International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 09 Issue: 07 | July 2022 www.irjet.net p-ISSN: 2395-0072

BLOCKCHAIN IMPLEMENTATION IN EDUCATIONAL SYSTEM

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Abstract: *In order to create a chronological single-source-of-truth for the data, a blockchain is a database that stores encrypted chunks of data before chaining them together. Instead of being copied or moved, digital assets are distributed, resulting in an immutable record of the asset. Due to the asset's decentralised nature, the public has complete real-time access and transparency. The public ledger and built-in security features of blockchain make it a top solution for practically every industry. Thus, in this paper we try to implement blockchain system to select an IDE Subject (INTER-DEPARTMENT ELECTIVE) which makes sure that the data isn't tampered through external source and the information is stored securely and is transparent to the college authorities and students.*

Keywords—*Block-chain, Database, Encrypted, Digital assets, Data Storage, Security, Immutable, Transparency, IDE (Inter-department elective)*

1.INTRODUCTION

Blockchain [1] is a constantly growing set of data with certain records in it called blocks, it is a particularly encouraging and progressive innovation since it lessens risk, gets rid of extortion and acquires straight forwardness. They are secured and linked together using cryptographic methods. Here we developed a program that simulates a real time block chain technology blockchain for choice of IDE (INTER-DEPARTMENT ELECTIVE), which ensure that the chosen IDE (INTER-DEPARTMENT ELECTIVE) can't be changed by any outside source and it is likewise straightforward to people in general. A block of data it consists of data of students such as the name, the college seat number and the subject selected .The Blocks containing these data are then encrypted [1] ,it's a way when normal readable text is converted into unreadable text so that it cannot be accessed and changed, the encryption works in such a way that if any word or spacing or caps is changed in the original text the encryption text gets changed .The encryption text is irreversible so the original text cannot be retrieved .The entire project is bound by using python and flask framework that helps us to host the website, to make entries these entries are then passed on to the databases these databases are distributed in nature which is the core concept of block chain. Any changes in any one of the database the data in other databases will not be changed unless the third person changes the data in all the database that make up more than 51% .

2.BACKGROUND

A blockchain [2] is an very advanced technology for safety and security of data. Every time a certain the exchange is done on the network, a record of this exchange is added to the registration of each member. Every exchange on the blockchain is represented by a square in the chain, and each time an exchange takes place, a record of that exchange is added to the record of every member. Ethereum the second biggest blockchain execution after bitcoin. Ethereum disperses a money called ether, yet additionally considers the capacity and activity of PC code, taking into account brilliant agreements. Starting around 2008 square chain has been seeing persistent development in all fields.

3.LITERATURE SURVEY

There are several distinct financial advantages of blockchain development [3]. The producers begin by utilising, for instance, a bank and all of the resources that are essentially squandered given that they handle and address all transactions themselves. With the use of this new record, the bank would be able to maintain safer records that are less likely to be tampered with and gain a more accurate understanding of prospective opportunities.

For security purpose, Tranquillini examines recent concerns with the prosperity and adequacy of European financial business sectors and government control [7]. In light of everything, he avoids a particular end and resolves that execution of such development would be inconvenient, most ideal situation, and that it will not happen as soon as possible.

In food security, researchers from Montana school figure out a couple of creating examples to address the need and potential for blockchain progresses for food security [7]. The major question in this issue is recognizability of food things, from their sources, on all through their dissemination frameworks, and on to their last client. This could assist with hindering blackmail and deflect -

or on the other hand if nothing else address issues of food borne ailment.

In Product Traceability, Tranquillini examines recent concerns with the prosperity and adequacy of European financial business sectors and government control [8]. His article serves more as a source for his insightful considerations on the capacity of the utilization of such advancement to the protections business. In light of everything, he avoids a particular end and resolves that execution of such development would be inconvenient, most ideal situation, and that it will not happen at whatever point as soon as possible.

4.PROPOSED WORK

Proposed a system that uses the blockchain core basics such as distributed database, immutable, Better Security by storing data in encrypted format with the encryption of the previous block[5].

Here the main approach was to create a distributed database, the creation of distributed database was done my initialize multiple database instances in various systems that was connected with our main program, an exact copy of the data from our program is sent to all the databases, the main data base used here is the MySQL database that stores data in a relational table, and a copy of a data is also sent to cloud database Firebase for added security.

Here the front end is controlled by the flask Framework to host the website on the person server which is a raspberry pi 4

Back end is programmed with python that handles all the requests and the API calls to all the software and also the encryption of the data.
The encryption method used here is SHA256 .

The distributed database is created by using multiple cloud server instances and local machine to host the database.

For the local machine database MySQL database the community version is used. Here the data is stored as records and in a table format. The data stored here will be the Student name, student college seat number, the subject selection. These data will not only be stored in one database but in different MySQL instance running in the different local host. In this project we had three MySQL instances running. Thus there were three copies of the same data at three different location.

As python was used to communicate with the databases. The connection was made:-

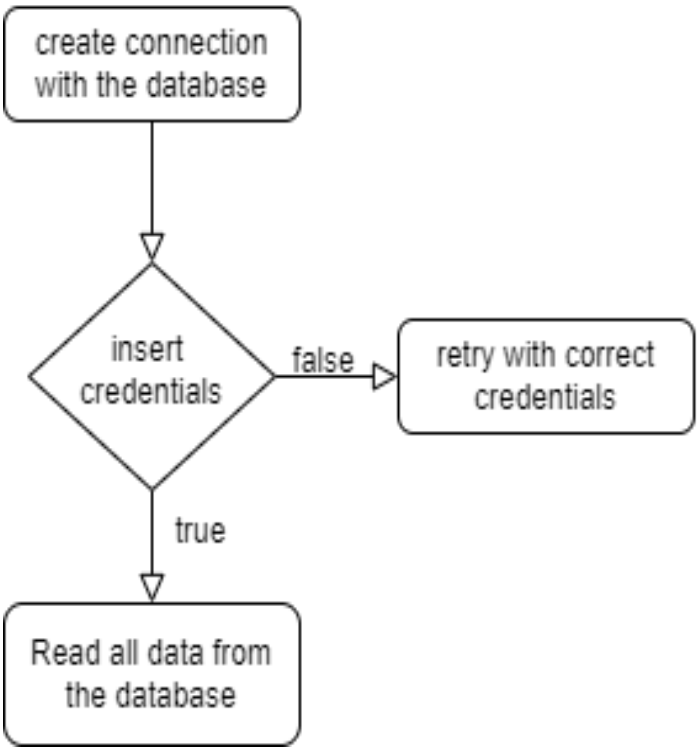

Fig 1:- Flowchart for credentials

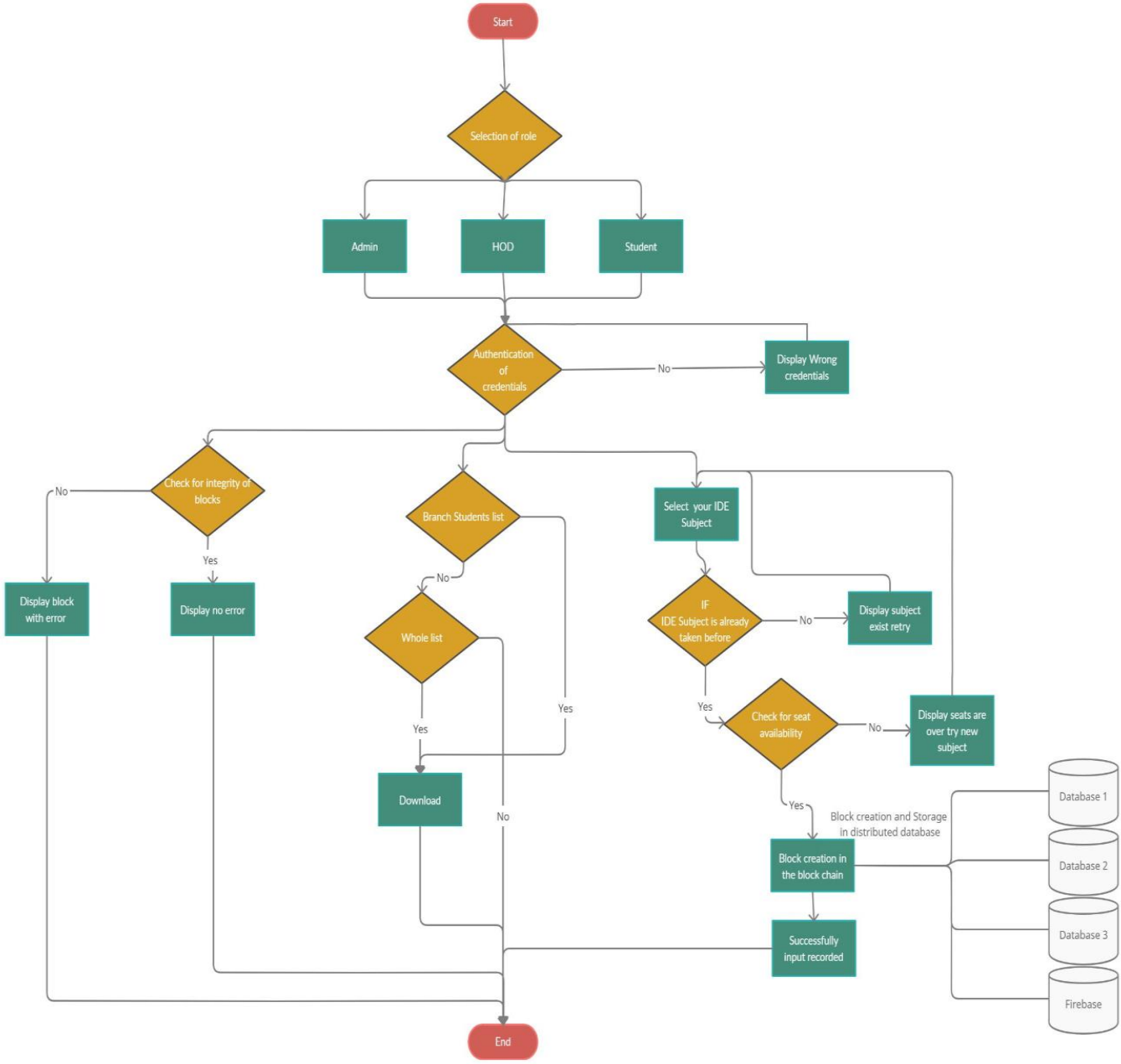

Fig 2:- flow chart of the entire program

The data was sent or written into the database my pre-defining the SQL query with variables that would be entered by the Student

For the database instance in the cloud FireBase Realtime Database was used, The Firebase Realtime Database is a database stored in the cloud. Every connected client receives real-time synchronisation of data saved as JSON. to develop cross-platform applications.

The Firebase Realtime Database enables safe access to the database from client-side code, enabling you to create robust, collaborative apps. The end user has a responsive experience because to local data persistence and real-time events that continue to happen even while the system is offline. The local data is updated when the device regains connectivity with the distant updates that took place while the client was offline.

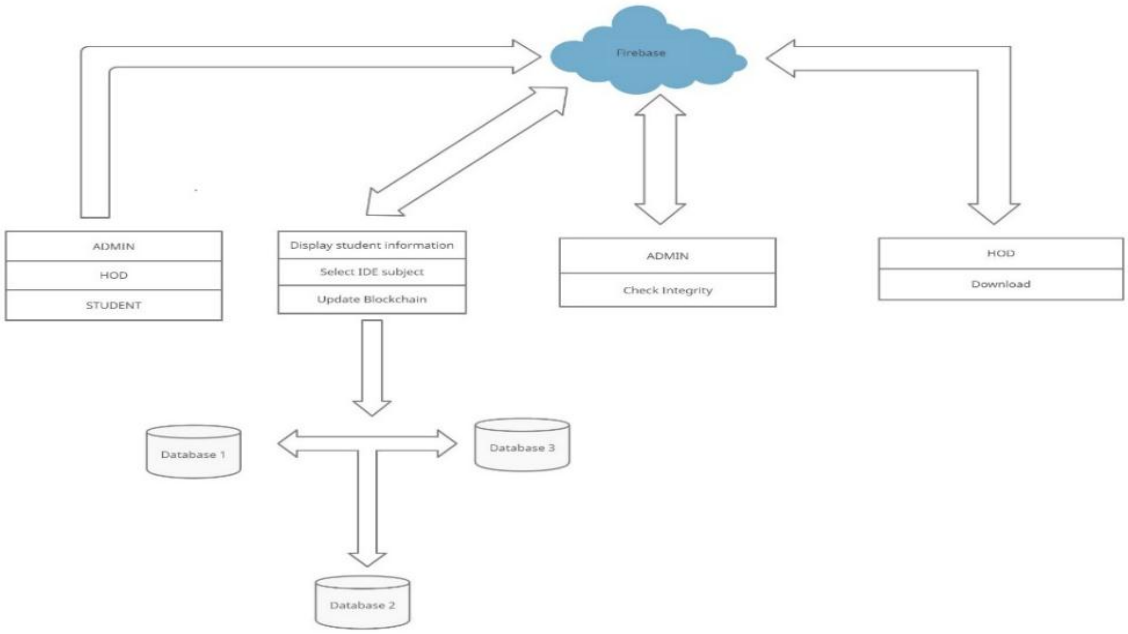

Fig 3:- block diagram of the working process

Thus totally four duplicate copies were getting saved in four different location which eliminated the centralized structure database.

Each copy the same data with the same capitalization and the encryption method.

Our website was developed using HTML, CSS that is used for the user/student to interact. It consists of the basic login page for the different authorities of the college and the student authentication. the information provided in the front end is then feed into the backend python program to create the block and also feed the block data in the database

The entire project is bound by the python code. It helps in sending and receiving data and also the check the integrity of the blocks, for any change in data.

The code takes in the values of the student and the encrypted value of the previous block and forms a dictionary which is a JSON type format and encrypts the data using SHA256 algorithm.

When a block is created the data of the block is encrypted and then the encrypted text is then stored in the block.

When the next new block is created it consists the encryption text of the previous block and the data of its block it encrypts the data with the encryption text of the previous block .

When a new block is created it checks the integrity of the other blocks like if any data has been changed and reports the change in data.

The integrity check is done by taking the human readable data and the entire data is encrypted and checked with the encrypted text inside the block that has the encryption of the block thus this two must match to show that the block is not tampered. For the next block it takes the data of the previous block and the data of the current block and encrypts the data and then checks the encryption text with that stored inside the block.

Hashing the process to convert normal plain text to non readable text which cannot be reversible it is similar to encryption but in encryption the text can be reversed with a key here in hashing it cannot be reversed.

Thus when storing data we use hasing so when an unauthorized person gets access to the code he cannot reverse the string. even a slight change in the plain text will create an exponetial change in the hashed texted we use the sha256 algorithm to hash the entire block.

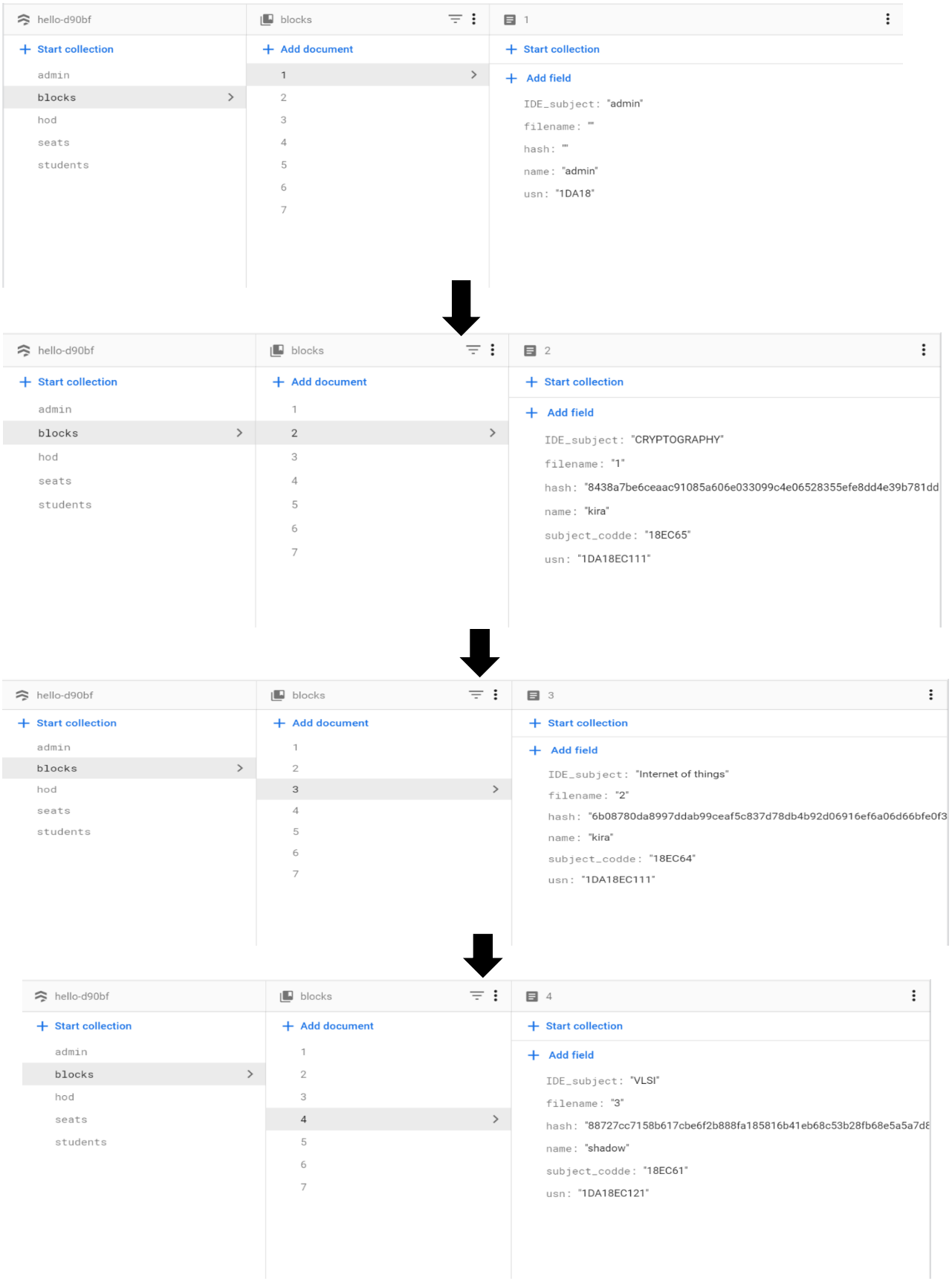

Fig 4 :- Block creation

Result:

The developed safe and secure database of student ledger showed promising results by using the blockchain technology. Since the existing way of recording the student academic detail of the number of subjects taken by the student and the difficulty in segregating the repeated subjects, the blockchain technology will eliminate the entire difficulty since it uses the technology of hashing which enables the portal to give students a different subject apart from the subjects already finished.

There are 3 different types of logins namely hod login student login and the admin login

The student login is only for the students where they will have to login with their respective email ids and password which will take them to their home page which displays the name of the student semester of the student and the university seat number of the student and all the subjects the student has already studied in the previous semester and the option to select the available subjects. Upon selecting the subject, a new block will be generated connecting to the hash of the previous block and records the data in the decentralized database which is now permanent and cannot be altered.

The hod login is primarily to monitor the student's history of the subjects taken and to assign the teachers for a particular class from the student's response to a specified course. The hod (head of the department) will be given the privileges to check how many have opted for each individual subject or course.

The hods are given a login id and password with which they can login to the document and download the required documents

The admin section is to control, monitor and maintain the entire process without anyone facing issues regarding the selection process and to keep track of the entire process of subject selection. The admin will have the complete control on the entire network and can resolve the issues faced by the students or the professors or the head of the departments.

REFERENCES

[1] Zheng, Z., Xie, S., Dai, H., Chen, X., & Wang, H. (2017). An Overview of Blockchain Technology: Architecture, Consensus, and Future Trends. 2017 IEEE International Congress on Big Data (BigData Congress).

[2] Ahram, T., Sargolzaei, A., Sargolzaei, S., Daniels, J., & Amaba, B. (2017). Blockchain technology innovations. 2017 IEEE Technology & Engineering Management Conference (TEMSCON)

[3] S K, V., R S, Y., Prashanth, Y., N, Y., & M, N. (2020). E-Voting Systems using Blockchain: An Exploratory Literature Survey. 2020 Second International Conference on Inventive Research in Computing Applications (ICIRCA).

[4] Hjalmarsson, F. P., Hreioarsson, G. K., Hamdaqa, M., & Hjalmtysson, G. (2018). Blockchain-Based E-Voting System. 2018 IEEE 11th International Conference on Cloud Computing (CLOUD).

[5] Sachchidanand Singh IBM Software Lab Pune, India - 411 057. Nirmala Singh Tech Mahindra Pune, India - 411 057.

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[7] Ahmed, S., & Broek, N. t. (2017). Food supply: Blockchain could boost food security.(brief article). Nature, 550 (7674).

[8] Lu, Q., & Xu, X. (2017). Adaptable blockchain-based systems: A case study for product traceability. IEEE Software.

[9] Cocco, L., Pinna, A., & Marchesi, M. (2017). Banking on blockchain: Costs savings thanks to the blockchain technology. Future Internet.