International Journal of Engineering Applied Sciences and Technology, 2022
Vol. 7, Issue 4, ISSN No. 2455-2143, Pages 156-159
Published Online August 2022 in IJEAST (http://www.ijeast.com)

A REVIEW ON APPLICATIONS OF BLOCKCHAIN IN BANKING SECTORS

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Abstract **- In the banking and financial service domain, blockchain technology can make business process less complex while creating safe, trustworthy records of agreements and transactions. Public's huge support in Digital Ledger Technology & blockchain's decentralized control can shift user trust from humans to machines. Decentralized Finance will grow more & more so applying it to banking sectors might be very useful to get more people on board with this new technology. It also has the potential to solve traditional banking problems of lending money, trusting government & bank authorities etc. The time needed to process various tasks such as tax filing , insurance , bank transactions of large amounts will be heavily reduced. Crypto is our future & with the help of Smart Contracts , DAO , DeFietc we can flourish our banking sectors for the general public.**

Keywords- **Blockchain, Smart Contracts, Banking Sector, Finance , Decentralized Finance.**

I. INTRODUCTION

Currently , money and other transactions are made through an intermediary entity or organization and we have to trust on them and hope & assume that they would carry out the transactions neutrally or without any biases. Also we need to cover a fee, pay a percentage of the sum we send, and then wait for a few days while the transaction is being processed. This involves a huge risk as we have to blindly trust them. Blockchain is a technology which can completely change the finance and banking sector by introducing a peer to peer or decentralized transaction based system. Blockchain is a distributed ledger or distributed database which keeps a record of all digital transactions. Instead of having a centralized database system, here the database is duplicated and distributed across the network and synchronized via the internet. [1]

Bitcoin's blockchain requires the use of a consensus algorithm that runs on hardware scattered throughout the world. The machines integrate Bitcoin transactions into the blockchain, and the process requires a computationally intense proof-of-work function called mining. Bitcoin mining has evolved to become a highly vertically integrated system with single companies owning one or more data centers, designing the chips, and maintaining the hardware. Through application-specific integrated circuit (ASIC) clouds, today's Bitcoin miners give us a preview of the future of planet-scale computing. [2]

II. COMPONENTS OF BLOCKCHAIN

- **Blocks** [3] - they contain transactions and are linked together to form a chain and include two important numbers called nonces and hashes. Nonces are 32-bit whole numbers generated when a block is created, while hashes are 256-bit numbers linked to the nonce and used to identify that specific block's data (think of them as fingerprints).
- **Nodes** [3] - Nodes are essentially devices that are capable of participating in a blockchain. When a new node joins a blockchain, it is given its own copy of the chain, and in order to make additions or changes to the chain as a whole, the node's actions must be algorithmically approved by the blockchain's network.
- **Miners** [3] - Blockchain miners are responsible for changing (or "mining") a blockchain's data, creating new blocks by means of consensus. This is done by finding the right nonce-hash combination in a single block (also known as the "golden nonce").
- **Smart Contracts[4]** - A smart contract is a self-executing code which acts as a contract with the terms of the agreement between two parties or people.
- **Distributed Consensus[5]** - A procedure to reach in a common agreement in a distributed or decentralized multi- agent platform

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III. OVERVIEW OF SMART CONTRACTS

A Smart contract[3] is a piece of software code (computer program) that lives in a decentralized environment (Blockchain). This type of code is immutable (cannot be changed), transparent and automated — meaning everyone can see it but no one can change or update it, and it can automatically execute by itself without any third party intervention. Smart contracts act as contract agreements between parties, where the terms of the agreement can be programmed or coded. The parties who can execute smart contracts can be humans, machines or organizations.
Smart contracts could become the management framework for private records including wills, conveyances, and medical records; public records including land titles, vehicle registrations, passports, and building permits; personal records including education certificates and degrees, employment records, and curriculum vitae; asset tracking including car or house keys, warranty information, and package deliveries; and other miscellany including coupons, vouchers, licenses, patents, and tickets.

IV. APPLICATION AREAS OF BLOCKCHAIN & SMART CONTRACTS

- Even though the modern banking system works rather smoothly, its imperfections are hard to deny. Smart contracts do not require any intermediary agent . Hence, we pay no fees. As there's no centralized organizations involved, transactions become super fast and inexpensive. Moreover, the transparency given by the blockchain reduces the potential risks of fraud.

- Also tax filing is a very tedious & time consuming job. Automatic payments triggered by smart contracts would save you from fines and prevent us from committing a tax crime unintentionally. All the data about taxes is recorded & preserved on the blockchain and available for everyone to check. The transparency of the tax records makes frauding almost impossible.

- May we get into a minor car accident, the first thing we would worry about is an insurance payment. If the accident is not our fault, we expect the guilty side to cover repair expenses. But what if this person denies their fault? Our chances of getting a refund are very less .If the car is equipped with an IoT device reporting its location, speed, time of the accident, we would have no reasons to worry. In case we were right, the data on the blockchain would prove our words, and we would get your payment automatically.

- We can have smart contracts where a person "checks in" with his or her private key every year to prove they are alive. They can no longer check-in when they die. The smart contract will realize that more than a year has passed without a check-in, and will automatically distribute the assets of that deceased person to his or her beneficiaries. Smart contracts can automate the transfer without needing an executor. In this example, the Smart Contract has completely removed many middlemen such as lawyers, notaries and asset managers from the process.

- Envision a mortgage agreement. This type of arrangement has many rules and conditions to meet. Many details are needed, such as income, mortgagee, credit score, as well as outgoings. There are a lot of third parties involved in verifying these details, making the process too lengthy and troublesome for the lender as well as for the loan applicant. Smart Contracts can be extremely helpful in this scenario because they can remove the middlemen through code, automate the process, and all the information can be stored in a place which is accessible by all parties at any time. Once the transactions are settled in the blockchain, the transaction becomes an irreversible truth, creating a ledger where anyone can check the records of the mortgage.
- Banks as well as other financial institutions can use smart contracts for loans and other automatic payments.
- Postal or delivery companies can use it for payment on delivery with some IOT help.

V.CONTRIBUTION CHARTS

Bitcoin[6]	Bitcoin is a consensus network that enables a new payment system and a completely digital currency. Bitcoin's primary use is as a virtual currency and store of value.
Ethereum[7]	Ethereum is a technology for building apps and organizations, holding assets, transacting and communicating without being controlled by a central authority. It is Programmable. The Ethereum network can also be used to store data and run dapps . Rather than hosting software on a server owned and operated by Google or Amazon, where a company controls the data, people can host applications on the Ethereum blockchain. Ethereum gives users control over their data and they have open use of the app as there's no central authority managing everything.

Solidity[7]	the default language for most developers when creating smart contracts on the Ethereum network.
DAO[8]	Decentralized Autonomous Organization. Its goal is to code the rules and decision making parts of an organization, eliminating the requirement for documents and people in governing, creating a structure with decentralized control. Main advantage of DAOs is that they enable the building of fairer organizations than the human-run kind. Most companies today have leaders who sometimes make decisions that affect the entire company. A DAO would make this kind of decision-making impossible; stakeholders have more direct control over how the company should operate.
DApps[9]	D Apps are like normal apps, and offer similar functions, but the key difference is that they are run on a peer-to-peer network, such as a blockchain using smart contracts. The source code is available for examination and the application is stored in the blockchain to ensure trust and transparency. Miners are responsible for securing the application and are rewarded with tokens for the validation of the D App. Benefits of dapps include : ● Censorship-resistant - With no single point of failure, it's very difficult for governments or powerful individuals to control the network. ● No downtime - Relying on a peer-to-peer system ensures that the dapps continue to work even if individual computers or parts of the network go down. ● Decentralized - As they are made using smart contracts, they can easily integrate crypto currencies into the basic functionalities of the dapp.
DeFi[9]	DeFi or Decentralized Finance is a collective term for financial products and services that are accessible to anyone who can use blockchain. The markets are always open and there is no one authority who can block payments or deny you access to anything. Services that were previously slow and at risk of human error are automatic and safer now that they're handled by code that anyone can inspect and scrutinize.
Gas[10]	Gas is a factor of estimating the computational performance of running transactions or smart contracts in the Ethereum network.
Uniswap[11]	Built on the Ethereum blockchain, Uniswap serves as an exchange for hundreds of Ethereum-based digital tokens, and its algorithm creates dynamic additional payment structures for users to form liquidity pools by compensating them for trading fees. It allows users anywhere in the world to trade crypto without any intermediaries. Some of the potential advantages of Uniswap include: ● Safe: Funds are never transferred to any third party because both parties are trading directly from their own wallets. ● Global and permission less: Anyone with a smart phone and an internet connection can participate. ● Ease of use : No account signup or personal details are required.
Flash Loan[12]	A flash loan is an uncollateralized liability whose duration is mere minutes (or even seconds) in length.It solves 2 risk factors : ● when the borrower takes the money and disappears. ● The second risk for a lender is illiquidity These loans work in the following way: ● Getting loaned as much money we need for one transaction ● Repaying the lender at least the amount lent by the end of the transaction ● If unable to pay the amount, the transaction is reverted

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