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DARQ - The Bleeding Edge Technology

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Abstract - *DARQ is an acronym for the combination of Distributed ledger technology (DLT), Artificial Intelligence (AI), Extended Reality and Quantum Computing. You may have some idea about these technologies and these technologies have the greatest potential in future. In this paper, we will be taking over the above-mentioned technologies, how does this technology (DARQ) work, in which way does DARQ technology can make our future better and finally, our opinion on DARK (Conclusion).*

Key Words: DARQ Technology, Distributed Ledger technology, Artificial Intelligence, Extended Reality, Quantum Computing

1. INTRODUCTION

We are living in the age of technology. We cannot say that we are at the bleeding edge of technology but in future, we will. Because the more we think about the problems in this world, the more we find the solutions to the problem. Here the solution is nothing but the technology we develop solve that problem. Even then we may find some limitations in that technology. What do we do next? we simply upgrade that technology. This cycle continuous repeatedly, thus, we evolve.

This so-called Technological evolution is to and will make our lives easier. We constantly upgrade so that we can live happily and have a better future.

While we do not have the ability to predict the future as we have not gone that far, we can offer speculations on technology's evolution. We are constantly seeing emerging media and the latest trends in technology, so we can predict the technologies which will have a better future scope. Here are a few technologies that are going to change the future.

- Artificial Intelligence and Machine learning
- Blockchain
- Extended Reality
- Quantum computing etc.

There is a newly emerging technology that is the blend of the above technologies and it is showing the greatest potential towards the future. It is the DARQ technology, in which we will be using the four big technologies mentioned above.

2. Technologies in DARQ

2.1. Distributed Ledger Technology

Distributed Ledger Technology (DLT) is for sharing and storing information across multiple data stores known as ledgers. Each ledger has the same data records. The task of the ledgers is to keep and control the distributed network of computer servers (nodes).

The changes to the single ledger are reflected throughout the whole distributed network, and all network members have a detailed, identical dupe of the whole ledger in any specific case.

2.1.1. Types of DLT

There are two types of distributed ledgers, they are permissioned and permissionless distributed ledgers.

The permissioned distributed ledger involves the demand of authorisation for nodes from central entities for penetrating the network and making variations in the ledger. This includes identity verification.

In the permission-less distributed ledgers, every node in the network holds a full and updated dupe of the entire ledger. All the proposed original additions to the ledger by network actors are communicated to all nodes throughout the network.

2.1.2. Blockchain

Blockchain is just a variant of DLT that uses cryptographic and algorithmic approaches to produce and corroborate a continuously expanding, append-only data structure that gradationally turns into a chain of transaction blocks that serve the part of a ledger. It is presently the most popular DLT variant in the world.

The nodes start new additions to the database through the creation of a new data 'block' which includes the records of different transactions or deals. Also, the information about the new data 'block' is participated across the whole network in the form of translated information. As a result,

Blockchains ensure that sale details are not intimately available.

Also, all the nodes in the network estimate the data block and corroborate its validity according to the pre-defined algorithmic confirmation method. The pre-defined algorithmic confirmation system is also known as the Blockchain consensus mechanism. When the data block is verified, all nodes can add the block to their own ledgers, creating, a 'chain of blocks' The Blockchain.

The best exemplifications of blockchain are Bitcoin, Ethereum etc.

The other variants of DLT include Hash graph, DAG, Holochain, Tempo

2.2. Artificial Intelligence

Artificial Intelligence is nothing but the intelligence of a machine provided by a developer. The reason behind providing the intelligence to the machine is to ensure that the machine makes its own decisions depending upon the situation. To explain it simply, AI is just the lines of code written by the developer. But the thing is AI is more than just code.AI is described as "power-up," in that when it is added to a machine, that machine is transformed.

Even today we are using AI. The assistants like Siri, Google, Bixby, Alexa are the best examples of AI. Also, the movie suggestions on Netflix, Prime, ZEE 5, Hotstar etc. Therefore, AI is a part of our life.

As this technology continues to evolve, we can create wonders. The subtopics of AI include machine learning, deep learning, neural networks, etc.

To perform tasks, AI needs the data. By using data, the patterns are built, which AI then uses to generate predictions and simulations. Often, this data is acquired, extracted, and mined as a process to build an understanding of how we use technology.

2.2.1. AI vs Ml vs DL

As we know artificial intelligence (AI), machine learning (ML), and Deep Learning (DL) belong to a similar category, but there are many key differences. AI is the super-topic that comprises the whole field of study, while ML is a subtopic within AI. DL is a further advancement of ML and is the most creative of AI applications that are being used.

To put it simply, artificial intelligence is the concept of machines that carry out tasks that have required human intelligence. AI can be divided into two diverse fields:

Applied AI: Machines that are developed to complete very specifics tasks like navigating a vehicle, trading stocks, or playing chess

General AI: Machines are developed in such a way that when completing any task which would normally require human involvement. The essence of General AI expects machines to "learn" as they confront new tasks or situations. This need for a learned approach led to the development of modern Machine Learning.

2.2.2. Machine Learning

Machine learning is the process of developing machines that can obtain data, later implement algorithms to it, and then orient themselves to develop meaningful understandings from the information.

The main difference between ML and AI is that ML does not hinge on its creator's code. ML systems, on the other hand, begin with computer code and then load data, information, and inputs that can be evaluated. This relationship to large data is what connects machine learning and the Internet of Things. The ML is mostly used to detect faces, voice commands, and objects, to translate languages, also used in chatbots.

2.2.3. Deep Learning

Deep learning brings AI a step further by utilising artificial neural networks to mimic how the human brain works. Each neuron in an artificial neural network is assigned with responding to fundamental questionings about a piece of data with a binary response.

A Deep Learning machine can provide exact outputs without altering the coding by extending over thousands or millions of these artificial neural networks.

2.3. Extended Reality

Extended reality (XR) involves technologies such as augmented reality (AR), virtual reality (VR), and mixed reality (MR). These technologies expand the reality we visualise by either combining the virtual and real worlds or by establishing a fully immersive experience. To put it simply, we can find them in video games and apps that allow you to fantasise a different 'reality' using your device. XR improves the human visual experience and immerses people in a magnificent way.

Extended reality can be referred to as a bridge between real and virtual environments. Over the years, the demand for augmented, virtual, and mixed reality technologies have increased due to new innovations in the semiconductor and photonics industries. Well, it is predicted that ER technology will spread into more diverse industries as it has a greater potential.

2.3.1. Technologies in Extended Reality

2.3.1.1. Augmented Reality (AR):

AR combines digital elements like visual overlays (objects with no background) and haptic feedback over the real-world space. This technology can be easily accessed compared to VR and MR. All we need is a camera to capture the real world and virtual objects are then overlaid by the AR app, allowing us to see them on our mobiles.

AR can also be experienced using smart glasses or headsets. AR glasses do not change the environment around us, but they add digital objects to real space. Here the digital data is projected right before the user's eyes. Right now, AR is mostly used for navigation.

2.3.1.2. Virtual Reality (VR):

VR headsets literally create or display the virtual reality environment around us, which is nothing but a 3D simulation. They create an artificial environment that is computer generated. VR is currently used for entertainment, gaming, healthcare etc.

The VR headsets are of two types:

PC-connected headsets: These headsets are connected to a computer or a gaming console that creates high-quality virtual experiences. Today's computers and consoles can handily produce natural and convincing digital worlds.

Standalone headsets: The standalone headsets do not require a computer or console connection. Most standalone VR headsets use a smartphone screen to provide the VR experience. Not only are these devices more affordable but also easy to use

2.3.1.3. Mixed Reality (MR):

MR allows users to visualise and interact with a completely virtual environment that is overlaid onto the real space around them. This mixed reality is more towards VR than AR.

The following are the two main devices used in MR.

Holographic devices - These headsets have translucent glasses that allows user to see the real-world surroundings and the virtual experiences are created by means of holograms.

Immersive devices - These headsets have a non-translucent display so that they block out the real world and use cameras for tracking the real-world surroundings.

2.4. Quantum Computing

Quantum Computing is the final technology in DARQ and it is the most experimental technology in the world. Personally, it is the most powerful technology in DARQ according to me. It is the branch of computing i.e., based on quantum mechanics. Quantum computers were developed to solve problems that super-computers cannot solve. The significant quantum computers for the future are still in their first stages.

2.4.1. How does quantum computing work?

Quantum computers use the laws of quantum mechanics—to speed up processes of computation. Quantum computing has the potential to reshape the world. Can also be used to lead scientific advancements, industries, etc, this can be done even if we are only at the beginning of our journey.

Quantum computers use quantum bits, or qubits to encrypt the information as 0s or 1s or both simultaneously. Quantum computers can manipulate huge combinations of states at once due to this superposition of states and other quantum mechanical phenomena of quantum entanglement and tunnelling.

2.4.2. Supercomputing vs Quantum Computing

Super-computers have the best computational speed compared to traditional computers. But there are problems that even super-computers cannot solve or take years to solve. This led to the creation of quantum computers.

- We use Supercomputing in supercomputers to solve complicated problems and massively data-laden issues.
- A supercomputer has a high computed ratio of 1/0 and has many effective computing cycles per second.
- scientists and engineers use these computers to solve problems that are intractable due to their size and complexity.
- The applications include climate change, explosions, molecular behaviour etc.
- Quantum computing is a novel type of data processing based on quantum theory or quantum mechanics concepts.
- A quantum computer is a computer designed to accelerate digital processing by applying new quantum algorithms.
- It is the application of quantum mechanical phenomena such as superposition and entanglement to data processing.

- The application of quantum computers is still a work in progress, but once a stable quantum computer is built it has the potential to change the world.

3. How does DARQ technology work?

As we know the DARQ technology is a stack of four powerful technologies namely Artificial Intelligence, Extended Reality, Quantum Computing, Distributed Ledger Technology.

First, let us talk about artificial indigence. Artificial intelligence is the intelligence of a machine (it can be a device or an application) which is based on the code that the developer wrote and the machine learns from situations it encounters. In DLT, the group of computer servers are connected to each other to form a chain-like distributed network so that they can share and store the information in the best secure way possible. The Extended Reality helps us to visualise things and recreates the environment around us in an unimaginable way. Quantum computing helps us to compute lifelong tasks in some seconds.

In the DARQ technology, we will be using the above-mentioned technologies together. Assume that we somehow managed to provide the AI to the nodes in the DLT network and we are also dealing with the Extended Reality. As we are dealing with complex problems and situations using the three big three technologies normal computation may not be efficient. So, we will be using quantum computers as nodes in-network or at least for a central entity.

Note:

It might take fifty to a hundred years for the above assumption to come true.

4. Future Scope

Let us go to the future where we finally have flying cars, but managing the traffic in the air (3D space) is difficult, as we are not moving on the roads (surface). So, we will be using DARQ technology. Now every car has a quantum processor, and each car is connected to a nearby car through a DLT network to receive the positional information. Based on that info the AI in the car drives itself. So, the flying cars will travel just like a group of ants (as ants communicate with each other). So, accidents, traffic jams can be avoided. The passenger can view the journey details inside the car with the help of ER.

Assume there are nanobots in our bodies. If they detect any new virus, they will send the info to the respective alert station and will kill the virus before spreading. This can be done with help of DARQ technology. Here the nanobots make the decisions using AI, there are connected through a DLT network. The person can view the health stats through ER.

The other ways in which this technology can make our future better like:

- A UNI operating system of every device of yours, whose UI will just float on air.
- ER based encyclopaedia.
- Adaptable Nanotech or artificial matter – matter that reshapes itself based on user thoughts.
- Drones that heal the ozone layer from time to time.
- Space ships that can drive themselves at light speed (with the help of quantum computing).
- Drones and bots that can terraform the mars
- To de-construct every cell in our body at one location and re-construct the same cell in another location or simply teleportation

5. CONCLUSION

There are many problems that are arising from day-to-day. To solve them we must be adapted to change and embrace innovative technology. As we know each technology has its own scope. If the technologies come together the scope will be off the charts. As we know Artificial Intelligence, Extended Reality, Distributed Ledger Technology, Quantum Computing are life-changing technologies. If they come together the term 'Life Changing' for the scope is small, as of now what we know is that it is the 'DARQ Technology'.

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