



Quantum Computing: The Next Revolution in Technology

*In my opinion, there is the development of some new form of computer. This computer will be able to solve problems which are even too difficult with the current computers. These computers are being developed by people who do research and business organizations everywhere around the globe. This type of computing is called **Quantum computing** and the computers that are used for this purpose are called **Quantum computers**. Quantum computers will not make huge difference immediately. But in the future it may help us in solving complex problems. Many industrial problems can also be solved using these computers.*

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Introduction

Computers are very important in our lives. We use them to manage banking, to communicate and in our businesses. We cannot live the same way without computers because most of our major tasks are dependent on computers. Computers have become faster and more powerful over time. But this progress is now slowing down. This is because our traditional computers are reaching to their limits. Traditional computers operate using **transistors** which are becoming too small and it is very hard to improve them. These are now too small such that it is very difficult to improve them. So this is the issue that traditional computers even more powerful computers of this time cannot solve complex problems easily. This is where quantum computing comes in. It is not just an improved version of current computers, it is a completely new way of computing. It allows computers to perform tasks using the principles of quantum physics.

In our country Pakistan it is not just a new idea it is an opportunity. It can help us to improve our areas like research, healthcare and tech because it has a potential to support development in these fields"

Technology Overview

To understand quantum computing, we should first look at how traditional computers work. Traditional computers use bits, which can only have two states: 0 or 1. All calculations are based on these values. Quantum computers use quantum bits, also called **qubits**. These are different from normal bits because they can exist in multiple states at the same time. This property is called **superposition**. Because of this, a quantum computer can explore many possibilities at once instead of processing them one by one.

Another concept is **entanglement**. In this, qubits are connected in such a way that the state of one qubit affects the state of another, even if they are away from each other. This connection allows quantum systems to perform calculations more efficiently. The third principle is called **interference**. It helps the system find the correct solution by strengthening the right possibilities and reducing the wrong ones. We can understand this with a simple example. In traditional computer, each possible solution to a problem is checked one by one but in quantum computer we can evaluate many solutions at the same time. This makes the process much faster.



Key Findings & Impact

Quantum computing can change many industries and make them work better and faster. In **healthcare**, it can help find new medicines faster by studying small chemical reactions. This means doctors can get new treatments more quickly.

In **finance**, it can analyze large amounts of data to understand risks, detect fraud, and improve investment strategies. In **climate science**, researchers can use it to better understand environmental changes and predict future outcomes. In **Research and education** will also benefit. Universities and students will be able to solve problems that were previously too complex. Currently, companies like **IBM** and **Google**, along with governments around the world, are investing heavily in quantum computing research. This shows that it will become very important in the future. For Pakistan, quantum computing could be very important. If people invest in it and learn about it, universities and startups can use it to develop solutions in areas like agriculture, healthcare, and data analysis.

What's Next?

As we discussed the potential of quantum computing is very high. But, are also challenges. Quantum systems are very expensive to develop and maintain. The qubits in these systems also are very sensitive to their surroundings which can cause errors. However, the field is growing rapidly. Scientists are working to create more stable systems. They also explore new ways to combine classical and quantum computing. It is unlikely that quantum computers will completely replace traditional computers. Instead, they will be used for specific tasks where they perform better.

As a student, I find this technology very interesting because it has the potential to solve real-world problems that current computers cannot handle. For me it is not just about faster machines it is about changing the way of our thinking that how we are solving problems. This makes it very exciting.

About the Author

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Keywords: Artificial Intelligence; Cybersecurity; IoT; Software Engineering; Pakistan Tech

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