A Decentralized Social Media Platform with Sentiment Analysis Using Blockchain

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# Abstract

This research proposes a decentralized social media platform built on blockchain technology with integrated sentiment analysis using Natural Language Processing (NLP). Traditional social media platforms face issues such as data privacy breaches, central control, and lack of transparency. The proposed system utilizes Ethereum smart contracts and a decentralized architecture to enhance trust, ownership, and user privacy. Sentiment analysis is applied to user-generated content to gain insights and improve user interaction. The system is implemented using the Remix IDE, MetaMask wallet, Sanity database, and ReactJS frontend. This approach provides a transparent, secure, and scalable solution for the next generation of social networking applications.

# Keywords

Blockchain, Smart Contracts, Sentiment Analysis, Decentralized Social Media, Ethereum, NLP, DApp

# I. INTRODUCTION

Blockchain and smart contracts offer promising alternatives to centralized systems by ensuring transparency, immutability, and user ownership. With increasing digital interactions, particularly through social media, there's a growing demand for secure platforms that respect user privacy. Decentralized applications (DApps) enable such platforms by distributing control and eliminating intermediaries. This paper presents a blockchain-based social media platform that integrates automated sentiment analysis for real-time interpretation of user sentiments.

# II. LITERATURE REVIEW

Previous works have explored blockchain for financial services, privacy, and healthcare. ETH Relay by Frauenthaler et al. improved transaction validation for Ethereum. Sentiment analysis frameworks using Lexicon-based and machine learning techniques (Drus et al.) have demonstrated accuracy in analyzing public opinion. However, practical implementation in social media remains limited. The need for secure, real-world deployment in this space forms the basis for our proposed solution.

# III. MOTIVATION

Centralized social platforms like Twitter often compromise user data and control. Blockchain-powered networks eliminate this by ensuring data ownership and tamper-proof storage. Moreover, sentiment analysis can assist in gauging public opinion, trending topics, and user moods, making the platform more interactive and valuable.

# IV. RESEARCH CONTRIBUTION

- Developed a secure, decentralized social media application.  
- Integrated sentiment analysis using NLP.  
- Implemented Ethereum smart contracts with MetaMask and Sanity database.  
- Demonstrated improved security, privacy, and user engagement.

# V. PROPOSED SYSTEM

The DApp operates on the Ethereum blockchain and uses smart contracts for transaction validation. Users interact through a ReactJS frontend, connect wallets via MetaMask, and perform actions like tweeting, messaging, and sentiment analysis. Sanity DB stores profile and tweet data.

# VI. IMPLEMENTATION METHOD

Smart contracts are deployed using Remix IDE. The Tweet Book smart contract handles tweet-related actions. The frontend connects with MetaMask for authentication and ether transactions. A flowchart illustrates the complete user journey from wallet connection to posting tweets and analyzing sentiments.

# VII. SYSTEM ARCHITECTURE

Components include:  
- Frontend (ReactJS)  
- Backend (NodeJS server)  
- Blockchain (Ethereum)  
- Database (Sanity.io)  
- Load balancer for performance optimization

# VIII. RESULTS AND DISCUSSION

Screenshots demonstrate each step, including wallet connection, tweet posting, sentiment scoring, and secure message exchange. Sentiment scores help classify tweets and influence the user interface dynamically.

# IX. CONCLUSION AND FUTURE SCOPE

This work presents a functional decentralized Twitter-like application integrating blockchain and sentiment analysis. It improves user privacy, eliminates intermediaries, and enhances transparency. Future enhancements include multi-language support, mobile app deployment, and extension to platforms like Facebook or LinkedIn.

# ACKNOWLEDGEMENT

We express sincere gratitude to Prof. Vivek Pandey for his guidance and to all contributors to this project.

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