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The Future of Decentralized Blockchain and Artificial Intelligence

Deepesh Jami*
Graduate Student, Department of Computer Science Engineering, Vellore Institute of Technology, Vellore, India

***Abstract*: Recently, Artificial intelligence (AI) and Blockchain have become two of the most advanced and disruptive technology. Blockchain technology has the ability to make automatic payments in cryptocurrency as well to provide access to shared data, activities, and logs in a secure, secure, and trusted environment way. And with smart contracts, the blockchain has the ability to control interactions between participants without a mediator or a trusted third party. AI, on the other hand, provides intelligence and decision-making the power of human-like machines. In this paper, we present a detailed blockchain survey AI applications. We review books, create tables, and summarize emerging blockchain applications, platforms, and protocols that directly target the AI environment. We also identify and discuss open research challenges to use blockchain technology AI. A lot of research is being done diligently to test the full potential of Blockchain. Some believe that Blockchain is the key to a free society.**

***Keywords*: Artificial Intelligence (AI), Machine Learning, blockchain, decentralized, cyber security.**

1. Introduction

Blockchain is one of the technologies that has emerged over the past decade and brought many promises about it. Work is still under way to test the full potential of Blockchain and its potential applications. Some believe that Blockchain is the key to a free society. Our current ecosystem is completely integrated, meaning that the power to make decisions lies in the hands of a few. For example, our entire financial system is regulated by state-owned banks and in organizations the decisions are made only by a few board members. Even giants like Google and Facebook, used by billions of users every day, decide what they want us to see. Although decentralized has any authority, power is given to all members of the network. Bitcoin is an example where there is no need for a bank or anyone in the middle of a transaction because it is all transactions. they are visible to all groups and the blockchain keeps track of history and allows anyone on the network to track back any transaction from your source.

Bitcoin's basic technology, blockchain, has recently emerged as a disruptive innovation with a wide range of applications, capable of redesigning our business, political and social interactions. Although scholarly interest in this subject is growing, a comprehensive analysis of blockchain applications from a political point of view is still lacking. This paper aims to fill this gap and discuss the key points of blockchain-based governance, which challenge the various levels of traditional methods of State authority, nationalism and democracy. In particular, the paper ensures that the blockchain and expanded forums can be regarded as political tools, able to manage social media on a large scale and dismiss traditional central authorities. The analysis highlights the risks associated with a high level of independent power in distributed ecosystems, which could lead to general reduction of citizens' power and the emergence of a global society.

2. Blockchain Structure

A Blockchain can be thought of as a series of blocks (Nodes) connected to each other. Tasks are stored across the network. Whenever a new activity arises or changes in any transaction, it must be confirmed. Verification is not an agreement between nodes, there are various ways to achieve consistency. Information in Blockchain cannot be added or modified until a consensus is reached that proves fraudulent.

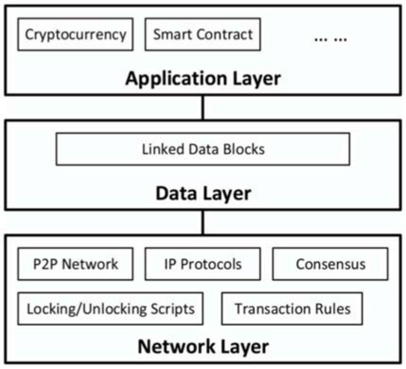


Fig. 1. Blockchain structure

The Blockchain Framework can be divided into three categories namely Network Layer, Data Layer and Application Layer, for understanding. Network Layer enables Blockchain to connect and interact with the environment and users. It also makes the whole system segmented using a peer-to-peer network and IP protocols. One of the most important tasks, consistency is achieved in this layer. The data layer is what creates blocks in Blockchain. All data and algorithms and other methods such as digital signature. The Merkle tree and hash

*Corresponding author: deepesh.jami@gmail.com pointers are described here. These algorithms and data structures help to make Blockchain transparent and seamless. The application layer represents various applications that can use Blockchain and its features such as smart contracts and cryptocurrency for their own purpose.

3. Future of Blockchain and AI

Since the advent of Blockchain, a lot of research has been done to explore what else we can do with this amazing technology. Blockchain applications are still available, a few of which will be discussed here.

A. Financial Applications of Blockchain

Majority of Blockchain Technology is used in finance industry. It all started with Bitcoin when the blockchain was used to keep a record of financial transactions, eliminating the average person. Since Bitcoin, different Blockchain technologies have spawned so many different Cryptocurrencies that there are hundreds of cryptocurrencies on the market right now. Figure 2 shows us the Bitcoin Blockchain. Whenever a new activity is performed it spreads across the network. Miners record this transaction and after verification, the transaction closes cryptographically and becomes blockchain. This block is now attached to the previous block with hashing.

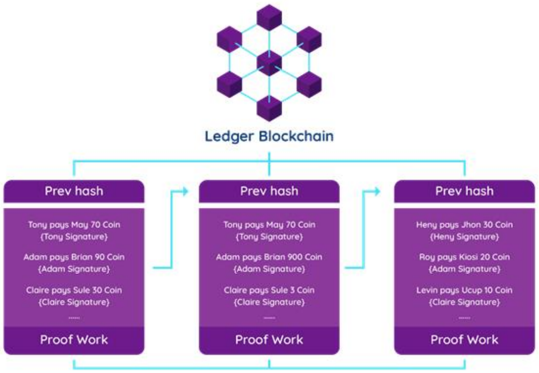


Fig. 2. Blockchain hashing

Current trading methods for obtaining payment permits depend on medium-sized generators to record all activities and to keep account balances. In fact, the action is transmitted once from trading groups to a consultant, eligibility checks, and appropriately for both accounts they are fixed. In a blockchain, transactions are transmitted across all network nodes, including many more transfers and more processing power and time. Transaction also becomes part of blockchain, copied to all computer components. This is slower and more expensive than one place permit, and helps explain why Visa & Mastercard cancel 2,000 transactions per second while Bitcoin can erase only seven. Bitcoin has a blockchain not because it allows for cheap transactions, but because it removes the need to rely on third-party mediation: the action is deleted because nodes compete to verify them, yet no area needs to be trusted. Not applicable to third party consultants to think they can improve their performance through such technology sacrificing efficiency and precision speed to remove external corporate coordinators. For any kind of money controlled by the middle group, it will always be very effective to record what is done in one place. That eliminating third-party mediation is a powerful enough benefit to justify increased inefficiency of distributed letters is a question that can only be answered in the coming years in the survey of market acceptance of digital currencies. What can be clearly seen is the blockchain payment applications will need to have allocated blockchain funds, not centralized funds.

B. Smart Contracts

As the name implies, Blockchain with smart contracts can eliminate the need for lawyers and consultants. Wise contracts will be available to all parties involved and any changes to the contract should be made after reaching Consensus. Wise contracts can be useful in business and private marketing.

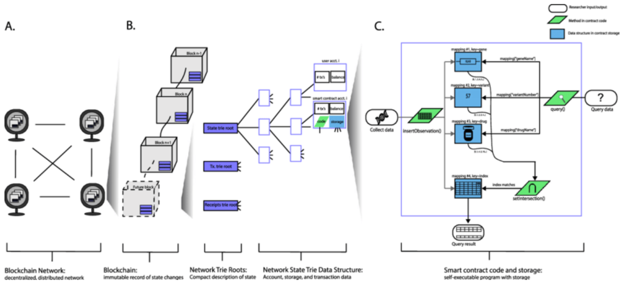


Fig. 3. Ethereum blockchain and smart contracts

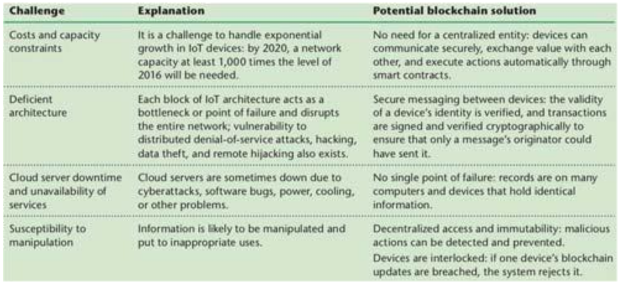
At present, contracts are drafted by lawyers, judged by courts, and enforced by the police. Smart contract cryptographic systems like Ethereum enter into blockchain contracts to create commit suicide, with no chance of appeal or defamation, and beyond the jurisdiction of the courts the police. “Code code” is a slogan used by intelligent contractors. The problem with this The idea is that the language lawyers who use the contracts are understood by more people than they are Coding language used by smart contractors. Only about a few hundred people worldwide by technical experts to fully understand the implications of a smart contract, as well and do not miss the obvious software bugs. All of this was reflected in the initial launch of contracts on the Ethereum, the Decentralized Autonomous Organization. After another invested more than $ 150m in this smart contract, the attacker was able to create code in such a way diverted about a third of all DAO assets to its account. It can be difficult to explain this attack is a theft, as all investors have accepted that their money will be controlled by code and nothing else, and the attacker did nothing but make the code as accepted investors. Following the DAO hijacking, Ethereum developers tried to reverse it block to modify attacker transactions, and as a result the Ethereum network splits in half two networks have two different currency types, one that confirms the DAO attack, and the other that is take you back. This "fork" raises questions about Ethereum's blockchain claims for consistency. I The processing capacity of Ethereum (the second largest cryptocurrency) is small enough for a small facility a team of program planners may decide to postpone the process because their contracts have bugs in them, and has managed to capture most of the hashing power in the network as well. This raises the questions of whether the whole sense of intelligent contracts, as it proved to be irresistible. Given that a blockchain can be reversed, smart contracts have not changed the courts by code, but they have changed courts with software developers with little experience, knowledge, or accountability to solve.

The DAO was the first application and to date only the most complex contract intelligence in the blockchain, and the information suggests that widespread use is still a long way off. All other apps right now they only exist in the prototype. Probably in the imaginary future when coding is very common again code is highly predictable and reliable, such contracts may be common. we in the foreseeable future, the need will only be found in simple contracts whose codes can be simplified confirmed and understood by many. The only blockchain contract applications with intent to do so are related on simple timed payments and multiple wallets, all done with blockchain money itself, especially in the Bitcoin network.

C. *Blockchain and Internet of Things*

The internet is a big part of everyone's life right now, sometimes we don't even know how connected everything is. All the tools like smart watches, smart refrigerators, cameras and cell phones etc. connected to the internet. The Internet of Things (IoT) is basically an intelligent and designed sensor network connected to the internet and sharing information alone to make our lives easier. There is no denying that IoTs make our environment smarter, but they also make us more vulnerable. Imagine living in a smart home, where all of these connections with all the devices are tracked and monitored, to help but all your data is online, insecure.

Blockchain as evidence of segregation and anger is very popular in the Internet of Things (IoTs) industry. The number of nodes in IoT is increasing day by day as well as the data being collected. Data security has always been a problem, Blockchain can help protect and manage this data. Fig.3 lists some of the challenges facing IoT that can be remedied by Blockchain features.



Challenge	Explanation	Potential blockchain solution
Costs and capacity constraints	It is a challenge to handle exponential growth in IoT devices: by 2020, a network capacity at least 1,000 times the level of 2016 will be needed.	No need for a centralized entity: devices can communicate securely, exchange value with each other, and execute actions automatically through smart contracts.
Deficient architecture	Each block of IoT architecture acts as a bottleneck or point of failure and disrupts the entire network; vulnerability to distributed denial-of-service attacks, hacking, data theft, and remote hijacking also exists.	Secure messaging between devices: the validity of a device's identity is verified, and transactions are signed and verified cryptographically to ensure that only a message's originator could have sent it.
Cloud server downtime and unavailability of services	Cloud servers are sometimes down due to cyberattacks, software bugs, power, cooling, or other problems.	No single point of failure: records are on many computers and devices that hold identical information.
Susceptibility to manipulation	Information is likely to be manipulated and put to inappropriate uses.	Decentralized access and immutability: malicious actions can be detected and prevented. Devices are interlocked: if one device's blockchain updates are breached, the system rejects it.

Fig. 4. Blockchain solutions

D. *Blockchain in Developing Countries*

Blockchain can help eradicate or at least reduce corruption in developing countries. It can help to make everything transparent and accessible to the public which makes it difficult for records to be kept. Being transparent will make the system credible and human rights will be protected.

E. *Communication*

Blockchain provides security and cannot be compromised. These features play a key role in protecting our connections with the networks. For personal or individual communication on the sidelines, consider what Blockchain can do for a sensitive government. institutions such as the military, police and Intelligence Agencies.

F. *Database and Record Management*

The Medical Industry is particularly interested in Blockchain technology to protect and track medical data collected from a patient. Medical data is very important, and any mistake or modification can lead to extreme consequences. With Blockchain data it can be made public for use without fear of alteration.

Blockchain is a reliable and proven site for distractions and assets sign up, but only with traditional blockchain money, and only if money is important enough network to be strong enough to process attack resistance. For any other property, physical or digital, blockchain can only be trusted as those responsible for establishing a link between asset and what it refers to in the blockchain. There are no efficiency or benefits of exposing things by use blockchain allowed here, as blockchain is only trusted as a licensed group to write it.

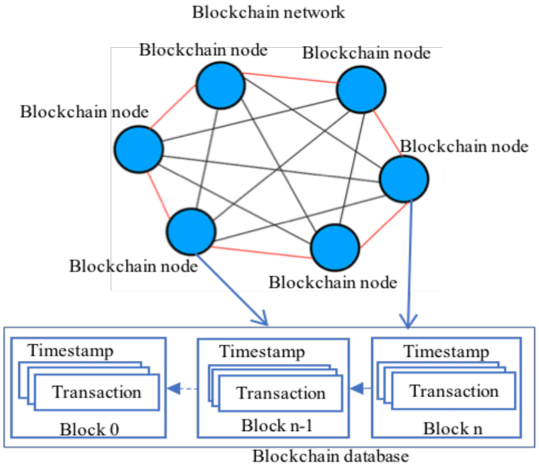


Fig. 5. Blockchain database network

Introducing the blockchain to the group's record keeping will slow it down, while do not add security or consistency, as there is no Proof of Work. Rely on a third party coordinators should remain, while processing power and time required for the use of the website iyanda. A blockchain-protected blockchain can be used as a notary service, where contracts or the documents are sent to the transaction barrier, allowing any party to reach a contract and be make sure the version shown is the one that was speeded up at the time. Such a service will provide a local blockchain market is rare, but it does not work on any blockchain without money.

G. *Blockchain and Artificial Intelligence*

(AI) lead new things today. They both make crazy moves in different domains. Recent Learning achievement (ML), especially in the Deep Learning (DL) field is used for guessing, classification, natural language processing and image recognition etc.

Suffice it to say that both AI and Blockchain have their strengths, but they also have some weaknesses. Blockchain deals with issues such as robustness, efficiency and security as well as concerns about Al creation of fake news, privacy issues and Al use by bullies. Al and Blockchain can help each other over their weaknesses.

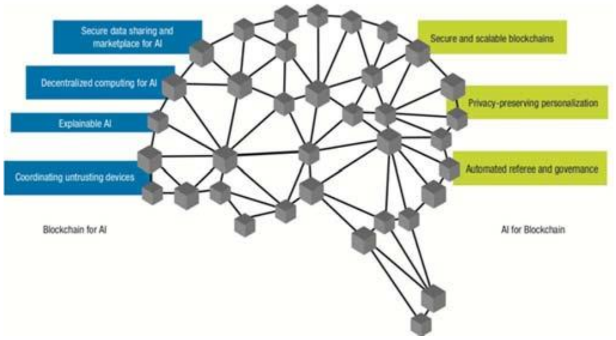

Secure data sharing and marketplace for Al
Decentralized computing for Al
Explainable Al
Coordinating untrusting devices
Blockchain for Al
Secure and scalable blockchains
Privacy-preserving personalization
Automated referee and governance
Al for Blockchain

Fig. 6. Blockchain and AI

Blockchain can provide Al-shared platforms like data, computing power and make Al decisions more transparent as data in Blockchain is public and contains all records, thus making Al less fearful AI can help with the creation and operation of Blockchain scalability and can change and improve Blockchain for better performance. And Since data in Blockchain is public, AI can help protect user privacy and privacy.

4. Drawbacks of Blockchain Technology

From exploring the above potential applications of blockchain technology, the four main obstacles to wide acquisition is identified.

A. Redundancy

Having all the activity recorded with each network member is very expensive redundancy is the only purpose of removing the mediation. To any arbitrator, even a financier or legally, there is no point in adding this termination of employment while remaining a consultant. There is no a good reason for a bank to share a record of all its transactions with all banks. Nothing more official the reason why any bank wants to have complete records of transactions with other banks. This outsourcing offers increased costs without any potential profit.

B. Scaling

A distributed network in which all the notes that record everything that is done will have the same function The ledger grows much faster than the number of network members. So storage as well the computer load on network members will eventually become too large for network members to perform manage as network size increases. Blockchains will always face this barrier to effective balancing, too this explains why as Bitcoin developers seek measurement solutions, they are moving away a clean blockchain model aimed at having payments cleared by intermediaries without blockchain. There is a clear trade between the scale and the distribution of countries. Should blockchain be made In order to meet the large number of transactions, the blocks need to be made larger, which will raise the cost of joining a network, and resulting in fewer nodes, making the network more central. I the least expensive way to have a large transaction is to be centred in one place.

C. Compliance Control

Blockchains with their own currency, like Bitcoin, exist orthogonally law, as there is nothing government officials can do to affect or change their operations, too the chairman of the Federal Reserve said he had no authority to regulate Bitcoin. Done will be deleted if active, and will not be clear if it is invalid, and there is nothing the regulators can do to eliminate it network compatibility capabilities. The use of blockchain technology is highly regulated industries such as legal or financial, with forms of currency other than Bitcoin will lead to regulatory problems and legal issues. Regulations are designed for a very different infrastructure blockchain and rules cannot easily adapt to blockchain operations, with great openness that all records be distributed to all members of the network. In addition, blockchains run across the Internet authorities have different rules of conduct, which makes it difficult to ensure compliance with all laws.

D. Irreversible

With payments through intermediaries, personal or software errors can be easily reversed by appealing to a mediator. In the blockchain, things are very complex. Once block secured and new blocks attached to it, it is only possible to undo any of it trading by setting up 51% of network processing power to engage in a 'strong fork' network, in which all these nodes agree to move simultaneously to the modified blockchain. Blockchain technology, after all, is intended to duplicate online marketing, and they will do so. repeat non-refunds after a cash transaction, and do not manage any retention benefits mediation.

Most likely, such a fork will not succeed if you try with Bitcoin, as it will require very far many different players to adapt and use resources without profit. After the DAO incident, it happened it has become clear that in any blockchain other than Bitcoin, the hash rate of the network is small enough, and financially influential designers, overturning blockchain components they do not have as. This means that the claim for blockchain technology 'immutability' only applies to the situation of Bitcoin. In any other blockchain, blockchain operators, or regulatory authorities, can actually change the record. The flexible blockchain is a completely absurd activity engineering technology: uses a sophisticated and expensive method to obtain a permit they do not coordinate and establish consistency, but then give the mediator the ability to dismiss that consistency. The current good practice in these areas includes transformation and regulatory oversight as well regulatory authorities, but using cheaper, faster, and more efficient methods.

E. Security

The security of the blockchain website depends entirely on the processing costs the ability to verify performance and proof of performance. Blockchain technology can be much better understood as the conversion of electrical energy into certified non-invasive proprietary records as well transaction. For this system to be protected, verifiers that use processing power must be protected compensated by the currency type of the payment system itself, adapting their motive and health as well network length. In the event that a processing fee is made for any other amount, then the blockchain is actually a private record kept by anyone who pays for the processing power. The security of the system depends on the security of the central organization that supports the miners, but it does is compromised by working on a shared manual that opens up many security opportunities violations that must occur. A system allocated area built on verification of processing power is highly secure when the system is very open, and the number of network members is large they use processing power in verification. A central system based on a single failure point is slightly more secure the number of network members able to write blockchain, as each additional network member is potential safety risk.

5. Possible Future Directions

Blockchain has demonstrated its potential in industry and studies. We discuss four future directions places: blockchain testing, what a tendency to do one place, big data analysis and blockchain application.

A. Blockchain Testing

Recently different types of blockchains have emerged and re-emerged 700 cryptocurrencies are listed to date. However, some engineers may cheat their blockchain functionality to attract highly driven investors. In addition, when users want to turn a blockchain into a business, see they should know which blockchain suits their needs. So The blockchain test method needs to be available for testing various blockchains.

Blockchain testing can be divided into two categories: the suspension phase and the testing phase. On suspension in the section, all procedures must be performed and agreed upon. When a blockchain is born, which can be tested on agreed terms to work if the blockchain works as well as the developer said. As in the testing phase, blockchain testing needs to be done on different terms. For example, the user in charge of an online retail business that cares about the exit of blockchain, so testing requires intermediate testing from user to post function to activity packed in it blockchain, blockchain blockchain and more.

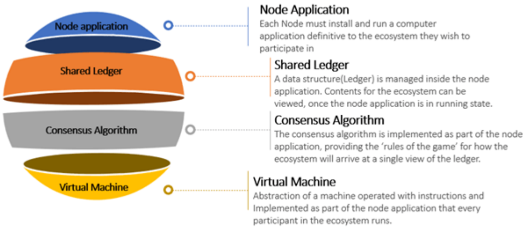

Node application
Shared Ledger
Consensus Algorithm
Virtual Machine
Node Application
Each Node must install and run a computer application definitive to the ecosystem they wish to participate in
Shared Ledger
A data structure(Ledger) is managed inside the node application. Contents for the ecosystem can be viewed, once the node application is in running state.
Consensus Algorithm
The consensus algorithm is implemented as part of the node application, providing the 'rules of the game' for how the ecosystem will arrive at a single view of the ledger.
Virtual Machine
Abstraction of a machine operated with instructions and Implemented as part of the node application that every participant in the ecosystem runs.

Fig. 7. Blockchain testing

B. Set the Tendency to Work in One Place

Blockchain is designed as an extended program. However, it is customary for miners to be housed in one location in a mining area. To date, the pools of the top 5 combined mines are the largest owners 51% of the total hash power in the Bitcoin network. Outside since then, the selfish mining strategy showed that pools with more than 25% of total computer power can earn extra money there is a fair share. Reasonable miners will be attracted a selfish lake and ultimately a pond can easily pass 51%. absolute power. Since the blockchain is not intended to serve a few organizations, alternatives should be suggested to resolve this problem.

C. Analysing Big Data

Blockchain can be well integrated with big data. Here we almost split the combination into two types: data management and analysis. Regarding data management, the blockchain can be used to store important data as it is shared and secure. Blockchain can also verify data it is real. For example, if a blockchain is used to keep patients health information, information could not be disturbed again it is difficult to steal that confidential information. When it comes data analysis, blockchain transactions can be used big data statistics. For example, user trading patterns may issued. Users can predict trading for potential partners behavioural analysis.

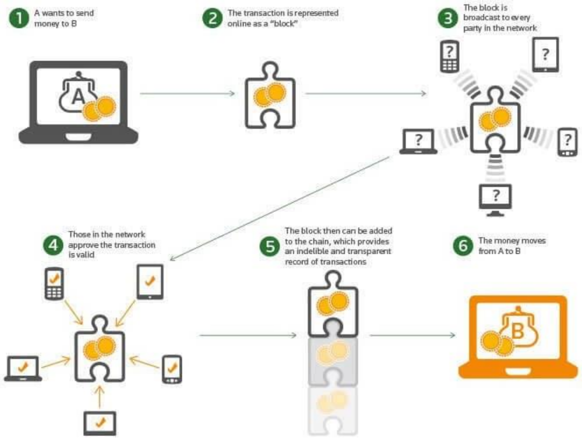

1 A wants to send money to B
2 The transaction is represented online as a "block"
3 The block is broadcast to every party in the network
A
?
4 Those in the network approve the transaction is valid
5 The block then can be added to the chain, which provides an indelible and transparent record of transactions
6 The money moves from A to B
B

Fig. 8. Blockchain analysing big data

D. Blockchain Applications

Currently most blockchains are used in the financial sector, many applications of different fields appear. Traditional industries can consider blockchain and use blockchain in their fields to improve programs. For example, user credentials can be kept open blockchain. At the same time, the industry is booming can use the blockchain to improve performance. Because for example, Arcade City, the start of a shared ride offers I an open market place where passengers connect directly with drivers through blockchain technology. Smart contract is a computer-generated transaction protocol make contractual terms. It has been proposed for a long time and now this concept can be used with blockchain. In blockchain, a smart contract is part of the code that can be done by miners automatically. Smart contract has the power to transform in various fields such as finance services and IoT.

6. Conclusion

Blockchain has demonstrated its ability to transform the traditional industry with its key features: distribution, persistence, anonymity and orderliness. In this paper, we present a complete overview of the blockchain. We start giving a comprehensive overview of blockchain technology including blockchain architecture and key features of the blockchain. In addition, we have listed some of the challenges and problems can prevent blockchain development and summarize further ways to solve these problems. Something else is possible futures directions are also suggested. Today blockchain-based apps are emerging and we plan to run an in-depth investigation into blockchain-based applications in Future.

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