, protons, neutrons, and other

INTRODUCTION

Quantum computer are those computers which used qubits for their computation instead of bits like just we are using in our original computers. Quantum computing used Qubits which also known as quantum bit. This Qubits have one extra function which bits don't have that is bits have only two states that is 0 or 1 while qubits have three states that is 0 or 1 or
01. That means we also have the third possibility. In quantum computing we get our output as fast as per our expectation. If Quantum Computing is applied in Medical Science than our Medical Science progress very faster which is beyond our expectation. For example, if we want to know that the person is alive or dead then we can implement Quantum Computing to detect their status. The status may be '0' that means person is dead or it may be '1' that means person is alive. But what happen when person is not alive or dead. Which mean person is in third stage that is
'Coma'. Exactly, coma is the stage where
person stage is in-between the 0 or 1. Simply,
10 or 01 because coma patient is person who take very less oxygen as compare to normal human being due to which

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sometime it seems to be dead but actually it is a condition where person is alive but their body stop responding. Like the test for CORONA virus or COVID-19. This virus almost similar symptoms as normal cold. to identify this test, it took 4 to 3 hrs to confirm it. That it is the common cold or COVID-19. If this, we implement with the Quantum Computing it hardly took a minutes to give the results. But here also the third possible stage which in between it. That third possibility is person is in first stage which is not actually COVID-19. Which is not that serious condition which can be easily cure. Which increase the speed of computation in Medical Science as compare to our ordinary computing.

PROBLEM FORMULATED

To introduced the Medical Science in Quantum Computing we can cure many diseases as soon as possible. To cure any diseases, its detection is very important. For detection of any diseases there are two possibilities i.e., positive or negative. Where positive sign indicates by '1' in form of qubits on the other hand negative sign indicate by '0' in form of qubits. Which we can represent in binary also. But qubit provide us third stage which is '10' and '01'. Not only these thereare also many possibilities left which can be very helpful for our medical science field to study the different stages of any diseases which help them to cure that diseases as soon as possible.

This technique can be implemented in detect the corona virus which become one of the most critical problem in the world. Coronaviruses (CoV) are a large family of viruses that cause illness ranging from the common cold to more severe diseases such as Middle EAST Respiratory Syndrome (MERS- CoV) and Severe Acute Respiratory Syndrome (MERS-CoV) is a new strain that has not been previously identified in human. As we all are already aware the symptoms of COVID-19 almost similar to the common cold. But they both having the different impact on the human body. To detect diseases some device is used which having the logic. These logic having only if and else condition in ordinary computer but after the implementation of qubit in the logic, developer can have the option of the if and else or both case is checked. Which make the third possibility in which if person goes for test then in case of ordinary computing then the possibility '0' or '1'. But in case of quantum computing we having the third possibility that is '01' or '10' which means that in between '0' or '1' there are many possibilities.

For example: - As we all known that in mathematics, there are uncountable number are found between the number 0 and 1. Between 0 and 1 there are many numbers like 0.1, 0.2, 0.3, 0.4, 0.5, so on ……………Similarly, by using qubits instead of bits the possibility of single events can increases which give wider area to study that specific event.

BRIEF DESCRIPTION OF QUANTUM COMPUTING

Quantum computer are those computers which used qubits for their computation instead of bits like just we are using in our original computers. Generally, we are using computers such as desktop, laptop, tablet or smart phone which is also known as binary computer. Because in which their functionality based on 1 or 0. In any binary computer to performed any calculation computer used processor and processor used transistor. Every transistor has only two states that is 0 or 1 which means transistor is ON or OFF states. There 0 stands for OFF states while 1 stands for ON state. Simply, we can say that transistor state two position that is yes or no. In a program or an algorithm what should be compute in next state it decides only in 0 or 1. These 0 and 1 are bits. While Quantum computing used Qubits which also known as quantum bit. This Qubit s have one extra function which bits don't have that is bits have only two states that is 0 or 1 while qubits have three states that is 0 or 1 or 01 That means we also have the third possibility. In quantum computing we get our output as fast as per our expectation.

For example, during logic creation time developer have only if then else is available but in case of qubits developer can check if then that case or if both case can be check. Which increase the speed of computation as compare to our ordinary computers.

METHODOLOGY

Quantum Computing based on Quantum mechanism which have quantum particle or qubits which behave very differently till qubits are not observed it will present in their all possible states which is called SPINNING STATES. Instead of measuring these states in 0 or 1 they measured in up, down and both states. These qubits functionally are based on physics quantum superposition phenomenon. Through the use of quantum entanglement, they can influence each other at time when they are not connection physically. In quantum physics we study that quantum particle behave differently when we observed them and behave very differently when we not observed them. Double slit Experiment is one of best example. Which tell when we observed quantum particle they act like a particle but when don't observed they behave like a wave. The reason behind this that they are originally (quantum particle) not either particle or waves. Because they are present in their probability original states which we called Wave Function. That is at the same time they are particle as well as wave but as we observed these wave system collapses.in which one state is chooses and at the end we get that states.

Similarly, in medical science when quantum computing is used then the possibility outcome of any test will become double or many more. As in above example it is clearly mention that quantum particle having different nature during observation and when don't observed. Similarly, in medical Science when test don't observe it can be many possibilities. Because when it doesn't observe then quantum particle behaves like the wave. As we all know that that in between the completion of the waves. That is between trough and crest. There can be

many possibilities can be formed in between one waves. Then there can be thousands possible outcome come during formation of the waves. Through the implementation of the quantum computing in medical science give the wider area for the study new possible outcome from one test. Through these outcome many new possibility can be generated which can be helpful for us to for new technologies. Conclusion Finally we can conclude by stating that if quantum computing is introduced in medical science then it can prove to be a tremendously useful technology.Understanding every patient's body and treating them accordingly will provide an accurate result .

From 0 to 1 we can get millions of outcomes giving million times more accuracy. So, working on qubits and bits should be started and we can enter a new world of enhancement and growth.

Quantum theory has presented a new line of scientific thoughts, predicted entirely inconceivable situation and influenced several domains of modern technologies.

It can revolutionize the entire world of medical science and biology. Study can obtain high level of smartness resulting to a brief overview in science.

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