

# **DR. AMBEDKAR INSTITUTE OF TECHNOLOGY**

(Affiliated to VTU, Belgaum)

Mallathahalli, Bengaluru - 560056



A MINI-PROJECT SYNOPSIS

ON

**“Decentralized NFT Minting and Marketplace Platform”**

**Submitted by**

KARTHIK V D – 1DA21CS073

HAJARATALI S MOGALALLI – 1DA22CS409

**Under the Guidance of**

**DR. SMITHA SHEKAR B**

Associate Professor

Department of CSE

**Department of Computer Science & Engineering**

**Dr. Ambedkar Institute of Technology**

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## **Introduction:**

The advent of blockchain technology has opened up new frontiers in digital asset management and ownership. Among the most groundbreaking applications of this technology is the creation and trade of Non-Fungible Tokens (NFTs), which allow for the unique representation of digital items on the blockchain. This project, titled "Decentralized NFT Minting and Marketplace Platform," aims to develop a comprehensive platform where users can mint, buy, sell, and trade NFTs in a decentralized manner. By leveraging the Ethereum blockchain and smart contracts, this platform will ensure transparency, security, and immutability in all transactions, thereby fostering trust and broadening access to digital asset markets.

## **Literature Review:**

The concept of NFTs, which are unique digital assets verified using blockchain technology, has garnered significant attention in recent years. Pioneering platforms like OpenSea and Rarible have set the stage for decentralized marketplaces where users can trade NFTs representing art, music, virtual real estate, and more. Research indicates that NFTs can revolutionize digital ownership by ensuring provenance and preventing duplication (Dowling, 2021). However, challenges such as high transaction fees and complex user interfaces persist (Ante, 2021). This project seeks to address these challenges by providing a user-friendly interface and integrating efficient smart contract solutions to minimize costs.

## **Objectives:**

Develop a user-friendly platform for minting NFTs: Simplify the process of creating NFTs, allowing users with minimal technical knowledge to participate.

Create a decentralized marketplace: Enable users to list, buy, and sell NFTs securely and transparently.

Ensure low transaction costs: Implement efficient smart contract designs to reduce gas fees.

Provide secure and decentralized storage: Utilize IPFS for storing NFT metadata, ensuring data integrity and availability.

Facilitate user authentication: Integrate with MetaMask to allow secure and straightforward user authentication.

## **Methodology:**

### **Platform Architecture:**

#### **Frontend Development:**

Build the user interface using React.js to ensure a responsive and intuitive user experience.

Backend Development: Use Node.js and Express to handle API requests and interactions with the Ethereum blockchain.

Smart Contracts: Develop ERC-721 compliant smart contracts for NFT creation and a marketplace contract for handling trades.

Storage: Integrate IPFS for decentralized storage of NFT metadata.

**Development Process:**

Smart Contract Implementation: Write and deploy smart contracts on the Ethereum testnet using Hardhat or Truffle.

Backend Integration: Develop API endpoints to interact with smart contracts, handling minting, listing, buying, and selling NFTs.

Frontend Integration: Connect the frontend with the backend and blockchain, enabling users to mint and trade NFTs seamlessly.

Testing: Conduct thorough testing on the Ethereum testnet to ensure the functionality and security of smart contracts and the platform.

Requirement Specifications

Technical Requirements:

Languages: Solidity, JavaScript, HTML, CSS, motoko

Frameworks: React.js, Node.js, Express, web3, DApps

Blockchain: Ethereum

Tools: MetaMask, Hardhat/Truffle, IPFS

**Functional Requirements:**

User Authentication: Integration with MetaMask for secure user login.

NFT Minting: User-friendly interface for minting NFTs.

Marketplace Functionality: Ability to list, buy, and sell NFTs.

Storage: Decentralized storage of NFT metadata using IPFS.

**Non-Functional Requirements:**

Scalability: Ensure the platform can handle a growing number of users and transactions.

Security: Implement robust security measures to protect user data and transactions.

Usability: Design an intuitive and easy-to-navigate interface.

**Application of the Project:**

This platform will serve as a comprehensive tool for artists, creators, and collectors to engage with the NFT ecosystem. Artists can mint their digital creations as NFTs, ensuring ownership and provenance. Collectors can buy, sell, and trade these NFTs in a secure and transparent marketplace. The decentralized nature of the platform will appeal to users seeking transparency and security, while the user-friendly interface will make it accessible to those with minimal technical expertise. By providing a seamless and efficient way to interact with NFTs, this project aims to contribute significantly to the growing digital economy and the mainstream adoption of blockchain technology.