PROJECT REPORT ON

TWITTER USING BLOCKCHAIN

Submitted to

Madhav Institute of Technology & Science, Gwalior

Towards the Partial Fulfillment for the Award of the degree of

Bachelor of Technology

In

ELECTRONICS & TELECOMMUNICATION ENGINEERING

2022-2023

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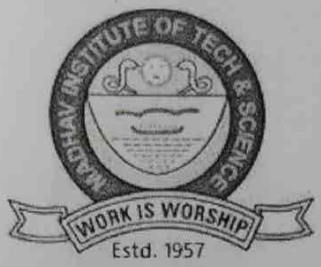

2022-2023

CERTIFICATE OF APPROVAL

This is to certify that the Project is carried out in **Madhav Institute of technology And Science, Gwalior** submitted by **HARSH SAHU (0901ET191027)** student of **B. Tech. IV-Year (VIII Semester)** in partial fulfillment for the award of the degree of **Bachelor of Technology in Electronics & Telecommunication Engineering** under R.G.P.V., Bhopal. It is a record of their own work carried by them during project.

29/05/23

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MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE
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2019-2023

CANDIDATE DECLARATION

We hereby declare that the work which has been carried out during the Project in partial fulfillment for the award of the degree of **Bachelor of Technology** in **Electronics & Telecommunication Engineering** from Madhav Institute of Technology & Science, Gwalior is an authenticated record of our work carried under the supervision /mentorship of **Dr. Karuna Markam** (Assistant Professor, MITS, Gwalior).The matter embodied in this project report is not submitted for the award of any degree or diploma anywhere else.

Date: 29/05/2023

Place: Gwalior

Harsh Sahu

(0901ET191027)

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Date: 29/05/2023

Place: Gwalior

Harsh Sahu

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Project Expected Outcomes

Session: Jan–June 2023

Student Name: Harsh Sahu

Enrollment No.:0901ET191027

Project Title: Twitter using Blockchain

Objective of Project: The objective of the project "Twitter Using Blockchain" is to develop a decentralized social media platform inspired by Twitter, using blockchain technology to tackle the existing challenges of privacy, security, and transparency.
Brief details of Project: The decentralized Twitter platform will enable users to create accounts, post tweets and track their tweets, all while ensuring data privacy, and user control. The blockchain technology will be utilized to store and manage user profiles, tweets, and interactions in a distributed manner, eliminating the need for a central authority to control and manage the platform. The successful completion of this project will result in a secure, transparent, and user-centric social media platform. The project will contribute to the adoption and exploration of blockchain technology in the context of social media and decentralized applications.
Expected/Achieved Outcomes of Project: 1. The project successfully achieved decentralization by using blockchain technology. 2. By implementing blockchain technology, the platform achieved enhanced security. User data is encrypted and stored on the blockchain 3. Through the use of blockchain's immutability, the platform ensures the authenticity and integrity of tweets. 4. The project contributed to the exploration and adoption of blockchain technology in the realm of social media.
Social relevance/Impact of your Project: The project "Twitter Using Blockchain" holds significant social relevance due to its potential to address various challenges and provide unique solution in the realm of social media. Here are some key aspects of its social relevance: Data Privacy and User Control, Trustworthy Information Sharing.

29/05/23

Harsh Sahu

(0901ET191027)

Dr. Karuna Markam

Assistant Professor

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INTRODUCTION

• Background for the project

Social media has become an essential part of our daily lives, enabling communication, share information and data, and making connections on a large scale. However, centralized social media platforms face problems such as data breaches, transparency issues, and lack of control over users' personal information. These issues have raised concerns about privacy, security, and the accuracy of information provided by users. Blockchain technology, which was first introduced as a cryptocurrency technology, has attracted a lot of attention due to its ability to solve these problems. Blockchain offers transparency, immutability, and decentralization, making it perfect candidate for changing the existing social media. Twitter, one of the most using social media, provide users to post and share short messages called tweets. It has a very big user base and plays a crucial role in spreading news. However, Twitter is a centralized platform, give rise to issues such as centralized problem, data privacy problems, and the spread of false information. To tackle these limitations and utilize the benefits of blockchain, the project "Twitter Using Blockchain" aims to develop a decentralized social media that copies the functionality of Twitter while applying blockchain technology. The objective is to develop a platform that provide data privacy and give access to user control. By applying a decentralized platform, the project targets to divide the user data and interactions across a network of nodes, eradicating the need for a central authority to gain control over the platform. By applying the concept of smart contracts, user authentication and data privacy can be made strong and better. The immutability of the blockchain will facilitate transparency and enable the verification of tweets, reducing the spread of fake news and promoting authentic content. The successful development of a decentralized Twitter using blockchain technology has the ability to address the incapability of centralized social media, powering users with data control and promote freedom of expression, and establish a more trustworthy and inclusive social media environment.

• Objectives of the project

The project "Twitter Using Blockchain" is considered with the following objectives:

1. Decentralized social media: To develop a decentralized social media that copies the functionalities Twitter.
2. Data Privacy and User Control: Tackling data privacy problems by giving users full access over their personal information.
3. Authenticity: Utilize blockchain's immutability to verify the authenticity and integrity of tweets and interactions.
4. Exploration and Innovation: Contribute to the exploration of blockchain technology in the social media realm.
5. User Adoption: Encourage users to adopt the decentralized Twitter and actively participate in its growth.

LITERATURE REVIEW

• Blockchain and its applications

Blockchain technology has come out as a tremendous innovation with variable implications across various industries. At its basics, blockchain is a distributed and decentralized ledger which make records of transactions in a transparent and secure way. Instead of depending on a central authority, blockchain depends on consensus algorithms and cryptographic techniques to validate and verify transactions. This unique and different combination of decentralization, transparency, security, and immutability has enabled many applications across various sectors and industries.

Blockchain technology can be understood by the following key characteristics:

1. Decentralization: Blockchain works on a distributed network of computers (nodes) where data and transaction records are copied and synchronized across multiple users and participants.
2. Transparency: All participants and users in a blockchain network have access to the same information, creating a transparent and inspectable environment.
3. Security: Blockchain uses cryptographic algorithms to secure transactions and data.
4. Each transaction is encrypted, and once added to the blockchain, it becomes nearly impossible to alter or tamper.
5. Immutability: Once a transaction is recorded on the blockchain, it cannot be modified or tampered. The decentralized consensus mechanism provides that any changes to the blockchain require the consensus of the network participants and users.

Applications of Blockchain Technology:

1. Financial Services: Blockchain has changed the financial sector with applications such as cryptocurrency (e.g., Bitcoin), smart contracts, cross-border payments, supply chain finance, and decentralized finance (DeFi).

2. Supply Chain Management: Blockchain provides end-to-end traceability, transparency, and accountability in supply chains. It enables the secure and efficient tracking of goods, verification of product authenticity, prevention of counterfeit products.

3. Healthcare: Blockchain can changed healthcare data management and patient privacy. It enables secure sharing and access control of medical records.

4. Voting and Governance: Blockchain can increase the integrity and transparency of

voting systems, enabling secure and inspectable elections. It provides a tamper-proof record of votes and prevents danger activities.

5. Intellectual Property Management: Blockchain technology can be used to create immutable records of intellectual property rights, including patents, copyrights, and trademarks.

• Analysis of Twitter's functionality

Twitter, one of the most using social media, provides a range of functionalities and features that have contributed to its widespread adoption and impact. Let's see some of the key features of Twitter:

1. Tweets: Twitter's primary functionality remains around tweets, short messages. Users can compose and share tweets, expressing their thoughts, opinions, or sharing information and news such as articles, images, and videos.

2. Followers and Followings: Twitter allows users to follow other users and to be followed back in return. This feature builds a network of connections, where users can see the tweets of their followers and can follow in their timeline.

3. Hashtags and Trends: Hashtags play a significant role in organizing and finding content on the Twitter. Users can add trending hashtags to their tweets, making them searchable and specifying them under specific topics.

4. Retweets: Retweeting allows users to share tweets from others with their followers, amplifying the reach of the original content. Retweets contribute to the trending of tweets, enabling information and content to spread quickly across the platform. This feature promotes the spreading of news, ideas, and discussions, making Twitter a dynamic platform for information sharing and conversation.

5. Multimedia Content: Twitter provides the function of the sharing of multimedia content, including images, videos, and GIFs. Users can attach media to their tweets, increasing the visual appeal and engagement potential of their posts.

METHODOLOGY

• Methodology used in the project

The methodology used in a project involving Twitter and blockchain would involve the following steps:

1. Requirement Analysis: This part includes understanding the objectives, goals, and particular requirements of the project. It includes identifying the functionalities we are desired to and features to be applied in the Twitter platform using blockchain technology.

2. Design and Architecture:

In this part, designing of the project and system components required to include blockchain into Twitter. The design should address scalability, privacy, and security considerations.

3. Development and Implementation: Based on the design, the development starts and applying the solution. This phase includes developing the important smart contracts, blockchain architecture and including the blockchain functionalities into the Twitter platform. It involves debugging to make sure the proper functioning of the system.

4. Testing: Thorough testing is required to validate the functionality and performance of the blockchain based Twitter.

5. Deployment and Integration: Once the testing phase is complete, the blockchain based Twitter platform is deployed over a environment. Proper deployment, planning and coordination are necessary to reduce problems to user experience.

• Blockchain platform for the project

When selecting a blockchain platform, it's necessary to think about the factors such as the platform's consensus mechanism, scalability capabilities, developer support, security features. Bedsides this, examining the platform's track record, documentation, community activity, and adoption in similar projects can help assess its suitability for a blockchain based Twitter.

ETHEREUM – Ethereum is a prominent choice as a "Twitter using blockchain" for several reasons:

1. Smart Contract Functionality: Ethereum is known for its robust smart contract capabilities. Smart contracts are self-executing agreements that facilitate the automation of processes and the execution of code on the blockchain. With Ethereum, you can use smart contracts to apply various functionality within a blockchain based Twitter, such as user authentication, tweet creation, content storage.

2. Established Ecosystem: Ethereum boasts a large and thriving ecosystem. It has a very big developer community, numerous development tools, libraries, and frameworks that make it easier to create a decentralized application (Dapp's). The vast ecosystem provides a wealth of resources, tutorials, and support for developers embarking on a project like integrating blockchain into Twitter.

3. Network Effects and Adoption: Ethereum has achieved significant network effects and enjoys wide-scale adoption in the blockchain space. Many projects, protocols, and decentralized applications are built on top of Ethereum, contributing to its liquidity and visibility. Choosing Ethereum as the blockchain platform for a Twitter project allows you to tap into this existing network and potentially benefit from other Ethereum-based applications, such as wallets, decentralized exchanges.

4. Scalability Solutions: Ethereum is continuously working on scalability solutions to tackle the limitations of its current architecture, which is known for its network congestion and high gas fees during periods of high demand. Initiatives like Ethereum 2.0, which introduces a transition to a more scalable and energy-efficient network through the use of proof-of-stake (PoS) consensus and shard chains, offer reliable solutions to enhance Ethereum's scalability. These developments can help address potential scalability challenges in a blockchain-enabled Twitter platform.

5. Interoperability and Standards: Ethereum has been instrumental in driving the development of token standards such as ERC-20 and ERC-721, which have become industry standards for fungible and non-fungible tokens, respectively. These standards promote ease of integration with other Ethereum-based projects and services. By choosing Ethereum, you can use these standards to decentralized finance (DeFi) integrations, and seamless interactions with other Dapps', expanding the possibilities for a blockchain-enabled Twitter platform.

• Tools and technologies used

The following tools and technologies are used to design and develop this project:

- **Ethereum Blockchain** – Ethereum is an open-source, decentralized blockchain

platform that allows developers to build and deploy decentralized applications (Dapp's) and smart contracts. As stated, above Ethereum is best suited for our project and can help us through its various functionality.

- **Solidity** - Solidity is a programming language particularly designed for developing smart contracts on the Ethereum blockchain. It is the most widely used language for writing smart contracts on the Ethereum platform. Solidity is a statically-typed, contract-oriented language with syntax similarities to JavaScript.

- **Alchemy** - Alchemy is a powerful blockchain developer platform providing a vast variety of developer tools. Developers building apps which interact with Ethereum can use Alchemy's powerful APIs to supercharge their apps.

- **Hardhat** - Hardhat comes built-in with Hardhat Network, a local Ethereum network node designed for development. It allows you to deploy your contracts, run your tests and debug your code, all within the confines of your local machine.

- **Goerli TestNet** - Goerli is an Ethereum test network that allows for blockchain development testing before deployment on Mainnet, the main Ethereum network.

- **MetaMask Wallet** - The MetaMask wallet app allows users to send or receive coins with any other wallet or smart contract provided a supported blockchain is used. Users also have the option of buying coins using providers on the platform.

- **Visual Studio Code** – This platform is used for writing, testing and developing of various components of project. VS Code helps to write code quickly and debug and it accelerates the development through its tools.

- **HTML and CSS** - HTML (the Hypertext Markup Language) and CSS (Cascading Style Sheets) are two of the core technologies for building Web pages. HTML provides the structure of the page, CSS the (visual and aural) layout, for a variety of devices.

- **JavaScript** - JavaScript is a scripting language that enables you to create dynamically updating content, control multimedia, animate images, and pretty much everything else.

- **React.js** - The React. js framework is an open-source JavaScript framework and library developed by Facebook. It's used for building interactive user interfaces and web applications quickly and efficiently with significantly less code

IMPLEMENTATION DETAILS

• Overview of the development process

To start the development process of the project, first we are going to build up a smart contract

for our project. The smart contract is built up with the help of solidity programming language. In the smart contract we are going to define the functions and events we want in our project. After development of the smart contract, the next step is to test these functions whether they are working properly or not. To validate this, we are going to use hardhat we will create a test file to test our functions. After successful validating of our smart contract, we move further and it's time to deploy our smart contract on goerli TestNet network. After deployment of our contract, our backend part of project is done and it's time to work upon the frontend and user interaction part of the project.

To start the development of our frontend part we will create a react app, our app will host on local network. Next, we will work on various components of user interface for example sidebar component, middle component and event component. After completion of this part, the user will be able to make tweet and see their tweet verification.

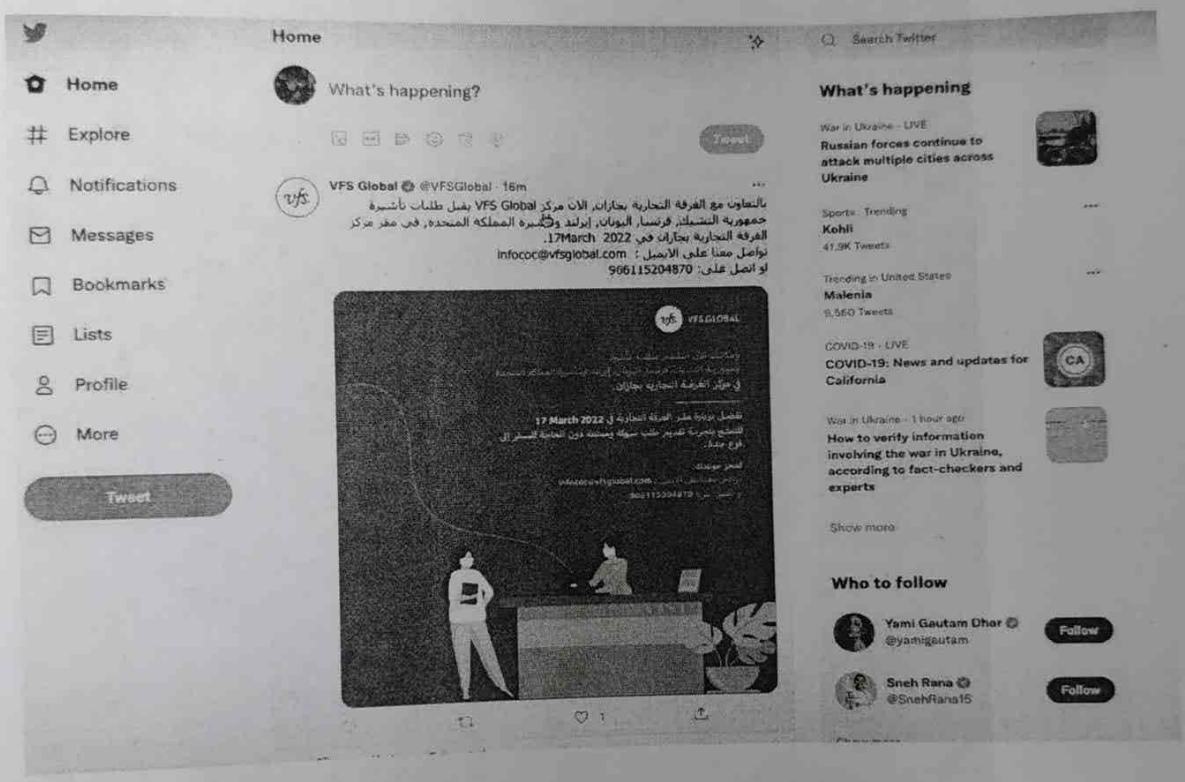


Fig.1 **Twitter Interface**

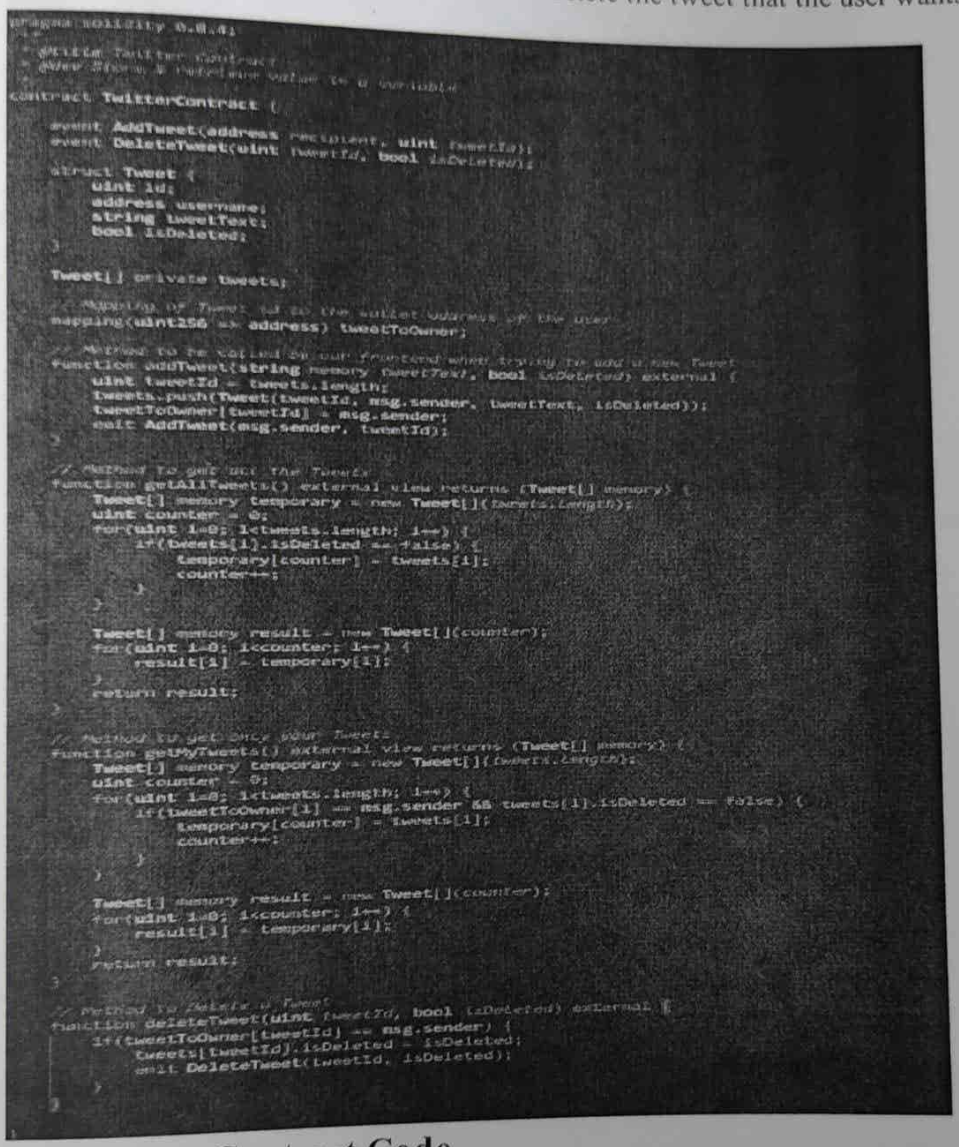
• Description of the smart contract

The name of our smart contract for our project is **TwitterContract** and the file is **TwitterContract.sol** . The ".sol "extension is used to save solidity files. In this file, many functions have been created to power up our smart contract and overall projects.
The functions in the smart contract are as follows:

- **addTweet() –** This function is going to be used for creating and adding a tweet into a

user portfolio.

- **getAllTweets()** – This function is going to be used for getting all the tweets on the platform.
- **getMytweets()** – This function is going to be used for getting my tweets only.
- **deleteTweet()** – This function will delete the tweet that the user wants to delete.



```
pragma solidity 0.8.4;

contract TwitterContract {

    event AddTweet(address recipient, uint tweetId);
    event DeleteTweet(uint tweetId, bool isDeleted);

    struct Tweet {
        uint id;
        address username;
        string tweetText;
        bool isDeleted;
    }

    Tweet[] private tweets;

    mapping(uint256 => address) tweetToOwner;

    function addTweet(string memory tweetText, bool isDeleted) external {
        uint tweetId = tweets.length;
        tweets.push(Tweet(tweetId, msg.sender, tweetText, isDeleted));
        tweetToOwner[tweetId] = msg.sender;
        emit AddTweet(msg.sender, tweetId);
    }

    function getAllTweets() external view returns (Tweet[] memory) {
        Tweet[] memory temporary = new Tweet[](tweets.length);
        uint counter = 0;
        for(uint i=0; i<tweets.length; i++) {
            if(tweets[i].isDeleted == false) {
                temporary[counter] = tweets[i];
                counter++;
            }
        }

        Tweet[] memory result = new Tweet[](counter);
        for(uint i=0; i<counter; i++) {
            result[i] = temporary[i];
        }
        return result;
    }

    function getMyTweets() external view returns (Tweet[] memory) {
        Tweet[] memory temporary = new Tweet[](tweets.length);
        uint counter = 0;
        for(uint i=0; i<tweets.length; i++) {
            if(tweetToOwner[i] == msg.sender && tweets[i].isDeleted == false) {
                temporary[counter] = tweets[i];
                counter++;
            }
        }

        Tweet[] memory result = new Tweet[](counter);
        for(uint i=0; i<counter; i++) {
            result[i] = temporary[i];
        }
        return result;
    }

    function deleteTweet(uint tweetId, bool isDeleted) external {
        if(tweetToOwner[tweetId] == msg.sender) {
            tweets[tweetId].isDeleted = isDeleted;
            emit DeleteTweet(tweetId, isDeleted);
        }
    }
}
```

Fig.2 **Smart Contract Code**

• Components and their functionality

A. SIDEBAR COMPONENT

Sidebar component provides options such as home icon, search icon, notification icon, mailoutline icon, bookmark icon etc.

```
function Sidebar() {

  return (
    <div className="sidebar">
      <TwitterIcon className="sidebar__twitterIcon" />

      <SidebarOption Icon={HomeIcon} text="Home" />
      <SidebarOption Icon={SearchIcon} text="Explore" />
      <SidebarOption Icon={NotificationsNoneIcon} text="Notifications" />
      <SidebarOption Icon={MailOutlineIcon} text="Messages" />
      <SidebarOption Icon={BookmarkBorderIcon} text="Bookmarks" />
      <SidebarOption Icon={ListAltIcon} text="Lists"/>
      <SidebarOption Icon={PermIdentityIcon} text="Profile"/>
      <SidebarOption Icon={MoreHorizIcon} text="More" />

      {/* Button -> Tweet */}
      <Button variant="outlined" className="sidebar__tweet" fullWidth>
        Tweet
      </Button>
    </div>
  );
}
```

Fig.3 Sidebar Code

B. TWEET BOX COMPONENT

This component will provide the functionality of adding and creating the tweets.

```
function TweetBox() {
  const [tweetMessage, setTweetMessage] = useState("");
  const [tweetImage, setTweetImage] = useState("");
  const [avatarOptions, setAvatarOptions] = useState("");

  const addTweet = async (e) => {
    let tweet = {
      "tweetText": tweetMessage,
      "isDeleted": false
    };

    try {
      const {ethereum} = window

      if(ethereum) {
        const provider = new ethers.providers.Web3Provider(ethereum);
        const signer = provider.getSigner();
        const TwitterContract = new ethers.Contract(
          TwitterContractAddress,
          Twitter.abi,
          signer
        )

        let twitterTx = await TwitterContract.addTweet(tweet.tweetText, tweet.isDeleted);

        console.log(twitterTx);
      } else {
        console.log("Ethereum object doesn't exist!");
      }
    } catch(error) {
      console.log("Error submitting new Tweet", error);
    }
  }
```

Fig.4 Tweet Box Code

C.WIDGETS COMPONENT

```
function Widgets() {
  return (
    <div className="widgets">
      <div className="widgets__input">
        <SearchIcon className="widgets__searchIcon" />
        <input placeholder="Search Twitter" type="text" />
      </div>

      <div className="widgets__widgetContainer">
        <h2>What's happening</h2>

        <TwitterTimelineEmbed
          sourceType="profile"
          screenName="kunalmm92"
          options={{ height: 800 }}
        />

        <TwitterShareButton
          url={"https://facebook.com/cleverprogrammer"}
          options={{ text: "#reactjs is awesome", via: "cleverqazi" }}
        />
      </div>
    </div>
  );
}
```

Fig.5 **Widgets Component Code**

D.POST COMPONENT

This component will provide the functionality of posting a tweet.

```
const Post = forwardRef(
  ({ displayName, text, personal, onClick }, ref) => {

    return (
      <div className="post" ref={ref}>
        <div className="post__avatar">
          <Avatar
            style={{ width: '100px', height: '100px' }}
            avatarStyle='Circle'
            {...generateRandomAvatarOptions()}
          />
        </div>
        <div className="post__body">
          <div className="post__header">
            <div className="post__headerText">
              <h3>
                {displayName}{" "}
              </h3>
            </div>
            <div className="post__headerDescription">
              <p>{text}</p>
            </div>
          </div>
          <div className="post__footer">
            <ChatBubbleOutlineIcon fontSize="small" />
            <RepeatIcon fontSize="small" />
            <FavoriteBorderIcon fontSize="small" />
            <PublishIcon fontSize="small" />
            {personal ? (
              <DeleteIcon fontSize="small" onClick={onClick}/>
            ) : ("")}
          </div>
        </div>
      </div>
    );
  }
);
```

Fig.6 **Post Component Code**

E. FEED COMPONENT

```
function Feed({personal}) {
  const [posts, setPosts] = useState([]);

  const getUpdatedTweets = (allTweets, address) => {
    let updatedTweets = [];
    // Here we set a personal flag around the tweets
    for(let i=0; i<allTweets.length; i++) {
      if(allTweets[i].username.toLowerCase() == address.toLowerCase()) {
        let tweet = {
          'id': allTweets[i].id,
          'tweetText': allTweets[i].tweetText,
          'isDeleted': allTweets[i].isDeleted,
          'username': allTweets[i].username,
          'personal': true
        };
        updatedTweets.push(tweet);
      } else {
        let tweet = {
          'id': allTweets[i].id,
          'tweetText': allTweets[i].tweetText,
          'isDeleted': allTweets[i].isDeleted,
          'username': allTweets[i].username,
          'personal': false
        };
        updatedTweets.push(tweet);
      }
    }
    return updatedTweets;
  }
```

Fig.7 **Feed Component Code**

RESULTS

The smart contract is successfully created and is tested with the hardhat.

```
PS C:\Users\Asus\twitter_clone_project> npx hardhat test
888    888                         888 888                 888
888    888                         888 888                 888
888    888                         888 888                 888
8888888888  8888b.  888d888 .d88888 88888b.   8888b.  888888
888    888     "88b 888P"  d88" 888 888 "88b     "88b 888
888    888 .d888888 888    888  888 888  888 .d888888 888
888    888 888  888 888    Y88b 888 888  888 888  888 Y88b.
888    888 "Y888888 888     "Y88888 888  888 "Y888888  "Y888

Welcome to Hardhat v2.14.0
      ✓ Should emit an event on withdrawals
    Transfers
      ✓ Should transfer the funds to the owner

  Twitter Contract
    Add Tweet
      ✓ should emit AddTweet event
    Get All Tweets
      ✓ should return the correct number of total tweets (65ms)
      ✓ should return the correct number of all my tweets
    Delete Tweet
      ✓ should emit delete tweet event


  13 passing (5s)
```

Fig.8 **Hardhat Test**

CONCLUSION

• Summary of the project's objectives

The project "Twitter Using Blockchain" aims to increase the functionality and security of the popular social media Twitter by using blockchain technology. By applying blockchain into Twitter, the project aims to address existing challenges such as data privacy and user control over their own data.

The project utilizes Ethereum as the chosen blockchain platform due to its robust smart contract functionality, established ecosystem, and extensive developer support. Smart contracts are employed to automate various operations within the Twitter, including user authentication, tweet creation etc.

The blockchain based Twitter platform offers several advantages. It enhances data privacy by allowing users to have more control over their personal information and messages. By using blockchain's transparency and immutability, the platform can increase trust and accountability, making it more difficult for fake actors to manipulate information.

In summary, the project "Twitter Using Blockchain" aims to revolutionize the Twitter platform by making the use of the benefits of blockchain technology. By leveraging the transparency, security, and decentralization offered by blockchain, the project aims to create a more secure and user-centric social media platform.

• Insight gained from the project

The project "Twitter using Blockchain" has helped to learn various lesson and learnings. Some of these are as follows:

1. The project helped me to understand a problem and find out all the possible ways to get solution. It helped me in logic building and addressing a problem.

2. It helps me to learn emerging and decentralized technology blockchain. I gained various insights of the blockchain how it works and how the blockchain stores data that is different from that of storing on servers.

3. Learned about Ethereum blockchain and understanding its potential in development of decentralized apps.

4. Gained knowledge about test networks that is provided by blockchain, API and blockchain development platforms.

5. Learned about frontend technologies, smart contracts and solidity programming language.

6. The project helped me to learn about decentralized app development and how the various components work together to provide a user experience.

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- ✓ https://hardhat.org/hardhat-network/docs/overview

Project Daily Diary

Session: Jan–June 2023

Name of Students: Harsh Sahu

Enrollment Number: 0901ET191027

Branch and Year: Electronics and Telecommunication (Fourth Year)

Project Title: Twitter Using Blockchain

Month	Date	Daily Progress Details
Jan. 2023	9/01/23 16/01/23 33/01/23 30/01/23	• Start research for topics for major project • Start gaining knowledge about blockchain and its application • Studied about twitter and its functionality • Theoretical research and studies completed on the project
Feb. 2023	7/02/28 14/02/28 21/02/28 28/02/28	• Start learning about smart contracts and solidity language. • Building of smart contract started. • Learn about debugging of the smart contracts • Studied about deployment of the smart contracts.

March 2023	8/03/23 15/03/23 22/03/23 29/03/23	• Research about hardhat and learn how to use it • Tested the functionality of smart contracts using hardhat • Deployed the smart contract on Goerli TestNet network • Smart contract and backend work is completed.
April 2023	6/04/23 13/04/23 20/04/23 27/04/23	• Learned react and frontend technologies • Start developing front end of the project • Separate the frontend into components and start working on separate component • Sidebar and tweet box component work finished
May 2023	5/05/23 13/05/23	• Widgets, post and feed component also get finished. • Logos and final set up to the project is given.

29/05/23

Dr. Karuna Markam

Harsh Sahu
(0901ET191027)

MADHAV INSTITUTE OF TECHNOLOGY AND SCIENCE, GWALIOR

(A Govt. Aided UGC Autonomous and NAAC Accredited Institute, Affiliated to RGPV, Bhopal)

2022-2023

This is certified that Harsh Sahu has submitted the Major Project titled "**Twitter Using Blockchain**" with verified plagiarism report. As per the software Turnitin available online the, plagiarism content is 11% in total manner.

Date: ~~6/10/2020~~ 29/05/23

Harsh Sahu (0901ET191027)

29/05/23

(Dr. Karuna Markam) (Supervisor)

29/5/23

(Dr. Vandana Vikas Thakare) (Head of Dept.)

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