The Real Verse Technologies Pvt. Ltd

Working field: IT Sector

Technology: Quantum Technology and Centralized Real Time Data Preservation System.

Mission:

Right now we are living in a very revolutionary time period. Research and development is on high speed even after maturation of computers it's growing day by day we exploitation new technologies and machines according to our requirements.

We are growing in each in every sector Earth science, energy, medical science, chemical science, pharmaceutical industry, food and agriculture industry, defence and marine, space, infrastructure development etc….

Technology, manufacturing and progress is very important for us for human being, livelihood but on the other hand we are lacking somewhere else. This is very harmful for us. We are losing everything our nature, climate, health, food, money…..

We are takes up more than half of the land for feeding us; this is very correct time for "Evolution of Technologies" we need to take correct decisions in technology developments for all the benefits of human being, livelihood, our climate, nature and earth. The accuracy of any kind of technology in any sector is depends on the database of related field, accuracy of the data and process of that database. Which give us an edge to take accurate decision on high speed with zero margin of error. So we need to preserve the information of each and every field.

So Quantum Technology and data preservations both are not only the very important for us even its an authoritative for us to take very accurate and secure decision in very high speed for our growth save our future, climate, nature and earth.

So problems are everywhere solution is Data Preservation and Quantum Technology:

Pollution and Global worming: we are releasing carbon di-oxide which is heating the faster than at any time in the last 500 million years, we are warming and acidifying our oceans and destroying their natural balance and killing the vast swathes of marine life we are causing weather event fire and drought, using extreme chemical fertilizers in farming that are returning the earth to its barren beginnings and it's not just that we are doing any of these but that we are doing all of them and all at the same time and to make matters worse that we are doing it at meteoric speed although rare, mass extinctions change the course of history like nothing else so far, the earth has endured five of these apocalyptic events. In the last 50 years alone wildlife populations have fallen by average of almost 70% and this time we are the ones responsible but there remains a glimmer of hope we are the first species in the four-billion years history of life to understand what is happening to our earth and we are also the first species to understand what is needed to put it right. Our intelligence has brought us this far and it's the only thing that can save us. Our future and that of the planet is yet to be written, how we act now will determine the next chapter in the account of life.

Space science: Quantum Sensing and quantum communication are going to play a major role in space science as a future technology. Quantum computing and quantum sensing are very useful for Imaging, high speed communication in wide range, development of all the new equipment, machines and all the other necessary and useful parts for space science and satellites. Now we are leaving in the age of space war and discover new information about our galaxy and accomplished the entire new space mission. It's an billion dollar industry. Quantum communication for transfer the quantum information between distance and using "Quantum Key Distribution" and "Quantum Cryptography" for secure transmission. Quantum sensors can detect images beneath Earth, ranging from transit tunnels, sewers, and water pipelines to ancient ruins and mines. More accurate sensing can significantly benefit civil engineering, particularly around nuclear power plants, high-speed rail, etc...

Time and Frequency Transfer:

Many modern conveniences, such as telecom networks, rely on GPS clocks to keep cell towers synced so that calls may be transmitted between them. Clocks are used in many electric power systems to fine-tune current flow.

But depending on the existing atomic clocks for timestamping, as GPS satellites now do, is becoming increasingly difficult. GPS navigation is now precise to around three meters (about ten feet), which makes it challenging to use for autonomous driving

Energy:

Quantum computing can contribute to the development of cleaner fuels and more efficient energy storage solutions. Quantum simulations can aid in researching and modeling advanced batteries, leading to breakthroughs in energy storage technologies.

The average life cycle of IT in the Energy and Utility segment is between 5 and 10 years. In it all kind of Software, hardware, Communication Networks, Data Centers and IOT devices. Industrial Control Systems (ICS) including supervisory control and data acquisition (SCADA) systems, distributed control systems (DCS), and programmable logic controllers (PLCs), are critical for monitoring and controlling energy and utility operations.

- Rising energy demand will exponentially expand the volume of data used to optimally operate power systems. Available security and connectivity infrastructure will also fall short.
- With more data and nodes, traditional computers won't suffice for many problems in the energy sector.

Global energy demand is set to increase by 50% over 2018-2050. Bharat is a developing country and Energy demand will be almost double within next 10 years at the same time, so we need more sustainability. To achieve this kind of

target and supply more energy more efficiently, we need to do work on our energy generation plan, transmission system, and distribution system.

As global energy demand and networks grow, the infrastructure development also need to sustain them can also rises. Reasons behind for this is the enlargement of energy distribution systems such as all kind of renewable energy (Green Hydrogen, solar, wind, hydro and thermal or smart homes generating their own energy, the enlargement of new transportation system e.g.; Electrical vehicle are increase in demand more broadly and then weather is also very important factor. Together, these factors exponentially expand the amount of data needed to maintain, process, and optimize power systems. They also add pressure on the security and connectivity infrastructure.

Current conventional computers and system are not capable enough to analyze and proceed the data we need to proceed for future energy generation programs, technology and to develop the very accurate infrastructure, grid stability and architectural development.

Quantum machines are capable to achieve that task, create the algorithms to generate that huge mass level energy generation, storage system and infrastructure develop for distribution and ensure efficient utilization of renewable energy resources.

Healthcare, Pharmaceutical & Life Science Sector: medical sector is important aspect of the health and life of the human beings and any other species and play a very important role in our life it's about the health and even financially too. It's growing very significant speed. However now we are facing very devastating effects on human life because of number of reasons new diseases, pollutions, new kind of virus, wars etc….

Even after the significant grow of medical sector we are facing the problem to diagnose the problems, with current available technologies, in image analysm its low resolutions and irreplaceable, design the drugs its time consuming and still very costly clinical trial process a completely simulated clinical trial is not feasible with current available technologies, problems to understand the sequence and

analyzing DNA as we saw a radicle changes in genetics and genomics, problems in arriving the perfect and accurate decision support systems, most important part is research and developments and the treatments, tests of the patients are very costly and time consuming. Hence the number of problems will be increase if we count. But the solution is Quantum technology and Data Preservation Systems

Financial Sector: The financial services (FS) sector has always been dominated by risk, uncertainty, and the need to respond quickly to a changing business environment. Today, this is truer than ever, with financial stability affected by climate-related risks such as the increasing likelihood of natural disasters, a growing threat of cyber-attacks, and other disruptive economic and political events. More than ever before, the financial sector needs robust solutions to promote growth and maintain trust. Quantum technology may become an important enabler of these solutions since it will offer a completely new paradigm for computing. Already, large financial institutions are investing and experimenting with this technology.

Front office and back office decisions on client management credit origination, treasury management, trading and assets management, business optimization and compliance need quantum and data preservation technologies

Quantum computing specific use cases for financial services can be classified into three main domains: targeting and prediction, trading optimization and risk management or profiling this has direct applications to many current financial methods including pricing of derivatives and minimum risk and maximum return analysis.

Risk analysis, which is the analysis of huge volume of data with the goal being to identify potential risk so that it can then become possible to mitigate those risks.

Portfolio optimization, which involves finding the right mixes of financial instruments that allow the maximum possible return on investment within acceptable tolerance for risk.

Fraud detection, which relies on the quick processing of vast amount of data, thus making it possible to detect fraudulent activity in a timely manner

Real-time trading, which again relies on the rapid processing of considerable volumes of information, and which enable decision making based on latest market information.

Financial modeling, which involves the quick efficient execution of complex calculations that are really very slow, and potentially even impossible, with classic computation.

This list of classifications will grow as quickly as listed of use cases and it is reasonable to assume that novel approaches to quantum computing in finance.

Agriculture & Food Industry: as per we grow in each and every field, the global population is also increase in very rapid speed, and at the same time food demand, supply chain management, infrastructure are also need to be grow. According to some reports world population will reach approx. 10 billion by 2050. The food demand and the cost for generate that food requirements is also going to be increase. And most dangerous part of the current farming is use inorganic pesticides and fertilizers to increase the yield. Which leaves a very negative footprints in our climate, nature, health, our priceless land and our money. We are realizing all the necessary minerals from the earth and convert our soil into the sand. And then there are increasing environmental pressures, such as climate change and the economic impact of catastrophic weather events, and social pressures, including the push for more ethical and sustainable farm practices, such as higher standards for farm-animal welfare and reduced use of chemicals and water. We need more efficiency, resilience, digitization, agility, and sustainability. By the end of the decade, enhanced connectivity in agriculture could add more than $500 billion to global gross domestic product, a critical productivity improvement of 7 to 9 percent for the industry. Organic farming, biodynamic farming and homoeopathic farming is a sustainable form of agriculture that does not use synthetic pesticides and fertilizers. But we need to more grow for sustain according to the future scenario and develop that kind of infrastructure, save our soil, water and improve the quality and health of our land and water. Through which we can save our health, money, nature, and climate. For it we need to set a favorable algorithm by use the quantum technology and

available information for increase the yield, production, solve the financial scenario, supply chain management problems etc…

Defense: Some of the primary applications for quantum sensing include position, navigation, and timing and possibly intelligence, surveillance, and reconnaissance.

Quantum technologies is an emergent and potentially disruptive discipline, with the ability affect many human activities. Quantum technologies are dual-use technologies, and as such are of interest to the defense and security industry and military and governmental actors.

Quantum technologies for military applications introduce new capabilities, improving effectiveness and increasing precision, thus leading to "quantum warfare", wherein new military strategies, doctrines, policies and ethics should be established

Quantum technology is an emerging field of physics and engineering based on quantum-mechanical properties- especially quantum entanglement, quantum superposition and quantum tunneling – applied to individual quantum system, and their utilization for practical applications

Quantum warfare is warfare that uses quantum technologies for military application that affect intelligence, security and defense capabilities of all warfare domains, and it ushers in new military strategies, doctrines, scenarios and peace as well as ethics issues

Quantum in Industries and Science:

Chemical & petroleum Science: Quantum technology going to make revolutionary changes in every industry and science. In order to do energy calculation in a quantum mechanical system such as large molecules calculating all the different parameters including the movement of electrons become intractable on conventional computers. As result, modeling many industrially

import molecules become increasingly inexact, or simple too time-consuming, to wait for an exact solution.

Quantum computing may change the way chemicals are designed, hydrocarbons are refined, and petroleum reservoirs are located and produced. In the next few years, it may accelerate the go-to-market cycle in the development of new chemical products, refine investment strategies in light of tightening environmental regulations, and optimize complex systems that directly impact profits, such as transportation, refinery, and chemical plant processes.

For the human progress we need to new kind of chemical combinations and molecules. It's very difficult to search new chemical molecules in nature or any natural thing even it's more difficult to develop new molecule or simulate new compounds in laboratory with the help of current technologies and faces number of challenges. With the help of the quantum computer technology we can solve all of these kind of problems. It makes very easy to learn computational chemistry and simulate new compound atomic energy, reaction of different chemicals on the computers. Quantum computers will work as a research tool in it for the benefits of humankinds.

The Mightiness of quantum

Determining the electronic structure of molecules is imperative to understanding the reactivity of molecule. As molecules increase in size beyond hydrogen (H_2), the mathematical descriptions of molecule that accurately capture electron-electron interactions, nuclear effects, etc. become increasingly complex. In fact, when a full configuration interaction calculation is performed classically, the algorithms have exponential scaling. However, due to the nature of quantum algorithms, chemistry calculations have been predicted to scale polynomially, a promising step towards the ability to perform exact calculations on molecules that are currently out of reach.

For example, the simple hydrocarbon, Naphthalene ($C_{10}H_8$), could be modeled with ~116 qubits, but it would require a classical computer with 1034 bits to do the same. For perspective, 1034 bits is 7.1 billion times the total volume of data predicted to be stored electronically by 2025—perhaps 175 zettabytes.

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Eventually, quantum computers may be able to tackle reservoir simulation and seismic imaging. Consequently, quantum computing is expected to fundamentally disrupt the landscape of the chemicals and petroleum industry.
General application challenges across the industrial sector share the common problems domain optimization, machine learning,

Material science: simulating and predicting the behavior of complex, quantum mechanical system is critical for new design, such as new types of batteries or pharmaceutical drugs. Quantum chemistry will be an early disruptive application of quantum computing. Modeling polymers, solid molecules at high precision without experimentally synthesizing materials in the lab enables identification of effective molecular structure that satisfy desirable properties such as high energy density or stiffness

Engineering & design: engineering simulation are heavily used across the contributors of this paper particularly in the manufacturing sector. Such simulations are crucial to decrease effort for design and testing by reducing the necessity of physical prototype and laboratories, e.g., wind tunnels in the automotive and aerospace domain. Current in silico model are limited by the complexity and quality of supported model and the necessary compute time. Numerical simulations, particularly finite-element-method based are crucial to simulate complex processes such as aerodynamics, operating strength, structural dynamics, crush & safety, and production concerns

Espionage: search problems with no searchable structure and with as many answers as inputs are also solvable more efficiently with quantum computers. Password crackers are the most common applications even if post-quantum cryptography is achieved, it will take time to replace the method designed for conventional computers. In this process, the danger of breaking security and defense systems will increase.

Cyber-attack against banks, hospitals, defense, companies, financial sector and other nation security organizations that are not quantum proof can create a security problem for all nations. We need to develop method against the hacking.

We will use the following taxonomy:

Quantum computing and simulations

Quantum computers (digital and analogue quantum computers and their applications, such as quantum system simulation, quantum optimization)

Quantum simulators (non-programmable quantum circuits)

Quantum communication and cryptography

Quantum network and communication (quantum network elements, quantum keys distribution, communication)

Post-quantum cryptography (quantum-resilient algorithms, quantum random number generator)

Quantum sensing and metrology

Quantum sensing (quantum magnetometer, gravimeter,..)

Quantum timings (precise time measurement and distribution)

Quantum imaging (quantum radar, low-SNR imaging,..)

However, we place more emphasis on military applications. The quantum technology utilization impact classification is as follow:

Must have: quantum technology that has to be implemented to protect against future quantum attack (e.g. post-quantum cryptography)

Effectiveness: quantum technologies that increase the effectiveness of the current technology and methods (e.g. quantum optimizations, quantum machine learning or artificial intelligence)

Precision: quantum technologies that increase the precision of the current measurement technology (e.g. quantum magnetometers, quantum gravimeters, quantum inertial navigation, timing)

New capabilities: quantum technologies offering new capabilities that were beyond the scope of the present technology (e.g. quantum radar, quantum simulation for chemistry, quantum crypto analysis, quantum key distribution)