

Blockchain Technology for the Advancement of the Future

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Abstract - Along with other advanced technologies (AI, AR/VR, IoT), Blockchain technology has established a way to digitize all of our activities through cloud based development. A complex technology that embodied an ingenious and powerful vision to create a comprehensive solution to internet securities, Blockchain is rapidly evolving to be the next disruptive innovation for secured connectivity, promising major changes to how we work and live in the coming century. Our new challenge is how we will adapt with the advancements put forward by this new revolution. This article presents an overall view of Blockchain technology and its potential to contribute to the development of the future by proposing several directions for further research.

Keywords: blockchain; iot; smart technology; 4.0 revolution.

I. THE WORLD IN THE RUSH FOR INTERGRATION WITH SMART TECHNOLOGIES

A. Why everyone should be aware

Nowadays, there is no longer any doubt about a digital world. This will be a world of AI, robots will replace human completely in the work force. A world of smart houses, smart cities, smart countries, where everything has the ability to connect to the internet (IoT), bringing the real and digital world closer together. This trend for integration is called industrial revolution 4.0 building based on the digital revolution. Top experts have stated that this revolution will affect every single facets of society and industries. It will encompass tremendous and total changes to economy, society, security, and policies or even changes the very basis of our way of live and how we work and interact with other people.

B. Recognizing the industrial revolution 4.0

Industrial revolution 4.0 can be described as the emerging of new revolutionary technologies, enhancing the interaction between human and machines, elevating the integration of technologies in the real world. Different than previous industrial revolution: like the first one with mechanization and steam engine; the second with electricity and assembly lines; the third with information technology and automation. The fourth revolution will be the emerging of digital management systems with where efficiency and speed are the focus. With the IoT technologies, every home objects will have sensors and the ability to connect and interact with each other. Streets will be flooded with self-driving cars, the sky with self flying planes, etc. 3D printing will be popularized, robot with AI equipped will rapidly replace human in production. All manual labor today will be automated.

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C. Society interest with the industrial revolution 4.0

Even though the effects of the industrial revolution 4.0 will be enormous, society's attitudes toward it are unparalleled. Recent researches have shown:

Companies, from an initial reluctant attitude, viewing the revolution of a threat, have now been pushing efforts toward research and developing new smart factories, with automation and robotic labors. They hope that these innovations will shorten production team, increase productivity and reducing costs:

- For large companies and corporations, the blockchain technology has brought them opportunities to ensure supply, reducing intermediaries and operating costs.
- For the public and society, new technology applications are creeping into their lives. People see more appearances of robot in their daily lives at hospitals, courts, public buildings with the hope to better our whole society.
- For poor and developing countries, new implication will bring jobs, increase income, domestic product competitiveness, increase labor force comparative advantages. Labor value will be increased, and used more meaningfully.
- For countries will aging population with devastating lack of a highly educated young work force, the industrial revolution 4.0 will be the answer that their companies are looking for to face will threats and challenges from competitions.
- For developing countries, the industrial revolution 4.0 is being focus by their governments through building their countries specific strategy. They are building strong new regulations and policies, providing capital for development of "smart factories," using advanced technologies like robots, sensors, and AI, developing new technologies to serve our needs.

II. BLOCKCHAIN THE NEW FOCUS OF THE TECHNOLOGICAL WORLD

A. Blockchain's basis of operation

Blockchain is a "peer-to-peer" decentralized ledger technology, it provides a method to record and distribute information about transaction publicly on a peer-to-peer system of computers through the crypto protocol. Database is dispersed on the principle that each copy of new data is not only stored on a single computer, but also sent to all users in the chain or system. In order to change any bit of the database, hackers have to change 51 percent of the copies the entry on the system and each of these copies has to contain all of the previous interactions of this data. This protocol has successfully eliminate third parties, while

ensuring safety and flexibility with high interactivity. This helps increase trust and responsibility between the parties. Using blockchain helps organization to become more transparent, democratic, decentralized, efficient, and safe with reduced costs, regulatory barriers and bureaucratic procedures.

Similar to the internet, the strengths of blockchain technology are still being developed. By storing repeated information online, blockchain cannot be control by any single individual or organization, ensuring precision and error free. Blockchain can be imaged as a Googles Docs file that is shared to everybody. Everyone can view the content and can add new information, however, it is impossible to edit or delete entries.

B. Advantages of blockchain

Blockchain is the protocol behind cryptocurrencies, in which Bitcoin is the first cryptocurrency ever created and most recently is Ethereum. According to Ben Schiller (2016), using blockchain brings three distinct benefits:

- Blockchain is arranged rationally, allowing users to execute quick insurance requests quick that can be valuate immediately through using AI.
- Blockchain decentralization helps it become less likely to be attacked. This is the perfect condition to use for online security.
- Blockchain is the future as many have predicted, usage of blockchain will spread further and deeper in the financial industry in the near future.

C. Technology for the transparency of the future

Bill Gates has stated that (Genesis Block, 2017) "With the birth and development of the internet, our future world will be digitized, globally and drastically. Anything that is right today might not be right tomorrow." As many are still in suspicion of cryptocurrency, viewing them as fake and artificial, the birth of blockchain technology is changing the world dramatically. It is proven that multiple large irreplaceable industries are being threaten by this new technology. From: financial, insurance, voting, social welfare, medical services etc. to large corporation like Amazon, Uber, Walmart, Facebook etc. are facing with a new revolution calling Blockchain.

III. POTENTIALS OF BLOCKCHAIN

A. The role of blockchain within the technological revolution 4.0

Similar to the emergence of the internet, which has altered the media industry radically, the advent of Blockchain technology is predicted to trigger a widespread revolution. As forecasted, some typical areas that could benefit from Blockchain technology in the near future include financial services (fintech), public voting, data sharing system, decentralized exchanges as well as leading industries like artificial intelligence, internet of things and big data. At the moment, Blockchain is being experimented by hundreds of technological and financial corporations such as Google, IBM, Amazon and Goldman Sachs. It is predicted to open up plenty of unprecedented opportunities for start-up and employment.

A. The role of blockchain within the society

Recent research has shown that Blockchain can potentially change the way people live in many ways as follows.

Faster insurance and payment

Blockchain can help car insurance service become smarter. For instance, customers who need insurance for new cars can receive the service almost immediately. All the policies and resolutions in case of accident can be quickly updated. The combination of Blockchain technology and automation can facilitate negotiations regarding compensation because all the systems communicate with only one reliable point of data.

Easier travelling

Based on travel insurance contract, travel insurance agencies can automatically make payment to compensate for the loss of customers such as late departure, unsuitable means of transport, disappointed services, etc. By analyzing the entire journey, the AI technology and Blockchain can identify and verify the needed reimbursements and instantly make payment. This can save a great amount of time and help customers to avoid complicated administrative procedures.

Protecting corporate identities

Its decentralized characteristics make blockchain hard to attack and crypto technology have allowed blockchain to be a safe platform, easily audit from inside the system structure. With multiple validation and hardly any single machine capable of attack, blockchain is an ideal security technology on the internet. This creates the best environment to operate, ensuring safety for companies, and helps protect corporate advantage to enhance their brands and trustworthiness

Human management

Blockchain is able to analyze all actions happened on the computer and evaluate the probability of errors by monitoring the behaviors regarding organizational daily operation. The use of Blockchain can give broader understanding of behaviors that fail to meet the standards. For example, Blockchain can identify who do not use the systems they should be using and record any evidence on when someone leave their job irresponsibly in order to introduce suitable examination and resolutions.

IV. BLOCKCHAIN AND CHANGES OF VOCATIONS

According to research by Euvie Ivanova (2017), Blockchain will change various vocations in the next 5 -10 years. Recently, many vocations have been affected like:

Banking and imbursement

Implementing blockchain technology will create easier ways to use financial services for billions of people around the world, especially those in third world countries. Nowadays, technologies like Bitcoin, Onecoin are being used by many to send money across borders, instantly with very low fee. ABRA is a startup providing transaction service via Bitcoin. In addition, multiple banks like Barclay are also accepting Blockchain, as a technology to help operation to become faster, safer and more efficient

Internet Security

Even though blockchain ledger is public, data has to be validate and digitize through crypto protocol, thus these data is difficult to attack or change without permission. By eliminate third parties, using blockchain will help conduct more efficient activity comparing to now obsolete security systems.

Supply chain management

According to Adam Robinson (2016), using blockchain technology, all transactions are recorded in a decentralized permanent ledger, safely monitored and transparent. This would help reduce latency from human error. Blockchain is also used to monitor labor cost usage, even monitor unnecessary wastages in every point in the supply chain. Blockchain can also be used to validate good transaction by tracing their origin. Some startups in this space are Providence, Fluent, Skuchain and BlockVerify.

Forecasting industry

Blockchain will change how people approach to research, consult, analyze and forecast. Online platform like Augur is creating new decentralized global forecast. These technologies can be used to manage in other sectors such as sport, stock or voting decentralized.

Networking and IOT

Samsung and IBM are using Blockchain to create innovations related to a connected network of IoT gadgets, working as a public ledger for large range of technology, while eliminate the need central database. Digital gadgets can communicate with each other directly to update firmware, manage errors and monitor energy usage.

Insurance industry

Blockchain is used to validate data in an insurance contract like recognizing insurance users' features. With smart contract, Oracles can integrate data in the real world. This technology is very useful to any types of insurance based on real life data, like buying good insurance. Eternity is a blockchain project in this space.

Personal and shared transport

Blockchain can be used to create decentralized peer-to-peer applications for sharing rides, allowing both vehicle owners and users to arrange terms and time safely without needing a third party. By using a digital wallet, car owners can automatically pay parking fees, toll fees and fuel cost for the vehicles. UBS, ZF and INNOGY are startups that are developing these ideas.

Online data storing

Data in traditional centralized services is liable to online attack, losses or human errors. Blockchain allow cloud storage to be safe and more capable in protecting against outside influences. STORJ IO is an example for this cloud storage system that is using blockchain.

Charity activities

Using blockchain technology to monitor charity transfers to ensure that donors' money are being sent to the intended receivers, solving inefficiency and fraud. Bitcoin charity like BitGive Foundation is using Blockchain ledger to safely and

transparently transfer funds, allowing donors to verify directly that their money is being sent to the right people.

Voting

Blockchain can be used to sign up for voting and validating personal identification. Counting votes electronically will ensure that only valid votes are counted and no vote can be changed or moved. Public ledger blockchain recorded votes will make elections become more fair and democratic. Democracy Earth and Followmyvote are two startups that are creating the online voting platform for governments.

Government

The bureaucratic systems are notoriously slow, obscure and prone to bribery. Using blockchain can help alleviate bureaucracy, increase safety, efficiency and transparency of government's activities. Dubai is an example of leaning forward uploading all of their government data to blockchain system in 2020.

Public Welfare

Public welfare is also a victim of bureaucracy. Using blockchain to help that public to reach, validate and manage distribution of welfare or unemployment aids safely and directly. Govcoin, an English company is assisting the government in distributing welfare using blockchain technology.

Healthcare

Blockchain can help hospital to store medical records and sharing them to authorized individuals. This will help better security and correctness in healthcare services, reducing the chances that the system can be attacked due to their older database protocol. Gen and Tierion is two startups that are currently working in the database services for the healthcare sector.

Energy management

Using blockchain will eliminate centralized energy management of the public sectors and the forced trust on these agencies. Transactivegrid is a startup that is using blockchain of Ethereum to allow customers to buy and sell energy directly without going through any third parties.

Music streaming

Blockchain allows for the building of platform for musicians, composers to be paid directly from their fans without spending large amount of fees for music CD or record companies. Using smart contract can solve problems on granting permission and price tables of new songs from related publishers. Mycelia and Ujo Music are creating new Blockchain solution for the music industry.

Retail

Retail system based on blockchain operates by connecting the buyers and sellers will eliminate third parties and selling fees. Trust of users will increase thanks to the smart contract protocol, safety of transaction and the link to other reputable systems. Two startups that are disrupting the retail space of Amazon are Openbazaar and OB1.

Real Estate

To eliminate bureaucracy, lack of transparency, fraud and other errors in real estate documents, selling houses, blockchain technology help assisting transaction and reducing paper documentations, help searching and validating ownership. This will ensure correctness of document and transactions of document. Ubitquity is a startup about recording and storing real estate documentation in digital form.

+ Crowd funding

Using blockchain, trusts are generated from smart contracts and famous online systems, because using decentralized ledger technology has forever eliminated the need for third parties. New projects can issue Token coin for themselves, after that these can be easily exchanged into products, services or cash. Many startups blockchain have been raising millions of dollars from selling the fort mentioned Tokens.

All in all, any industries that deal with data or any types of transactions, they can be disrupted by blockchain technology. Through empirical evidences, it can be concluded that the blockchain space is widely open with numerous opportunities.

V. CONCLUSION

Blockchain is the decentralized ledger technology that is behind famous cryptocurrencies like Bitcoin, Ethereum etc. By providing a method to record and transmit data safely, verifiable and stable, Blockchain has the potential to help organizations that use it to ensure transparency, democracy, decentralization, effectiveness and safety. Blockchain implications are very diverse in managing data from taxes, real estate, copyright, to online shopping etc. Still, it most important implication is still in the financial field, as the core technology behind cryptocurrencies. With the revolution of IoT 4.0, it is predicted that the potential of Blockchain technology and digital assets is enormous and it with disrupt various industries in the next 5 to 10 years. There are many innovations and work to be done it the route to discovery (especially when combine with technologies like AI, VR, IOT, 3D printing, etc.) Even though blockchain's drawbacks are still up to debate, we have to accept that blockchain will be the future and it will change the outlook of our work. Opportunities will come to the first adopters and researchers.

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