# Student Funding System Using Blockchain

**SANCHANA.R** Assistant Professor Department Of Information Technology Sri Sairam Institute Of Technology

**JOSEPHINE RUTH FENITHA** Department Of Information Technology Sri Sairam Institute Of Technology

**SHANMUGAPRIYA.M** Department Of Information Technology Sri Sairam Institute Of Technology

**POORNA PUSHKALA.K** Department Of Information Technology Sri Sairam Institute Of Technology

**Abstract**

In times of crisis like Covid-19, students have to pursue their education online which demands the usage of electronics like phones, tablets, and laptops. Poor students cannot afford to buy these devices by themselves. Crowd funding can help those students to pursue their education without worries. Donors who donate for such causes have a doubt whether their donated money serves the intended purpose. The proposed system can help donors donate money without these doubts and help needy students. The administrator is the one who introduces Provider and Local Admin for each region into the system. Local Admins are responsible for organizations added under their region. Providers can provide proposals for affordable devices to organizations. These proposals include a document that defines prototype design. The organization can enroll students who are eligible to access the benefits of the system. Once the proposal is accepted by the organization, the public can view the proposal details in the dashboard and can donate ethers of their will. When sufficient fund is collected, devices are dispatched to organizations and the receipt of devices needs to be approved by Local Admin. For each student, proof of delivery should be submitted. Once every proof is received the proposal is marked as done and settlement of collected funds to provider takes place. This system makes use of blockchain for immutability, security. The proofs are too stored in IPFS. All the records are secure and immutable. The money donated by donors is stored in the smart contract itself. The public can view details related to the proposal which promotes transparency. The motiveof this system is to eliminate third parties and bring trust among donors that their money serves only the intendedpurpose

## I.      INTRODUCTION

The Domain of our project is blockchain and this blockchain is used as the main source of our funding-based systems for mainly security purposes and this was used for the transaction of the digital records. The term blockchain refers to the system that records information in a way that makes it difficult or impossible to change, hack, or cheat the system. As the information was fully secured there is no chance for the intermediate person to change the values or to alternate the content from the blockchain networks. A blockchain is a digital record of transactions. The name comes from its structure, in which

individual records, called blocks, are linked together in a single list, called a chain. Blockchain designed to be decentralized, distributed across a large number of computers. This decentralization of information reduces the ability for data tampering; this brings us to the second factor that makesBlockchain unique. Second, Blockchain create trust in the data, before a new block added to the chain a few things have to happen. First, a cryptographic puzzle must be solved that creating the block. Second, the computer who solves the puzzle shares the solution to all other Third, the network computers then will verify the solution, and if correct the block will be added to the chain. This is called proof-of-work. The combination of these with blockchain, institutions or organizations can choose an entire decentralized network where there is no need for a centralized authority, improving the system's transparency. Security is enhanced by the fact that each and every node within the network holds a replica of the transactions ever performed on the network. So, if any malicious person ever wanted to make changes in the transaction, he won't be able to do so as other nodes will reject his request to write transactions to the network. The data are once written cannot be reverted by any means because blockchain networks are immutable. Blockchain technology helps organizations to bring down a lot of costs associated with 3rd party vendors. There is no need to pay for any vendor since block chain technology has no inherited centralized player. The main advantage of usingblockchain technology is time-consuming processes and automation to maximize efficiency. Math puzzles and verification by many computers ensures that we can trust each and every block on the chain. Because the network does the trust building for us and now we have the ability to interact directly with our data in real-time. That's bringing us to the third reason; Blockchain technology is such a game changer his type of trust between peer-to-peer interactions with our data can revolutionize the way we access, verify and transact with oneanother.

Blockchain is a type of technology that can be implemented in many different ways. For example, some Blockchain can be completely public and open for everyone to view and access. Others can be closed to a selected group of authorized users such as

Company employees, a group of banks or government's agencies. Also, there is Hybrid public-private BlockChain, where access level is customized between private and public types based on the application used for. Government for example could use a Hybrid Blockchain to record boundaries of lands property and the fact that owns it as a public data and keeps the owners personal information private. Or it could allow everyone to view property record but reserve to itself the exclusive right to update them. So, it is a combination of all these factors (decentralization of the data, building trust in the data and direct interaction with one another without intermediaries), that gives Blockchain technology the potential to underpin many ways we interact with one another. This big aim behind Blockchain that would reinvent the wheel of all transactions of value around the world. All these promises are expected to bring with it all kinds of complex technical and non- technical questions, that makes everyone in almost all sectors curios to study how it works and can they contribute to realize its potentials, and what are the opportunities andchallenges.

Blockchain technology plays a vital role in the field of education, which including high security, low cost, enhancing students' assessments, better control of data access, enhancing accountability and transparency, identity authentication, enhancing trust, improving the efficiency of students' records management, supporting learners' career decisions, and enhancing learners' interactivity. Using blockchain assures the safety and privacy of data/transactions exchanged between the intended parties. Blockchain helps in reducing the security risk within the educational field using peer-to-peer topology. The blockchain was used to sign and validate learning traces and records. Each learning block consists of varied sorts of data associated with a learning activity. The data are protected by performing an encryption algorithm before sending it to other participants.

The project contributes to the sustainable development goal, Quality Education. It aims to "ensure inclusive and equitable quality education and promote lifelong learning opportunities for all". Our project is to maintain the quality of education for all in situations like endemic where e-learning becomes a predominant solution. But this kind of transition is not comfortable for all, due to the fact that some can't afford the proper devices or systems for pursuing their education in online mode. For those students, this project will help them to continue their studies by getting them suitable devices through crowd funding. There are many donors who have the idea for funding for benefit of students and the poor but they all have a question whether their funds are used fully by the systems and whether their funds are utilized for their intended purpose. The system proposed here will make donors donate funds without having these questions inmind.

## II.     LITERATURE SURVEY

Blockchain is one of the technologies that have created a disruptive change in many industries. Currently, Blockchainis being used in several places and there are more applications of Blockchain yet to be discovered and implemented. Blockchain is characterized by its decentralized nature, the integrity of the data stored in the chain, and its openness. Due to these characteristics, another place where Blockchain can be used is to releasegovernment funds for a project. Usually, when a project is allocated funds, there is no knowledge as to how these funds are being used and a large part of it is never shown in records due to corruption. To solve this problem, a system has been proposed using Blockchain to provide transparency. This paper also gives a description of a prototype that was developed using Hyperledger Composer. It then discusses the longer term development of this prototype and eventually, concludes with the applicability of Blockchain. This paper focuses on the tracking of funds for governmental projects. This acts more like a ledger that holds financial transactional details. Moreover, this uses Hyperledger which is a private blockchain. School operational funding called Bantuan Operational Sekolah (BOS) in Bahasa is financial support for education given to each and every school for the varsity needed. BOS was started to be implemented in Indonesia in 2005 until now. On the BOS implementation, there were many issues, such as corruption, the school could not manage it, it was not be included by the local government on the annual budget, etc. Considering the issues and looking at BOS characteristics, accountable and transparent, therefore it should be procedurally monitored. One of theprocedural monitoring solutions is by using blockchain technology which is transparent and decentralization. By implementing the blockchain, every entity could monitor each other. This research would elaborate on how to plan a BOS recording system using blockchain technology and implement the blockchain using a hyper ledger

framework, and also analyze its functional and performance testing process. It would prove that blockchain technology with its beneficial side could support BOS implementation by preventing any fraudulent acts from any stakeholders. This paper focuses on building BOS (i.e. School Operational funding) system using block chain. This is too a system that makes tracking of funds for school possible acting more like a ledger. This helps reduce fraudulent activities that are possible in conventional BOS systems due to the tamper-proof property ofBlockChain.

The lack of transparency has made people lose trust in charities, making social funding stagnant. The donor is unaware of the legitimate utilization of his funds. Corruption adds to the distrust of the donor. This paper proposes a system called Charity- Chain that is a decentralized network built on theEthereum blockchain. It helps social organizations to run projects transparently, using smart contract-based incentives to ensure their impact is independently verified and accessible to everyone. This makes it much easier for funders (philanthropic organizations, impact investors, small donors) to watch their transactions and hence restore their trust in giving to such socialorganizations.

Donors have distrust about how donated money is spent. Currently, blockchain technology is being implemented in several sectors. Blockchain technology allows you to form the method of donations and transactions of funds transparent. A single platform for tracking donations that will track all information aboutdonations, transactions, and donors must be developed. This paper considers the outline of the implementation of the platform for tracking donations supported by the blockchain technology. The System offers transparent accounting of operations donors, charitable foundations, and recipients based on blockchain technology, charitable platform should provide a transparent donation route, enable public users and donors to track and monitor where, when and to whom went resources of charityfunds.

## III.    SYSTEMARCHITECTURE

**EXISITING PROBLEM:** Existing crowd funding solutions need donors to donate funds to an account which belongs to a trust or organization which is believed to use them for intended purposes. They need a person in- charge to utilize these funds and maintain records about utilization. As these processes are manual, there is a chance for tampering the details and also for misuse of funds. There are even blockchain based crowd funding solutions. These solutions just use blockchain to store transaction records which do not allow tampering of records. They act like immutable ledgers. They can be used to track down the funds yet they need third parties to handle the funds. Also some of these solutions are built on private blockchains like HyperLedger which has less transparency. HyperLedgers are used mainly for commercial purposes. So existing systems either merely act as ledgers or involve third parties which make themsuffer disadvantages.

**SOLUTION:** The provider can provide proposals for low-cost but durable devices to educational organizations. An organization will enroll identified students for getting benefits and accept a proposal apt for them. Fund requests will then be notified to the public. Donors can respond to the request by donating money. Donated money is stored in the smart contract. When sufficient money is collected, the provider delivers the required quantity of devices to the intended organization. Local admin responsible for that region needs to verify that devices were received by organizations Organization then dispatches

the device to each enrolled student and uploads a proof for dispatch. When all the dispatches are done, money will be transferred to the provider effectively ending the proposal. Reports of proposal and dispatch details are available to the public. The proposed solution focuses on removing third parties and automates the process. This can increase the trust factor due to being fully automated. This solution even acts as a ledger while handling transactions automatically. Donated funds are securely locked within the smart contract on which no others can lay hands. Fig 3.1 given below represents the architecture of the proposedsolutions.
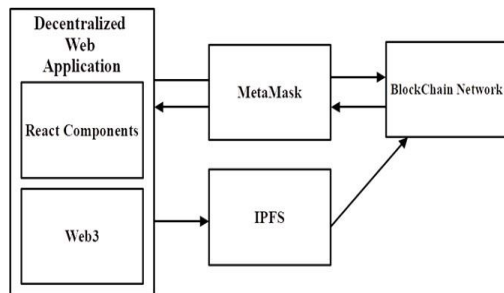


**Figure 3.1 System Architecture**

Blockchain consists of three important concepts: blocks, nodes, and miners. Blocks have three basic elements namely: data, nonce, and hash. Data is the record. The nonce is a randomly generated 32- bit whole number that generates a block header hash. Hash is a 256- bit number. Data in a block is said to be signed and linked with nonce and hash. Miners are those who create new blocks on the blockchain through a process called mining. Miners perform complex calculations to find a nonce that generated and accepted hash. Making a change to the already existing block needs miners to re-mine. This re-mining is to be done with the blocks that follow the changed block. This is what makes tampering with blockchain data difficult. After successful mining of block, the change demanded is incorporated in every node of the network and the miner is rewarded. No node in the blockchain network owns the chain. Every node has a copy of the blockchain. So if data is to tamper in blockchain, tampering must be done to every copy owned by every node in the network. These nodes can be any electronic device that holds a copy of the blockchain and keeps the network running. Blockchain promotes transparency so every action done in the network can be easily viewed and verified.

IPFS is a peer-to-peer network that stores and shares data in a distributed file system. This identifies files in the global namespace with the help of content addressing. In IPFS, large amounts of data can be stored. IPFS uses content addressing just like HTTP uses URL. This means that IPFS doesn't need to create unique identifiers to identify and locate files. It can simply address the file by the content it holds. HTTP addresses files by using the location of the file indicated by theURL.

IPFS works by hashing a file cryptographically and returning a hashed value which is a representation of the file itself. This representation ensures that no other file can have the same hash and replace it. Thus IPFS helps to keep proofs required in the system secure and un-tampered. An IPFS object has two fields: Data which

is a blob of binary data, Links which contain three more fields. Links contain the following fields: Name which is the name of the link, Hash which contains the hash of the linked IPFS object, Size which represents the size of the IPFS object. IPFS objects are referred to using their calculated hash value. It is distributed around the network just like other P2P systems. Proofs are hashed in IPFS and the returned hash is stored in the blockchain for futurereference.

## IV.  MODULE DESCRIPTION

### 4.1 ADMIN MODULE

This module handles administration functions.  Admin privilege is given to the address which actually deploys the contract. Admin is the one capable of introducing local admins for a particular region and providers for the entire system. Admin module includesfunctions that are defined in the smart contract and front-end component that makes interaction with the blockchain network easier.

### 4.2 LOCAL ADMIN MODULE

A local admin is assigned to each pin code by the admin. Local Admin control is restricted to the assigned zones. The main purpose of local admin is to introduce organizations with the range under local admin control, to the system. This local administrator can be changed if he/she is found to be guilty. This change can be made only by the administrator. This local admin needs to approve the receipt of proposed goods for further processing. Once an organization accepts a proposal and all intended activities are completed, the organization is blocked from accepting future proposals. Local admin has to unblock the organization to remove this restriction. This unblocking will be done once in an academic year to ensure that every organization benefit from the system. The local admin can update the total student strength of the organization if required. This module uses IPFS to hold a receipt of goods proof. Local admin thus supervises the proposal activities within their zones. A local admin can reset the proposal status of theorganization when the status of the proposal is accepted. It cannot be done after the local admin approves receipt of goods. All these operations are supported by this module. This module hasan interactive front-end to achieve the requiredfunctionalities.

### 4.3 PROVIDER MODULE

This module handles functions related to device providers. The provider is introduced to the system by the admin. Providers have unique CIN (Corporate Identity Number) to identify themselves. These providers are not restricted to a region but can provide services to the entire system. This module enables providers to offer proposalsfor an educational organization within any region. This provider module also enables providers to look at accepted proposals. This module is used to fix device prices per unit. A  provider can offer as many as possible proposals for an organization but the thing to be noted is that only one proposal can be accepted by the organization while others will be rejected automatically. Once the proposal is offered, it can't be revoked by the providers.  This provider module uses IPFS (Interplanetary File System) which stores the design documents of the device being offered. IPFS itself is a decentralized file system that is immutable, so once a document is uploaded to IPFS, it can't be removed or denied. It stands as proof if in case a provider tries to cheat. This document isalwaysavailable for the public and organizations. This module makes use of front-end

components to make interactions with blockchain and IPFSeasier.

## 4.4 ORGANISATION MODULE

This module helps organizations to make use of systems with ease. Organizations with a region are introduced to the system by respective local admins. These organizations are referred bytheir Ethereum address. These organizations can add to the system, identified students who are eligible. Their aadhaar number, average income, and income proof details are required to enrol them in the system. The number of such students added should not exceed the total strength mentioned. The income proofs are stored in IPFS so thatthey can be preserved and validated anytime. If any student is charged with fraud, the local admin can block the student. The organization has to accept a suitable proposal after which the cost required for manufacturing is calculated for enrolled students. Now the proposal can be funded by the public. After the required fund is collected, the provider delivers the proposed goods to an organization that needs approval from the local admin. The organization then has to submit proof of delivery for each and every enrolled student. These proofs are held in IPFS which can be accessed by the public. All these operations are supported by the organization module with the help of an interactivefront-end.

## 4.5 DONOR MODULE

This is the only module accessible by the public. It helps donors to track the status of proposals funded by them. This module accepts donations from donors and stores them inside the smart contract which makes it secure. It won't be accessible by anyone. It will get transferred to the provider automatically after proof for each and every enrolled student is submitted by the organization. It can even fetch other proposals that are not funded by the donor to ensure transparency. This module makes sure that donated ether does not exceed the required amount to prevent inconsistencies. Thus this module helps donors to contribute their part while not worryingabout trust andmisuse.
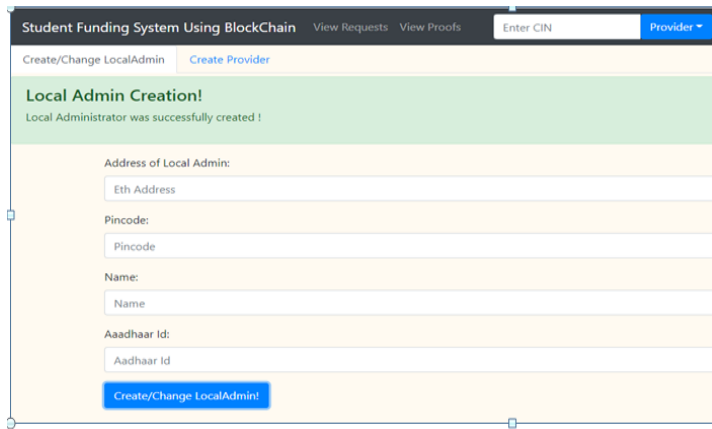
## V. RESULTS ANDDISCUSSION

Fig 5.1 given below represents the view of home page. This page is the first page that is encountered while using the application.
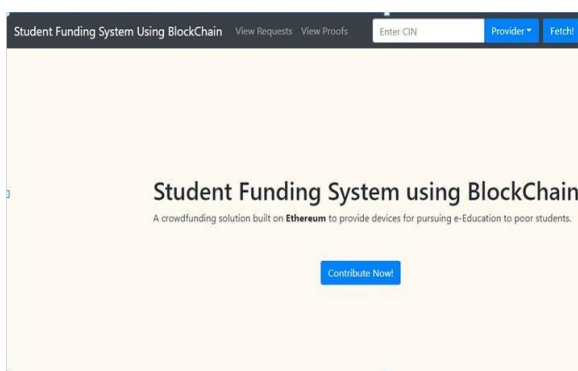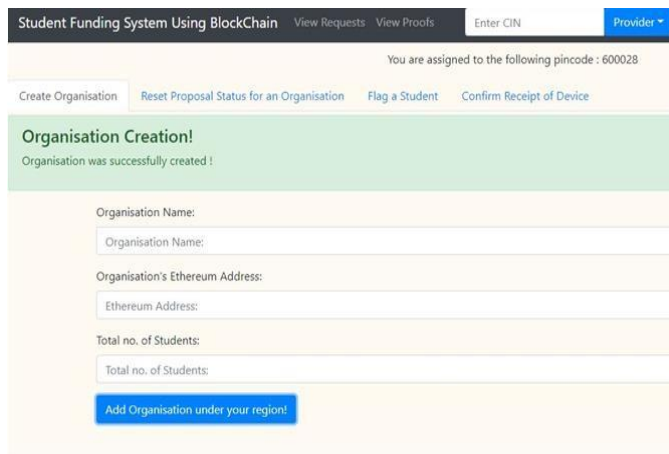


**Figure 5.1 Home page**

Fig 5.2 given below represents a view of Admin Module. Admin module can assign local admins for a region and providers.

**Figure 5.2 Local Admin creations in Admin Module**

Fig 5.3 given below represents a view of Local Admin Module. Local Admin module can create organizations under the region allotted to them.



**Figure 5.3 Organization creations in Local Admin Module**

Fig 5.4 given below represents a view of Provider Module. Provider module enables providers to create proposals for organizations. It has a search  bar to search for organizationrecords.
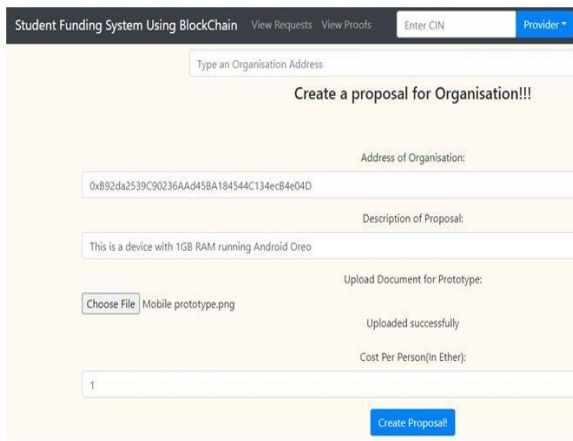
**Figure 5.4 Proposal Creation in Provider Module**

Fig 5.5 given below represents a view of Organization Module. Organization module enables organization to accept the proposals intended for them and add students into the system.
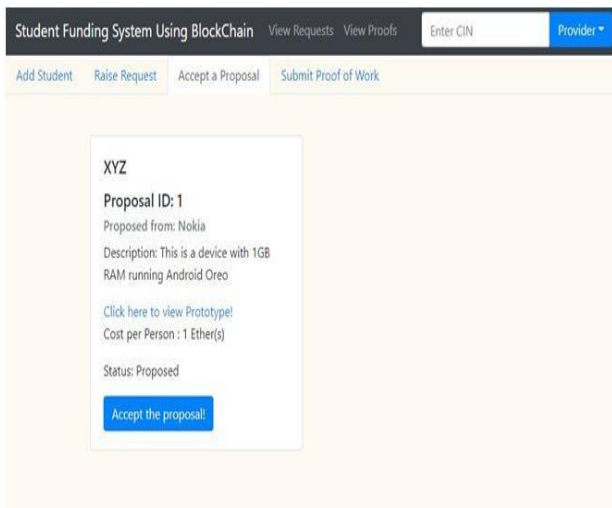


**FIGURE 5.5 PROPOSAL ACCEPTANCE IN ORGANIZATION MODULE**

Fig 5.6 given below represents a view of Organization Module. Organization module enables organization to accept the proposals intended for them and add students into the system.
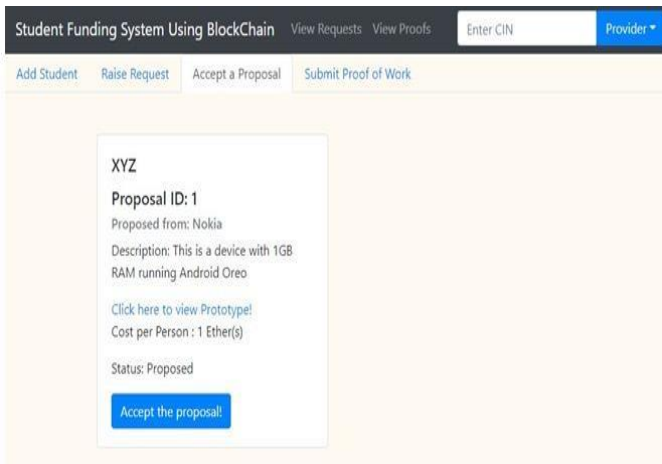
**FIGURE 5.6 PROPOSAL ACCEPTANCE IN ORGANIZATION MODULE**

Fig 5.7 given below represents a view of Proof Submission page in Organization Module. Organization module also helps organization to submit proofs of dispatch.
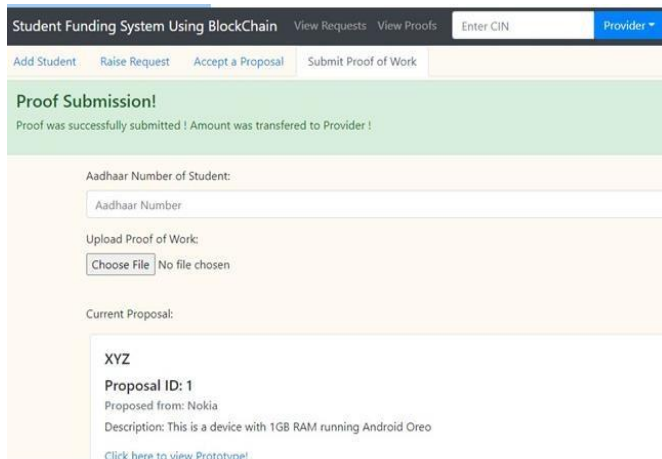


**Figure 5.7 Proof Submissions in Organization Module**

Fig 5.8 given below represents View Proof page. There is a page that enables public to fetch proofs submitted for proposals.
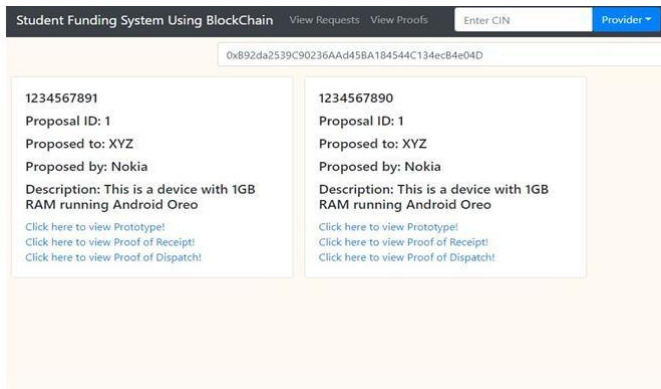
**FIGURE 5.8 VIEW OF SUBMITTED PROOFS**

Fig 5.9 given below represents View Requests page. Organizations can raise requests and every one can view those requests in this page intended forsuch requests.

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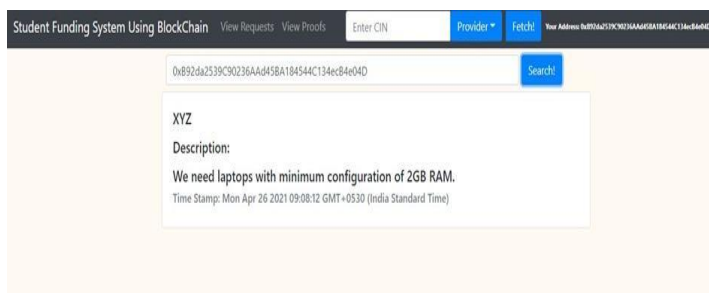
**FIGURE 5.9 VIEW OF SUBMITTED PROOFS**

## VI. CONCLUSION

Our proposed system "STUDENT FUNDING SYSTEM USING BLOCKCHAIN" can make donors donate with trust and not worry about the usage of funds. They can even see the proof of the utilization of their funds. These proofs are stored in a secure manner making tampering with them difficult. This system makes use of blockchain as a ledger but also a secure store for donated funds that are inaccessible to external objects. The system handles payments of funds automatically without the need of a person in charge. It is expected that this system could make more donors donate money to help poor students pursue theireducation.

## VII. FUTURESCOPE

In the future, this system can be extended to  provide need resources for organizations too. A system to automatically verify the uploaded proof can be integrated. A provision to donate material resources rather than funds as ERC tokens can be made. Also, a provision to track the transport of devices in real-time is planned to be added in thefuture.

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