**Decentralized Finance (DeFi) Security Platform**

**PROACTIVE FRAUD MITIGATION FOR BLOCKCHAIN TRANSACTIONS**

**Project Overview**

A full-stack DeFi security platform combining on-chain smart contract guards, ML-based anomaly detection, and real-time dashboards. The system actively monitors, detects, and blocks fraudulent transactions across DeFi protocols.

**Key Features & Architecture**

**1. Smart Contract Guard (Solidity)**

* Guard.sol halts suspicious activity, implements thresholds, anti-pattern filters, and emergency pause.  
  **2. ML-powered Anomaly Detection**
* Flask backend with ML model (trained via DeFiVulnLabs) detects fraud patterns in real-time.  
  **3. Oracle Contract**
* Bridges off-chain fraud signals to the on-chain guard.  
  **4. Visualization Dashboard**
* Intuitive frontend (React) with live DeFi metrics, triggers & notification on anomalies.

**(Visual suggestion**: Architecture diagram showing the flow: User Tx → Backend ML → Oracle → Guard.sol → UI update.)

**Limitations of Existing Solutions**

* Current DeFi security tools often miss zero-day attack vectors and are unable to trigger on new, evolving fraud tactics.
* Response times are slow; most require manual intervention.
* Incomplete integration between on-chain and off-chain detection.

**Project Solution**

* Tight integration of ML-based detection and on-chain enforceable controls (solidity guards).
* End-to-end real-time blocking, alerting, and transaction pausing.
* Unified visibility and control UI for operators.

**Roadmap & Timeline**

| **Week** | **Milestone** |
| --- | --- |
| 1 | Finalize scope, define team roles, set up repository |
| 2–3 | Build Guard.sol (thresholds, anti-patterns, pause) |
| 4 | Test vault, deploy to Hardhat & BlockDAG devnets |
| 5–6 | Develop Flask+ML anomaly detection engine |
| 7 | Build Oracle contract, deploy & connect backend |
| 8–9 | Frontend dashboard with real-time visualization |
| 10 | Integrate end-to-end transaction-to-UI flow |
| 11 | Simulate 2 real attacks; document blocked threats |

**(Visual suggestion**: Gantt chart or timeline bar with key icons for each phase.)

**Tech Stack**

* **Smart Contracts:** Solidity (Guard.sol, Oracle)
* **Backend/Detection:** Python (Flask, scikit-learn, DeFiVulnLabs)
* **Frontend:** React.js, Web3.js, real-time alerts/notifications
* **Infrastructure:** Hardhat, BlockDAG Testnet, MetaMask

**Github Repository of Project  - https://github.com/tanishqkolhatkar93/Defi-Security-BlockDAG**