

DecentraSocial

A MAJOR PROJECT

REPORT

Submitted by

RISHI DEO RAI **(04914802719)**

JANMAIJAY **(03014802719)**

CHINTU KUMAR **(13814802719)**

BACHELOR OF TECHNOLOGY
IN
COMPUTER SCIENCE AND ENGINEERING

Under the guidance of

Mr. Saurabh Rastogi (GUIDE)
(Assistant Professor, CSE)



Department of Computer Science and Engineering

Maharaja Agrasen Institute of Technology, PSP area, Sector – 22,
Rohini, New Delhi – 110085

(Affiliated to Guru Gobind Singh Indraprastha, New Delhi)

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MAHARAJA AGRASEN INSTITUTE OF TECHNOLOGY





CERTIFICATE

This is to Certified that this MAJOR project report “DecentraSocial ” is submitted by “Rishi Deo Rai (04914802719), Janmai Jay (03014802719), Chintu Kumar (13814802719)” who carried out the project work under my supervision.

I approve this MAJOR project for submission.

Prof. Namita Gupta
(HoD, CSE)

Mr. Saurabh Rastogi
(Guide)

ABSTRACT

*Corporate entities control major social media sites, and a small group of people within these companies set the rules of engagement. This has raised concerns about conferee speech and censorship among users. The immediate objective of this research project is to create a decentralized social media platform which allows users more control. Unlike centralized social networking platforms, federated networks foster independence without a central authority. Benefits include censorship resistance, ownership over personal data, and improved control over user-generated content. And also a user from his post which will be in the format of a **Non-Fungible Token (NFT)** can earn, by selling his NFT which was tipped by his followers By using the latest **Web 3.0** technologies like **Blockchain, Smart Contracts, Solidity, React Js, Decentralize Storage System IPFS (Inter Planetary File Storage System)**.*

Keywords:

Decentralize, Blockchain, NFT, smart contracts, Solidity, IPFS.

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Place: Delhi

Rishi Deo Rai (04914802719)

Janmai Jay (03014802719)

Date:

Chintu Kumar (13814802719)

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1. INTRODUCTION

DecentraSocial is a decentralized social media platform built on the **blockchain** and specifically designed to protect users from **censorship restrictions**, **promote free speech** and **safeguard user data** in the most solid way possible. This social network is different from the rest because it operates on independent servers or nodes, rather than existing on servers controlled by a central authority. DecentraSocial also often has tokens and **NFTs** that are used as new ways to monetize content. So DecentraSocial is not just a change to the infrastructure of centralized platforms but also a change to how social media companies make money.

2. LITERATURE SURVEY

Privacy in Existing Social Networks

Senthil Kumar and Saravanakumar Kandasamy observe that privacy concerns are very feeble on social networking sites. Today's social networking media users are concerned about privacy issues and information disclosure breaches. They also identified that many shortcomings exist in the technical structure of privacy and security measures of social media sites.

Data Security and Awareness

Johanna Cabalhin, in her research, pointed out that on many existing social networks, users are needed to reveal a certain detail about themselves online to prove they are whom they claim to be. The more information a user shares, the easier it is to predict some of the user's most private information using data mining. In the US, for example, a person's social security number may be revealed or predicted (with a certain level of accuracy) by using a combination of hometown and birthdate. Facebook has commercial relationships with several corporations for its advertorial revenues. These corporations integrate their marketing efforts onto the platform via tools provided by Facebook. Observations from public hearings, judicial probes, and data scandals have all but pointed to Facebook's practice of sharing consumer data with these corporate partners, beyond a point of user's awareness or at times ignorance. This has invoked a long-running debate about whether this trade of data for a "personalized experience" is right or not.

3. RESEARCH

3.1 Decentralize Social Media

Social media has brought forth a new meaning to building community relationships, fostering social ties, sharing ideas, and connecting to like-minded people across the globe. It is fair to say that social media platforms have become a way of life. No wonder over half the world's population is currently on one or the other social media platforms. But as the famous saying goes, everything comes with a price. And the price users are paying is too costly to endure.

It was only in 2021 that Facebook Leak plagued social media users, whereby the personal information of over 553 million Facebook users was exposed from 106 countries. One minute you think all your personal information is safe, and the very next moment, your details are sold to third-party websites. In 2021 alone, the world saw over 1800+ major data breaches registering a 68% increase from 2020. Even social media giant LinkedIn was not spared and saw the personal details of over 700 million users hacked and posted on a dark web forum by a hacker under the alias of God User. Such threats are inevitable with traditional social media platforms.

In comes, **Decentralized Social Media** platforms, are built and designed on blockchain to safeguard user data in the safest way possible. Apart from giving precedence to user data privacy, **Decentralized Social Media** platforms offer a host of other features as opposed to centralized social media platforms. The adoption of these social platforms is slow. But with increasing data breaches and the threats that centralized social media pose, **Decentralized Social Media** platforms are on the rise, keeping the ethics of community relationships intact.

3.2 Blockchain

Blockchain's role in reducing cost, processing time, and eliminating non-value-adding intermediaries and thereby value addition to existing business models, particularly in banking and finance segments is well discussed (VijayaKittu&Aruna, 2018). After getting initial acceptance from core banking and financial areas, the technology is now making inroads into secondary functional areas such as the asset management industry and mutual funds (VijayaKittu&Prasada Rao, 2018).

Decentralization eliminates dependency on a single location for data storage and retrieval. Centralized authority is removed with a consensus mechanism. Immutability makes data cryptographically encrypted and hashtags can act as data identifiers. This will make the data safe and tamper-proof and hence puts fraud and corruption under control. Because transactional data is distributed across the network, other computers can act as data validators and hence transparency and accountability are automatically achieved in the system. The elimination of processes (by removing non-value-adding intermediaries) or their simplification (by doing KYC only once) can help reduce processing costs in financial services compared to the conventional system. Blockchain has proved immense cost-cutting benefits in both inter-bank and intra-bank as per several use cases already available. Enterprise blockchain had dramatic speed optimizations compared to the original blockchain implementations and is now reaching industry-grade latency. Permissioning and layering in the form of public and private blockchains keep data access allowed only to parties having permission. Enterprise blockchain provides all three essentials - high performance, high resilience, and privacy and hence a suitable technology for financial services.

3.3 Blockchain-based Social Networks:

Blockchain-based Social Networks are essentially decentralized platforms built on blockchain technology. This allows for the development of applications and smart contracts between stakeholders on the network. These decentralized social platforms enable end-to-end encryptions for every interaction.

Similar to Blockchain ecosystems, Blockchain-based social networks generally have traits such as native currency, used for:

in-platform transactions

rewarding users

crowdfunding

Benefits of Decentralized Social Networks:

1. Users don't have to place their trust with a central authority.

We put our trust in companies and governments all the time, and it's perfectly fine to make these decisions on a case-by-case basis. However, we see numerous examples of this trust failing us in various ways. Misfire of trust can range from an app, which you trusted to backup all of your photos, being shut down when the startup behind the app is bought out or goes out of business, to a social media company, selling your data to advertisers who then track you all over the internet. You should be able to minimize or eliminate the trust you have to place in third parties in a well-designed decentralized network.

2. There will be fewer single points of failure.

We see single points of failure all the time in the form of outages of centralized websites. When Gmail goes down, productivity suffers as a result of not being able to access your email. Your bank's website shuts down for maintenance and you can't do



an online transfer to pay your bills. In DOSNs, because no single node in a decentralized network can bring the entire network down, your applications should remain up and running regardless of how many users come and go.

3. There is less censorship.

It is increasingly becoming common that central institutions e.g. draconian & non-democratic governments are using their regulatory powers to block individuals' access to social media. This may as well be an attempt to suppress information about internal affairs. It is simple for such institutions to shut down access to say Twitter because all they have to do is block traffic to Twitter's central servers. However, censoring traffic on a peer-to-peer network is significantly more challenging, because every outgoing packet sent could be connecting with another peer on the decentralized network, who could then forward that message onward.

4. Decentralized networks are more likely to be open development platforms.

This means that anyone can build amazing tools, products, and services on top of decentralized networks. In contrast, centralized technology is a more commonly closed source, with development prospects intentionally limited. Companies can still make money if they are open and decentralized. In fact, the greater products and tools that are built, the greater the network effects that lock consumers into the network, and thus the more potential to build great businesses on top of that.

5. Decentralized networks can be more meritocratic.

When everyone follows the same, transparent rules, the best product, service, or content should be more likely to get identified and rewarded over time. It's possible that the system will be less meritocratic if traffic, attention, and money are distributed

behind a closed, centralized algorithm.

4. APPROACH

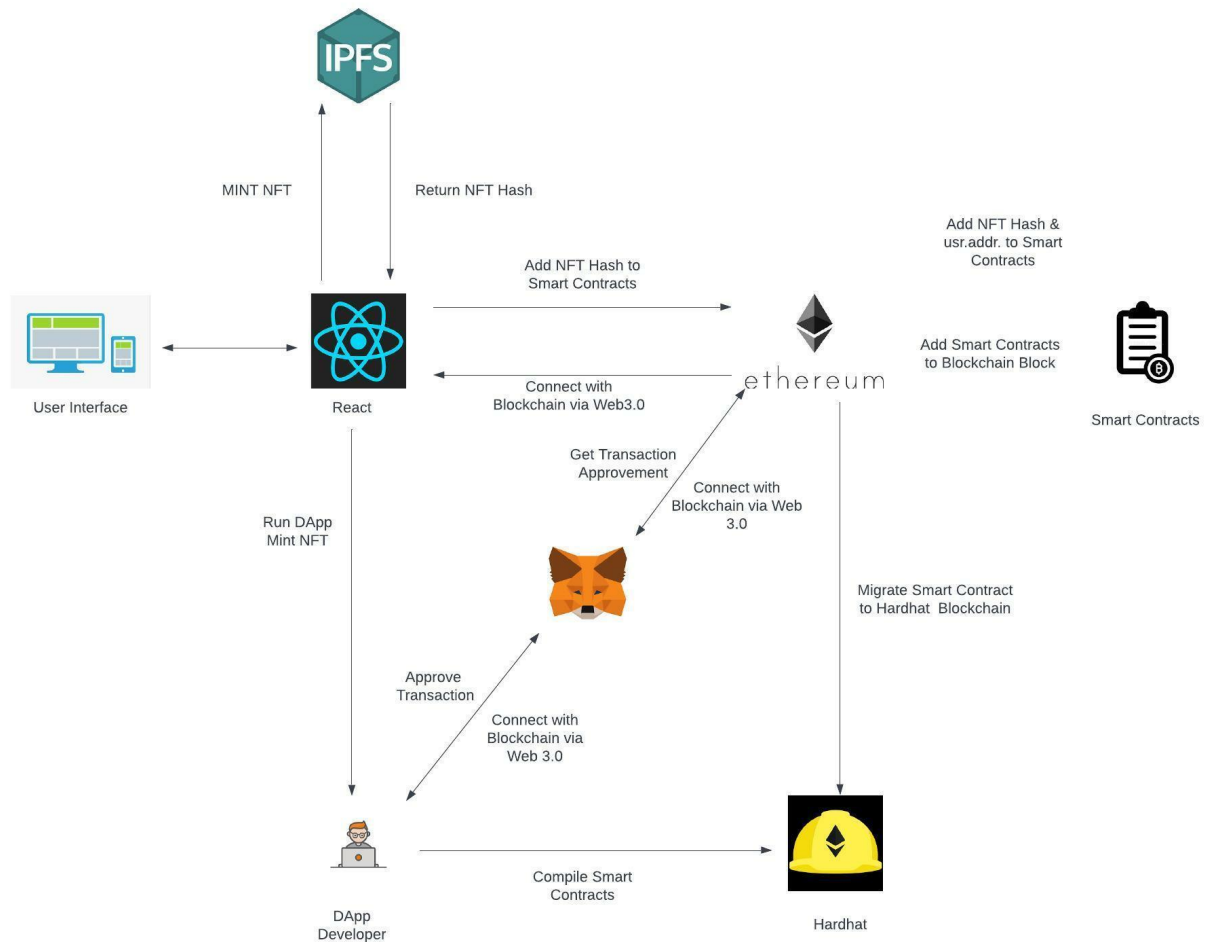


Fig.1 Flowchart

4.1 Implementation

Step 1 – The user creates a profile

A user could create a profile by using a meta mask wallet.

Step 2 – The user will choose any post for the profile

Once the account is successfully created, the user can mint the image

Step 3 – User Can also post text on their feed

A user from his account can post text

Step 4 – Other User Can Tip the post

After successfully creating the account, one user can tip other users' NFT and Text Updates by using Ethereum cryptocurrency.

Step 5 – NFT Owner can sell his NFT

NFT owners can sell their NFT on different cryptocurrency exchange platforms by using a hash key stored on smart contracts

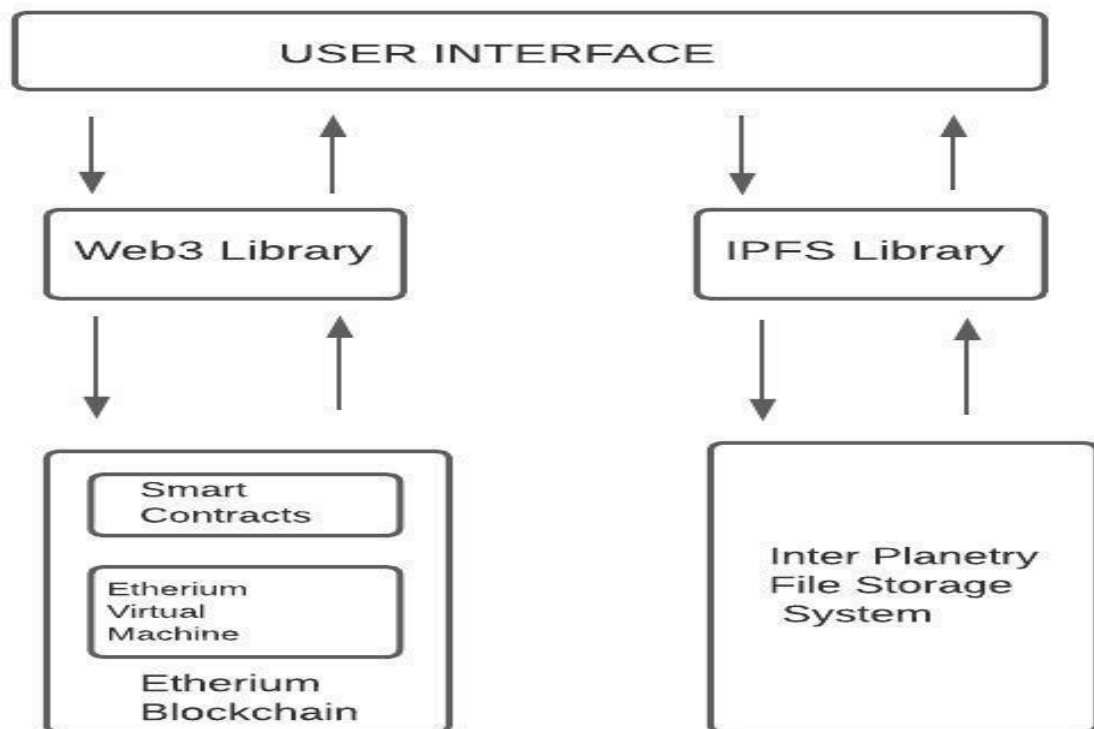
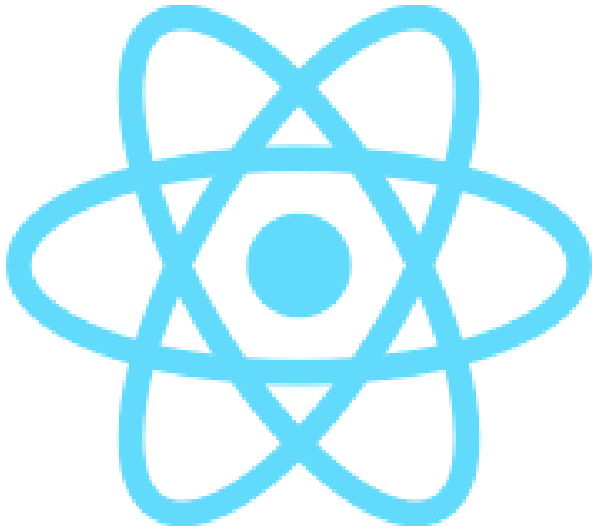


Fig. 2 Logic Flow

5. TECHNOLOGY STACKS



React JS

ReactJS is a JavaScript library used for building reusable UI components. According to React's official documentation, the following is the definition –

React is a library for building composable user interfaces. It encourages the creation of reusable UI components, which present data that changes over time. Lots of people use React as the V in MVC. React abstracts away the DOM from you, offering a simpler programming model and better performance. React can also render on the server using Node, and it can power native apps using React Native. React implements a one-way reactive data flow, which reduces the boilerplate and is easier to reason about than traditional data binding.



NFT (Non-Fungible Token)

A Cryptographic asset on a Blockchain with unique identification codes and metadata that distinguish them from each other.

A non-fungible token (NFT) is a unique digital asset that represents ownership of real-world items like art, video clips, music, and more. NFTs are often based on the Ethereum blockchain, in the form of ERC-721 tokens.

Digital transformation and the adoption of blockchain technology also mean the employment landscape is changing. More people are already working on NFTs, blockchains, and cryptocurrencies than ever before, but it will become increasingly common.

What are Smart Contracts?

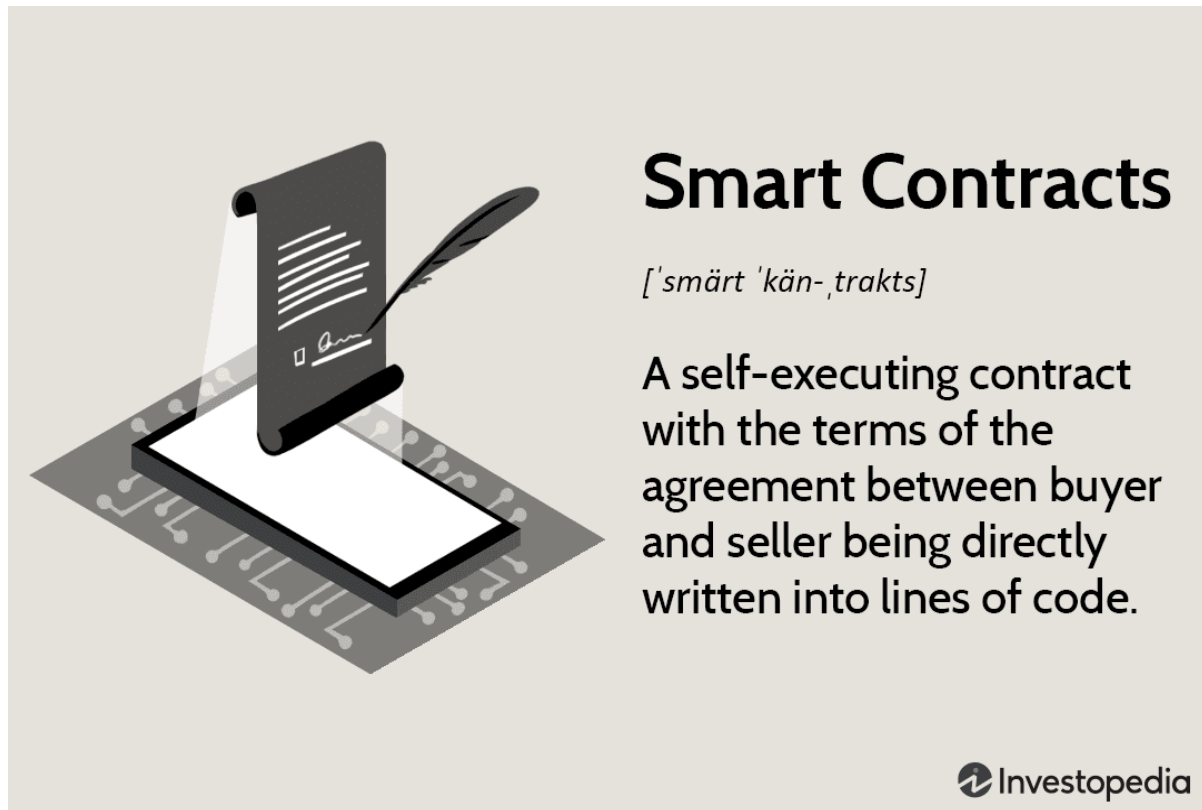


Fig. 3

Smart contracts defined

Smart contracts are simply programs stored on a blockchain that run when predetermined conditions are met. They typically are used to automate the execution of an agreement so that all participants can be immediately certain of the outcome, without any intermediary's involvement or time loss. They can also automate a workflow, triggering the next action when conditions are met.

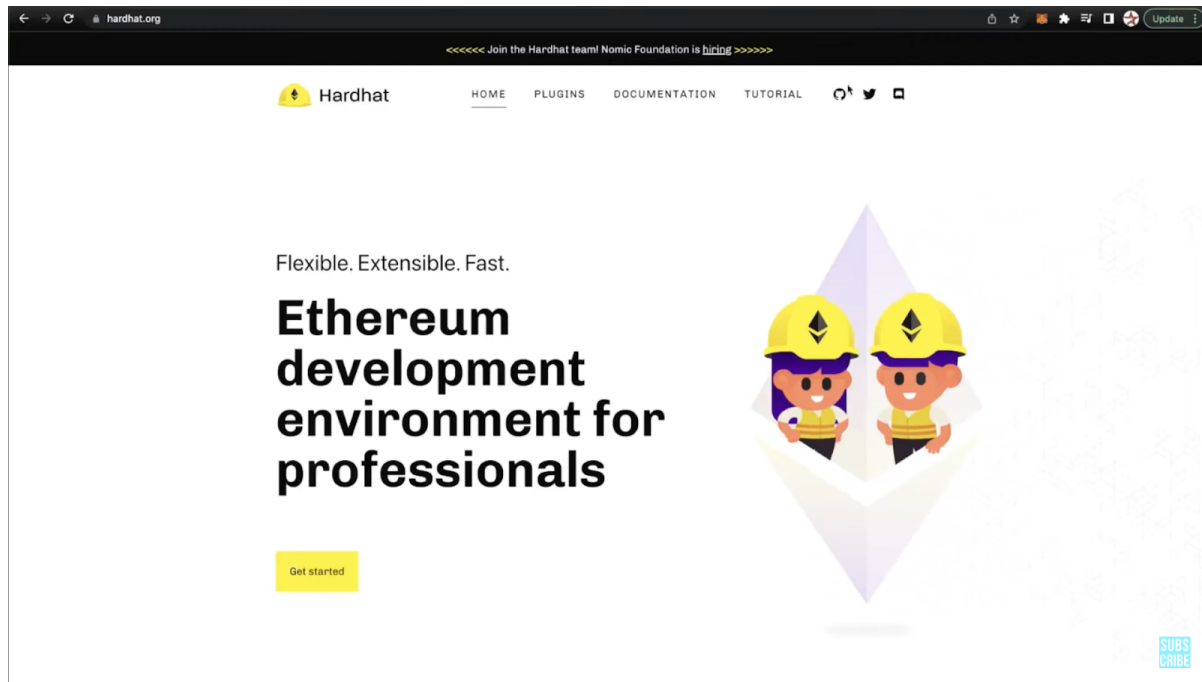
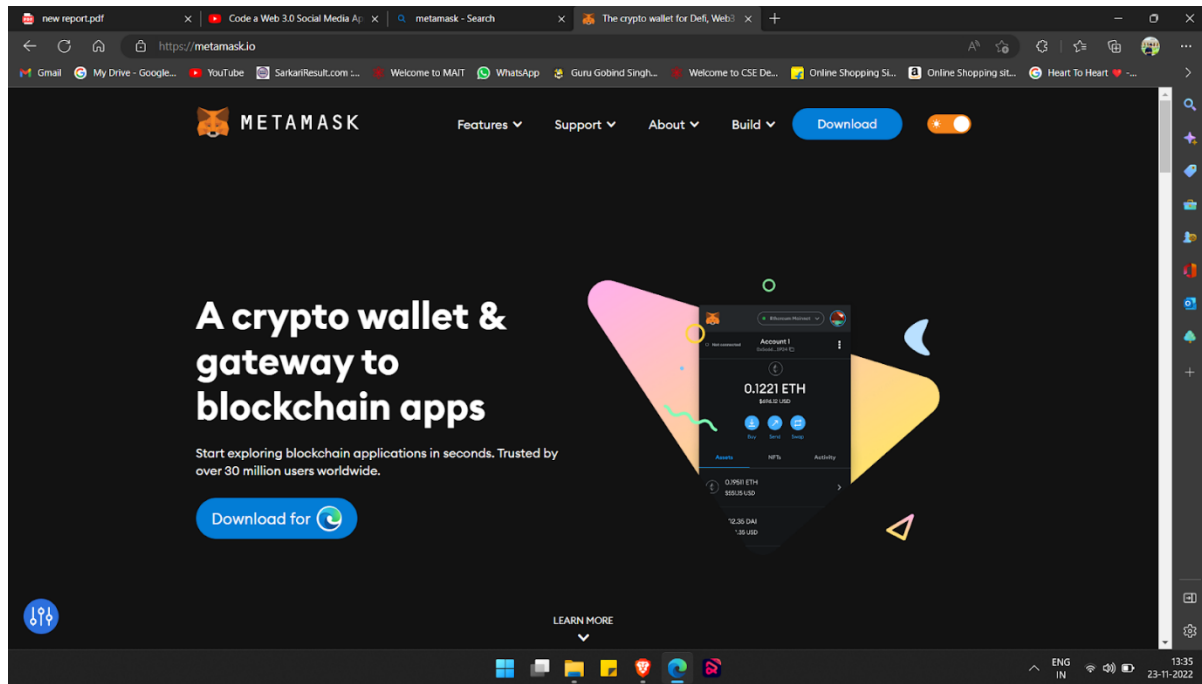


Fig. 4

HardHat Testing Framework

Hardhat smart contract development environment offers suitable tools to developers for managing the development workflow. In addition, Hardhat also ensures efficiency by introducing automation in specific steps alongside the facility of new and productive functions. Hardhat features a pre-built local Ethereum network tailored for the core objective of development. The Hardhat Solidity equation is clearly evident in the framework's focus on Solidity debugging. At the same time, Hardhat also features the facility of stack traces and messages for DApp failure. As a result, developers can have the necessary tools at hand to identify the instance and cause of the failure of applications. It can also offer the necessary answer to solve the problems underlying the application failure.



```

Last login: Sat Apr  9 12:31:33 on ttys000
ethancemer@Ethans-MacBook-Pro decentra_twitter % npx hardhat node
You are using a version of Node.js that is not supported by Hardhat, and it may work
incorrectly, or not work at all.

Please, make sure you are using a supported version of Node.js.

To learn more about which versions of Node.js are supported go to https://hardhat.org
/nodejs-versions
Started HTTP and WebSocket JSON-RPC server at http://127.0.0.1:8545/

Accounts
=====

WARNING: These accounts, and their private keys, are publicly known.
Any funds sent to them on Mainnet or any other live network WILL BE LOST.

Account #0: 0xf39fd6e51aad88f6f4ce6ab88279cfff92266 (10000 ETH)
Private Key: 0xac0974bec39a17e36ba4a6b4d238ff944bacb478cbed5efcae784d7bf4f2ff80

Account #1: 0x70997970c51812dc3a010c7d01b50e0d17dc79c8 (10000 ETH)
Private Key: 0x59c6995e998f97a5a0044966f0945389dc9e86dae88c7a8412f4603b6b78690d

Account #2: 0x3c44cdddb6a900fa2b585dd299e03d12fa4293bc (10000 ETH)
Private Key: 0x5de4111afa1a4b94908f83103eb1f1706367c2e68ca870fc3fb9a804cdab365a

Account #3: 0x90f79bf6eb2c4f870365e785982e1f101e93b906 (10000 ETH)
Private Key: 0x7c852118294e51e653712a81e05800f419141751be58f605c371e15141b007a6

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MetaMask Cryptocurrency Wallet

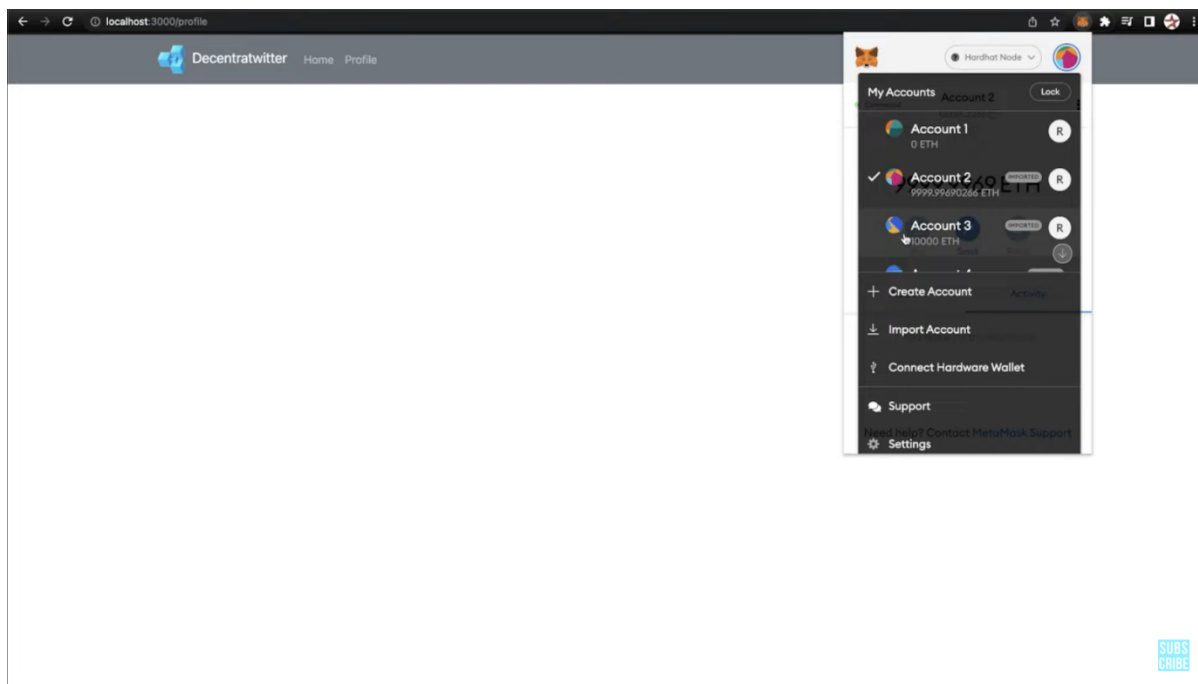
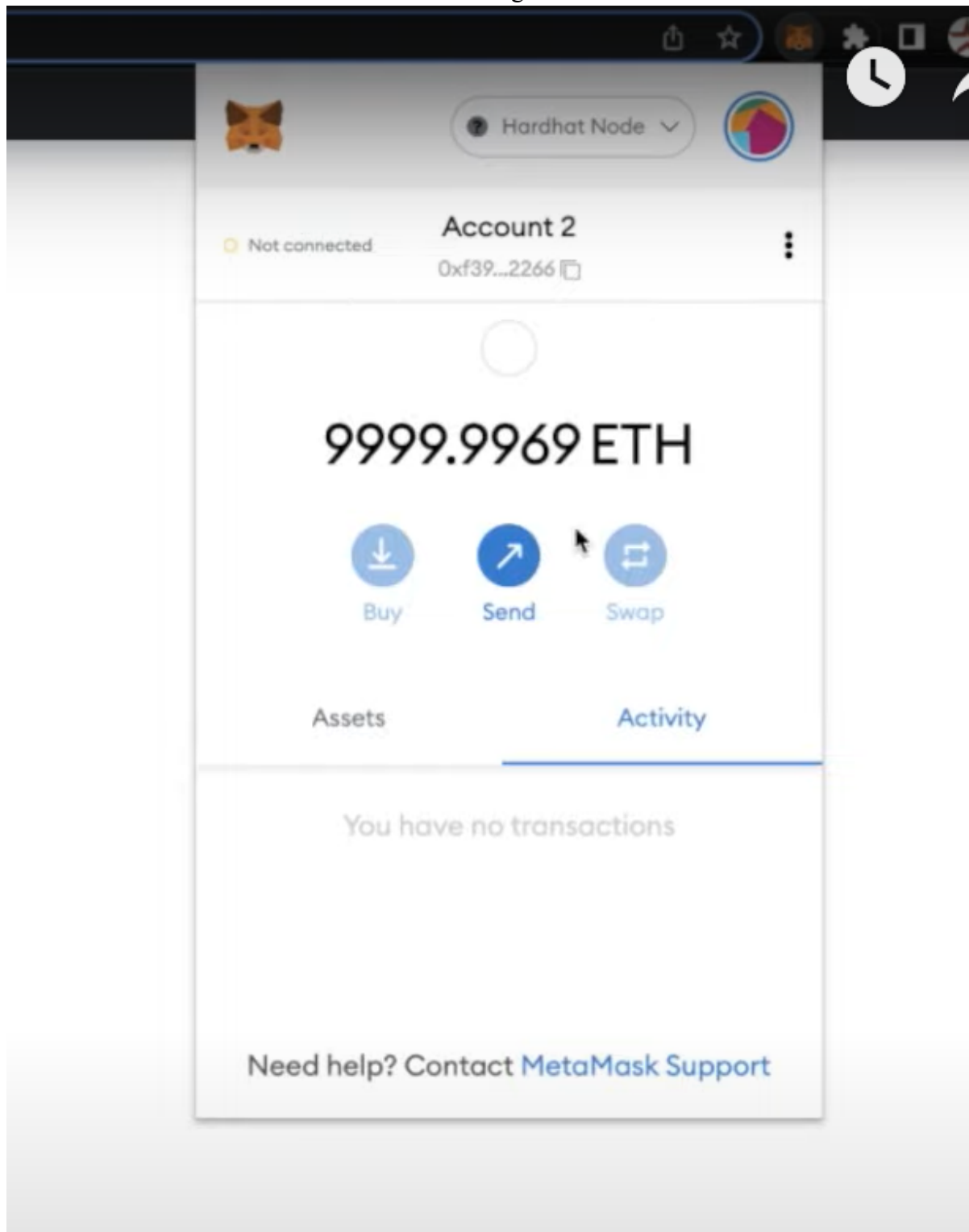


Fig. 5



MetaMask is a software cryptocurrency wallet used to interact with the Ethereum blockchain. It allows users to access their Ethereum wallet through a browser

extension or mobile app, which can then be used to interact with decentralized applications. MetaMask is developed by ConsenSys Software Inc., a blockchain software company focusing on Ethereum-based tools and infrastructure.

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Testing Libraries

Chai Assertion Library

Chai assertion library is an external JavaScript library used to write assertions. Compared to what we write directly in JavaScript, this assertion library needs less time & effort and easy to use.

Chai assertion library is available by default in Postman. So when you are writing chai assertions, then don't worry about other processes of installation. The main feature of Postman assertions is that they write the tests with English sentences, which are human readable. So it is very easy to read and user-friendly.

What Is Ethers Library?

The ethers.js library aims to be a complete and compact library for interacting with the Ethereum Blockchain and its ecosystem. It was originally designed for use with ethers.io and has since expanded into a more general-purpose library.

OPEN ZEPPELIN ERC-721 Standards

The ERC-721 standard enabled non-fiduciary tokens to be easier to handle and transfer within smart contracts. Creating an ERC721 Contract with Open Zeppelin

Creating an ERC 721 Contract with Open Zeppelin is relatively simple, and we will walk you through a step-by-step process.

InterPlanetary File System

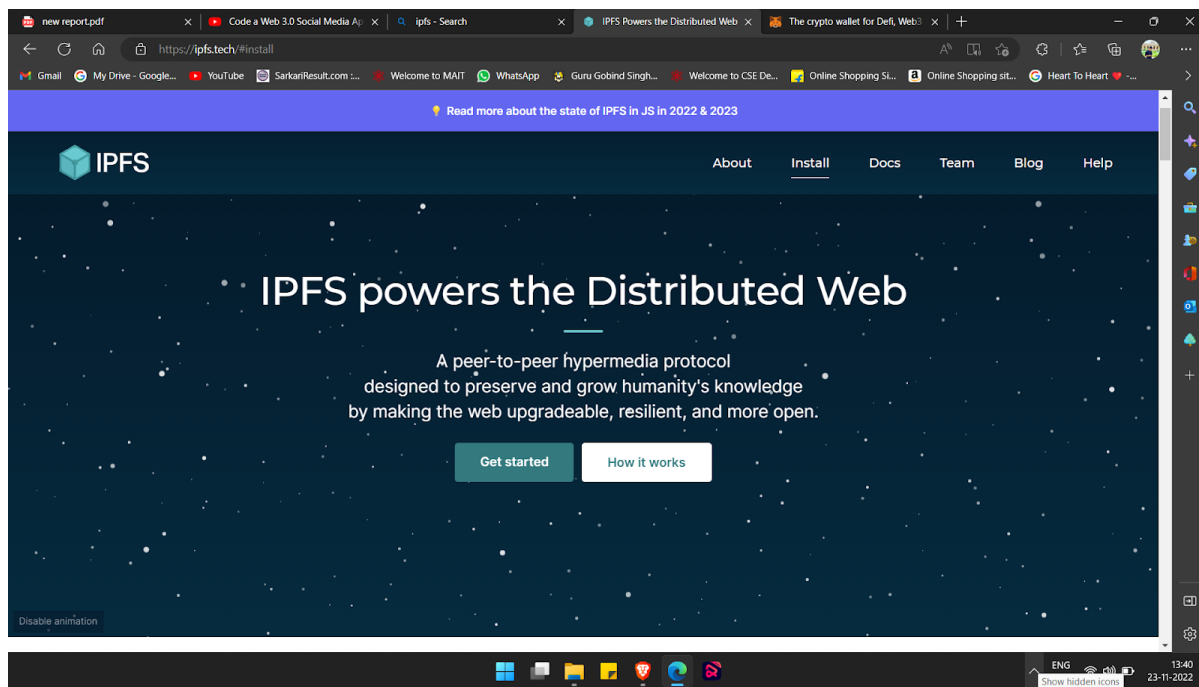


Fig. 6

The InterPlanetary File System (IPFS) is a protocol, hypermedia and file sharing peer-to-peer network for storing and sharing data in a distributed file system. IPFS uses content-addressing to uniquely identify each file in a global namespace connecting IPFS hosts.

IPFS can among others replace the location based hypermedia server protocols http and https to distribute the World Wide Web.

IPFS allows users to host and receive content in a manner similar to BitTorrent. As opposed to a centrally located server, IPFS is built around a decentralized system of user-operators who hold a portion of the overall data, creating a resilient system of file storage and sharing. Any user in the network can serve a file by its content address, and other peers in the network can find and request that content from any node who has it using a distributed hash table (DHT).

In contrast to BitTorrent, IPFS aims to create a single global network. This means that if two users publish a block of data with the same hash, the peers downloading the content from "user 1" will also exchange data with the ones downloading it from "user 2". IPFS aims to replace protocols used for static webpage delivery by using gateways which are accessible with HTTP. Users may choose not to install an IPFS client on their device and instead use a public gateway. A list of these gateways is maintained on the IPFS GitHub page.

6. RESULTS

User will get a UI which was created by React Js on which he can login by using different account using meta mask wallet, after than user can mint his NFT which could be in any format like gif, videos, image. Then his followers or another user on the platform can tip others post and the most tipped post will be on the top. All the tipping will be done by Ethereum cryptocurrency. And if the user want to sell his NFT on different cryptocurrency exchanges platform like WazirX NFT ,Open sea market then he can use the hash key of the NFT which will be stored on the Smart Contracts.

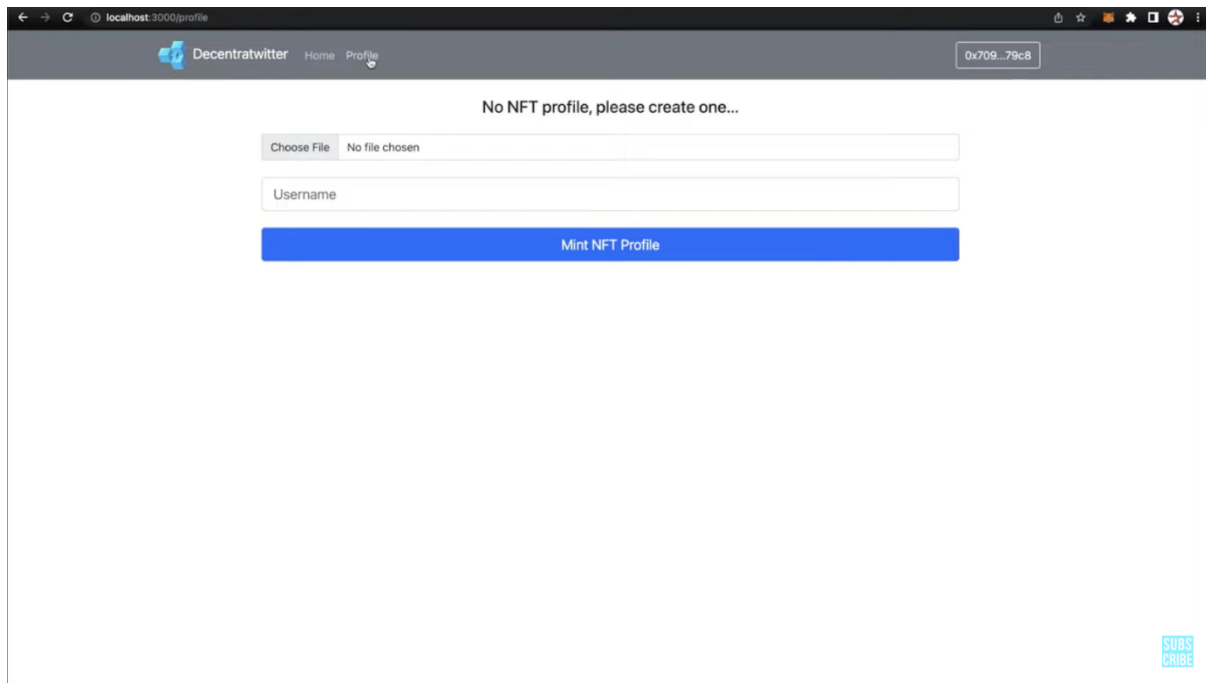


Fig. 7

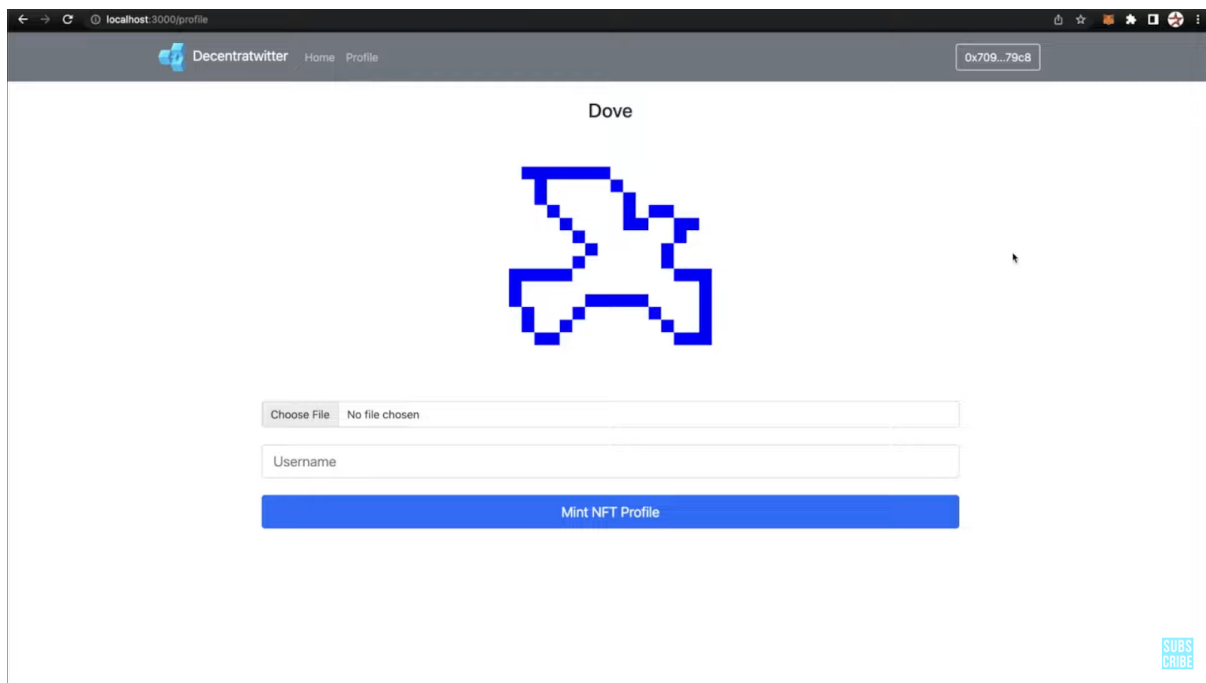


Fig. 8

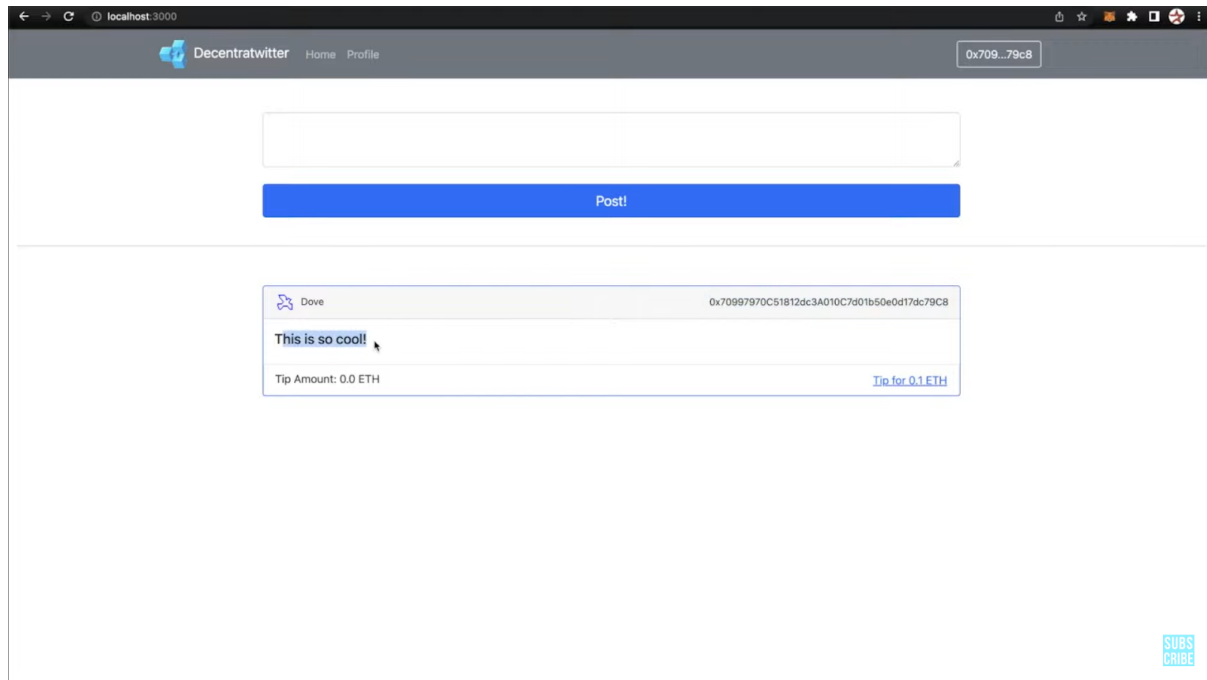


Fig . 9

7. SCOPE FOR FUTURE STUDY

Decentralized social media platforms are not yet popular enough for the majority of people to use them. But with time, this may change as the existing centralized social media sites become more inefficient and flawed in their current systems. The rise on popularity can be attributed largely due to Centralization within networks where individuals have little control over data consumption or even how it's used at all

Social network systems are intricate devices that can take years to refine. This is why it can take years for decentralized social networks to acquire significance and witness widespread adoption. However, it doesn't nullify the possibilities that the decentralized social media sites would open up. As people become more frustrated with Big Tech and its consistent attempts at breaching customer data privacy, we may see a change towards decentralized communication in the near future.

8. CONCLUSION

Decentralized social media platforms still have a long way to go before they can compete with giants like Facebook, Twitter or Instagram. However, people are learning and becoming more open to the idea of decentralized social networks, combined with the potential of Blockchain – especially due to the freedom and security provided. Many are especially attracted to the easy earning opportunities and schemes of being part of a decentralized, rewards-based social network. Needless to say, they will play a significant role in the future of social media.

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