CO-EVOLUTION OF BLOCKCHAIN AND ARTIFICIAL INTELLIGENCE

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Introduction

Nowadays both Artificial Intelligence and Blockchain are emerging technologies and the decision makers known as stakeholders are aware of the major social impact of these technologies.

Whereas Blockchain is a distributed, decentralized, immutable database which can be used to store encrypted data. In its purest form, AI is used to describe the theory and practice of creating machines,capable of carrying out tasks that require intelligence. Each technology has its own individual degree of complexity, but the combination of the two may be beneficial to both.

AI and Blockchain in the field of bigdata

We can see the major impact of revolution of AI in almost every field worldwide and mostly the credit goes to the progress being made in the field of Big data. AI and Blockchain both can make a considerable impact in handling of large amount of data and can take a responsibility to provide security to the Big data.

As blockchain is a distributed network i.e. there is no central authority ,and the data in blockchain is encrypted and cannot be tempered by anyone. On the basis of careful processing of data and using the methods of Artificial Intelligence, the blockchains may be considered as the ideal platform for storing delicate and personal data.

Increased Transparency in Al's decision through block chain

Blockchain helps us in better understanding the decision taken by AI.Inblockchain the decision stored will be in more elaborative form and it cannot be erased once written that means the data in blockchain is immutable and permanent.

Important features of AI[1]

- **Effective data management** : The potential for AI to improve business or any other field performance and also competitive demands a different approach to managing data lifecycle. AI provides effective data management and also flexible and fast access to data.
- **Objectification and systematization** : Marketers are at the forefront of benefiting from artificial intelligence.This technology provides the ability to develop a unified customer view and deep understanding of each customer at and individual level.
- **Error minimization** : AI talks not to humans but directly to computer programs, creating software that codes, edits and test itself. So with this technology AI has a capability to minimize errors.
- **Prediction of future :** AI is capable to predict the future in different field like in medical field it can predict the premature death. Its going to be a wonderful technology with this feature.
- **Real time facilitation** : AI has evolved to provide real time assistance in every industry and field like AI provides real time assistance to fill forms in banks. Also customer can capture images and videos in real time and interpret their surroundings.
- **Data Mining** : It involves the strategies that contribute to make sense from data. AI is the automation of intelligent behavior in artificial system.So AI provides machine learning so that process of extracting information from large databases become easier.

Important features of Blockchain

- **Distributed ledger :**It is a database that is shared and synchronized across multiple sites, institutions or geographies. It allows transactions to have public witness, thereby making a cyberattack more difficult.
- **Transparency**: This is the most appealing aspects of blockchain. It provides the privacy of a user with a powerful cryptography, that means its difficult to link public addresses with individual users.
- **Data protection**:Blockchain is a trusted platform when it comes of protecting data.It is an append-only database with transaction order and also secure time stamping. With these features it provides high data protection.
- **Immutability**: In blockchain the record once stored in a block is impossible to change. The data in block cannot be altered with this it provides data safety.
- **Decentraliseddatabase** :Blockchain doesn't rely on one central point of control. It makes the system fairer and considerably more secure

Assests of AI in the Blockchain system

- **Improved management of data** :Blockchain uses hash algorithms. These algorithms work with a 'brute force' approach. In this algorithm find every possible combination of characters until it finds the one that goes with the verification process is found. It includes higher efforts and more complications. AL can resolve this approach and can provide more intelligent approach which makes management of data easier.

- **Better consumption of energy** : AI can cut down the efforts and saves the time invested in mining the data in the Blockchain . AI improves the data mining system for blockchain.

- **Upgraded efficiency** :Blockchain system costs several million dollar a year on speed and effectiveness of performing a P2P transaction. The reason behind is that same task is executed by each node so as to be the first one to come up with a solution.
  AI provides a system that tells which node will provide the solution at the earliest so that other nodes stop performing the efforts. This will cut down the cost and improve the efficiency of the system.

- **Better scalability**:Blockchain has a problem of scalability because the size of it is growing every 10 minutes. AI can reduce this problem by providing an advanced decentralized system or some other technique that makes the system more powerful.

- **More secure** : As blockchain provides a high security platform but the applications developed using this technology are facing security problems.
  Here also AI can provide more secure environment by integrating natural language processing, image recognition, and multi dimensional real time data transformation capabilities into Blockchain peer-to-peer linking. Also it provides better machine learning intelligence that provides more flexibility to the system.

Transformation of Blockchain in AI environment

- **Secure and Faster transactions** :Blockchain includes Consensus models and Smart contracts so with that data and transactions are immutable and accessible to the public. This provides accurate and authentic data and also intermediators are not required , all these features results in faster, secure and fair transactions.

- **Increased quality of data without compromising in privacy and security of data** : AI faces a problem of limited access to data. AI doesn't have access to the private data of some entity. Here Blockchain provides the solution where it doesn't have any single entity. Also it includes Smart contracts with certain rules and tasks that needs to be followed to enter into a system. So with this the quality of data increases.

- **Effortless access to the authenticated information that is approved by the stakeholders** : Once the stakeholders have approved any information it is then easily available to all the users without any permission.
- **Fewer market entry blockade**: AI faces challenges with its apps and software to enter into the market because of in its involvement of intermediaries, inaccuracy risk etc. Blockchain with AI can overcome all these problems and also assure secure and authenticated data provided by the stakeholders involved.
- Detailed information of data is easily accessible.
- **Atificial trust is improved** : AI is facing major trust issues. Blockchain include digital signature with the information so that no one else can temper the information. Users can access the information verified by Smart contracts and consensus models, so this feature can upgrade the trust in Artificial Intelligence technique.

Benefits of involvement of both technologies

- **Reliable decisions :** Both the technologies can improve the decision making process. AI can detect frauds and risks in any transactions whereas Blockchain improves the accuracy of data with its data auditing process.
- **Easy and improved accessibility** : AI improves the process efficiency and also ensures the security while Blockchain based cryptocurrencies will put the currency barrier to end and foster international trading.
- **Enhanced business models :** These technologies together are very useful in newer business models .The blockchain will provide easy access to the information of the business ecosystem without worrying about the ownership. With this AI can get deeper insights from patterns , behavior and other factors. So that delivery of model can be with more accurate decisions.
- **Better smart contracts :**Inblockchain we have smart contracts for all the users to enter into the chain so that information provided by the users would be genuine. AI will make it possible for smart contracts to encode and validate complex commercial relationship on a blockchain.
- **Provide more trust and security**: Both Blockchain and AI can provide more trusty and secure environment with their features.
- **Personalized experiences are more secured:** They empower users to look into their data storage and security. It will help them to see every single step in the decision making process.

AI-Blockchain in different industries

- **Medical:** These technologies provide safety to the medical reports and can provide access to each patient to look into their reports and its details.Also they provide security to the medical records against any cyber-attack.

- **Retail:** Integration of AI and Blockchain will give power to the retailers to save the inside information of their customers in immutable blocks and the whole process is recorded. Also the payment process will be enhanced and reduce the risk of frauds.

- **Supply chain:** Combination of AI and Blockchain will provide better understanding of supply chain like what should go in the first place.This will result into an all new world.

- **Finance:** These two technologies provide more secure and reliable environment in the field of financing.Blockchain provide trust with smart contracts whereas AI will reduce the dependency on humans which will improve the performance level.

- **Government:** Combining thesetwo technologies provide the control over data to the general public instead of providing to the group of people. Also they can provide more effective e-voting procedure that can be easily accessible to all the citizens in real time.

Literature Review

➢ Artificial Intelligence provides extraordinary techniques and opportunities in healthcare department.But in this patients, developers ,providers and various regulators face various confrontation. The data , reports and elaborative information of drugs are not accessible to the patients and they remain unaware of their true value reports and various prescribed drugs. So here we introduced blockchain with Artificial intelligence so that every single bit of information will be transparent and easily accessible with a security so that the patients can easily evaluate their reports and drugs witout any centralized command. Also blockchain provides a route to the precautionary health care tips for various disease.Hereblockchain also ensures that any editing in information leads to the new block with the help of various consensus.[2]

➢ The two emerging technologies nowadays are Artificial Intelligence and Blockchain. Where blockchain provides access to the shared ledger through a payment known as cryptocurrency. As it is a distributed network so in this we don't need any trusted third party . AI provides different functions to machine to learn and explore different fields of the data that it collects. But because of its centralized property there are some chances of hacking and tampering of data so overcome this drawback decentralized

AI is introduced. Decentralized AI is the combination of AI and Blockchain.So that through Blockchain we can enhance the shortcomings of Artificial Intelligence.[3]

➢ According to the IBM survey on Blockchain it was concluded that one third of 3000 participants are using or considering adopting blockchain in their business. The result of survey echo a recent article in forbes entitled *"Blockchain As Blockbuster: Still Too Soon To Tell, But Get Ready"*.[4]

➢ Artificial Intelligence and Blockchain can provide innovative platforms and tools in online education system. Blockchain provide decentralized system in education field so that the data will be easily accessible and also it provides security. Whereas Artificial Intelligence may be able to change the nature of teaching so that teachers will be free to innovate more constructive work in the field of education.[5]

VARIOUS USE CASES OF CONNECTING BLOCKCHAIN AND ARTIFICIAL INTELLIGENCE:

1. **Singularity Network**: It is a set of rules i.e. protocol whose source is openly available and it is a collection of smart contracts for a decentralized market of coordinated AI services. Founded by Ben Goertzel.[6]
   Features:
   ❖ Able to interface with multiple Blockchains.
   ❖ Data access is validated through smart contracts and controlled by privacy policies.
   ❖ Collaboration arrangements with agent of AI
   ❖ Recovery from failure
   ❖ Securely hosts both public and private contracts.

2. **Deep Brain Chain(DBC)**: It provides platform for artificial neural network algorithm in a decentralized way.[7]
   Objectives:
   ❖ To make artificial neural network works in decentralized manner through blockchain technology.
   ❖ To protect and separate data provider and data training parties through smart contracts.

3. **Numerai:** A Blockchain powered, AI coordinated hedge fund.Blockchain allows scientists to give different predictions to improve the AI that manages the Hedge fund.[8]

4. **Matrix AI network :**It is an open source intelligent platform of Blockchain.
   It is in favour of smart contracts and machine learning services.
   AI is used to optimize the blockchain network itself.[9]
   Objectives:

❖ It provides the generation of smart contracts automatically without any programming expertise.
❖ Provides secured smart contracts using different factors.

Conclusion

In this paper we have discussed two emerging technologies i.e. Block chain and Artificial Intelligence and their collaboration.Artificial intelligence has its own loop holes as it is centralized in nature so to overcome this shortcomings we synchronize blockchain with AI and it becomes decentralized Artificial Intelligence.We have discussed different features of both the technologies and how they affect each other when synchronized.Bothtechnologies can do wonder in online education also and are really useful in online education system too.Also we have different use cases of connecting Blockchain and AI. Some are singularity network, deepbrain chain, Matrix AI network and Numerai. So synchronization of both the technologies that are AI and Blockchain can do wonders in various fields in future.

References

1. https://appinventiv.com/blog/what-happens-when-blockchain-and-ai-merge/

2. Converging blockchain and next-generation artificial intelligence technologies to decentralize and accelerate biomedical research and healthcare

Polina Mamoshina,[1,2] Lucy Ojomoko,[1] Yury Yanovich,[3] Alex Ostrovski,[3] Alex Botezatu,[3] Pavel Prikhodko,[3]Eugene Izumchenko,[4] Alexander Aliper,[1] Konstantin Romantsov,[1] Alexander Zhebrak,[1] IraneusObioma Ogu,[5] andAlex Zhavoronkov[1,6]

3. Blockchain for AI: Review and Open Research Challenges KHALED SALAH 1 , (Senior Member, IEEE), M. HABIB UR REHMAN2 , NISHARA NIZAMUDDIN1 , AND ALA AL-FUQAHA3 1Department of Electrical and Computer Engineering, Khalifa University of Science and Technology, Abu Dhabi 127788, UAE 2Department of Computer Science, National University of Computer and Emerging Sciences, Lahore 54770, Pakistan 3NEST Research Lab, Computer Science Department, College of Engineering and Applied Sciences, Western Michigan University, Kalamazoo, MI 49008, USA Corresponding author: Khaled Salah (khaled.salah@ku.ac.ae)

4. Block chain: The next Breakthrough in the Rapid Progress of AI by Spyros Makridakis,AntonisPolemitis, George Giaglis and SoulaLouca.

5.Artificial Intelligence andBlockchain in OnlineEducation by José Bidarra&HenriqueMamede
UniversidadeAberta

6.SingularityNET: A decentralized, open market and inter-network for AIs Ben Goertzel, Simone Giacomelli, David Hanson, Cassio Pennachin, Marco Argentieri and the SingularityNET team November 1, 2017.

7.NPTELblockchain course.

8. Numerai, https://numer.ai/

9. An Overview of Blockchain Integration with Robotics and Artificial Intelligence. **Vasco Lopes, Luís A. Alexandre**