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Final Project Proposal

Project Objectives overview

This project proposes a decentralized application that adds security and transparency to the traditional pawn shop experience. By using unique tokens to represent pawned items, our proposed platform maintains transactional integrity and facilitates the conversion of physical assets into cryptocurrency. This approach allows pawners to remain anonymous while making all previous transactions visible. This enables buyers to verify the fairness of prices and pawners to access historical interest rates. Additionally, the requirement for pawn shops to provide a stake prevents premature selling of items, while tokens serve as proof of ownership, helping to eliminate disputes and reduce fraud risks. This transparency helps to promote legitimacy and improved marketplace experience for all involved parties.

Scope

This project is focused on developing a DAPP for a blockchain based pawnshop, intended to act as a proof-of-concept (POC). This POC aims to showcase the basic functionalities and the potential of our methodology. However, it does not include many of the critical security controls and usability considerations associated with web application development. This project involves a full stack approach, where an Angular frontend communicates with a backend API. This API then uses ethers.js to interact with the smart contracts on the blockchain. The business logic of the application occurs within the smart contracts, involving the use of tokens to represent pawned items, streamlining and legitimizing the pawning industry. This project is designed to

demonstrate how blockchain technology can be applied to traditional pawnshop operations, though in a simplified manner for the scope of this project.

Problem statement

Traditional pawn shops can be somewhat of an untrusted transaction and often have a stigma surrounding them. Pawn shops have the ability to charge high interest rates and change the price of goods as they see fit. Additionally, those pawning goods often have to give personal information in order to receive funds. Pawn shops in some cases also do not have proper processes for tracking transactions and goods. Ownership of an item can be disputed and a pawn shop may sell an item before the given term, if a record is tampered with. Our solution looks to effectively solve these problems using the blockchain and the inherent trust achieved with the blockchain's record keeping and immutability.

Expected outcomes

By the end of this project it is expected that we will have a fully functional full stack application. We will have a user interface with an easy to understand and effective GUI. After the user logs in and makes a transaction, the website will send the information to a centralized server. At this point the server will make calls using a custom API we create to our developed smart contracts living on the blockchain. As this is a proof of concept we will not test more than one connection or request at a time. The contract will then do the main transactions and record keeping that gives this solution its secure design. The information will then be passed back to the centralized server and from there feedback and a coin representing the pawned object will be returned to the user through the web interface.

Methodology

Our design methodology can be broken up into a few main pieces. Smart contracts will be used to handle the business logic, such as user authentication, token creation, and finance-related management. The token creation will use ERC20 tokens to represent the user's pawned item. These smart contracts will be programmed in Solidity and completely decentralized. We will then create centralized servers that run the frontend and the backend. The frontend server will use Node JS and Angular to take input from the user, contact the backend API, and display the changes back to the user's view. The backend server will also use Node JS, and we will be using Ethers to contact the blockchain, perform business operations, and return the required data to the user. This backend server will require custom API routes for the front end to use, and it will require custom calls to the decentralized smart contracts.

Significance

The significance of this project is to help increase accessibility to pawning services, as well as to work towards a trustless pawning system via staking. Currently, when a customer pawns an item as a loan, they trust that the business will not sell their item before their return period is up. Through the use of staking and uniquely identifiable tokens, our system aims to limit trust in the pawning industry by helping create and complete transactions more reliably.