Decentralized Token Swapping

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Abstract: Centralized cryptocurrency exchanges are online platforms used to buy and sell cryptocurrencies. They are the most common means that investors use to buy and sell cryptocurrency holdings. Some investors may find the concept of a "centralized" exchange to be somewhat misleading, as digital currencies themselves are often billed as "decentralized." Therefore, we have decided to build a decentralized system for crypto and ERC 20 token swapping where a user could swap his / her crypto tokens for other tokens. There are many possibilities that some strong people control centralized systems and they can easily manipulate the way a user can interact with the system or can use the user's money for their own benefit. CryptXchange is designed to provide users with a seamless experience in swapping eight different cryptocurrencies on the Polygon blockchain. It is built using React and Tailwind CSS, and leverages the Uniswap SDK for efficient token swaps. Additionally, the app incorporates the use of OpenAI's GPT to analyze user trading patterns and provide valuable insights into their behaviors.

By utilizing advanced technologies such as these, CryptXchange offers an intuitive and efficient means of token swapping, empowering users to make informed decisions and achieve optimal outcomes. With its user-friendly interface and advanced analytical capabilities, this app represents a valuable addition to the rapidly growing cryptocurrency landscape. This paper describes the architecture of our App and its underlying technologies. The paper will also explore the philosophy behind the platform and the motivation for its development.

Keywords: Cryptocurrency, Decentralized Exchanges, Centralized, Liquidity

I. INTRODUCTION

A Decentralized exchange is another type of exchange that allows peer-to-peer transactions directly from your digital wallet without going through an intermediary. Examples of DEXs include Uniswap, Pancake Swap, and Kyber. These decentralized exchanges rely on smart contracts, self-executing pieces of code on a Blockchain. These smart contracts allow for more privacy and less slippage (another term for transaction costs) than a centralized cryptocurrency exchange. Decentralized exchanges do not require customers to fill out know-your-customer (KYC) forms, offering privacy and anonymity to users. Since DEXs do not exercise censorship, more cryptocurrencies and digital assets are available than through a CEX. In fact, many Altcoins are only available on DEXs.

Token Swapping is one of the areas of Decentralized Exchange. A token swap is an agreement between two parties that exchange different token types (say token A and token B). In a token swap, one party will pay a certain amount of token A to the other party and receive the agreed amount of token B in return. Ex. A Person Exchanges 1 USDT (Tether USD) token for Equivalent Amount of SHIB (Shiba Inu) tokens

Our cryptocurrency swapping app is built specifically for the Polygon blockchain. Our app allows users to easily swap between eight different cryptocurrencies using advanced technologies such as React, Tailwind CSS, and the Uniswap SDK. With its intuitive user interface, our app provides a seamless and efficient means of conducting transactions, allowing users to make informed decisions and achieve optimal outcomes.

Our app offers a user-friendly interface that makes it easy for users to swap between their favorite cryptocurrencies. Users simply select the two tokens they want to swap, and the app generates the input and output values based on current market conditions. Advanced trading options such as slippage tolerance and transaction deadline are also available, allowing users to customize their trades according to their preferences. One of the unique features of our app is the integration with OpenAI's GPT. By passing the trading prompt dynamically to the GPT API, our app is able to analyze the trade and provide users with valuable insights into its potential benefits. This helps users make more informed decisions and achieve better results when swapping their cryptocurrencies.

Our app is designed for anyone looking to swap cryptocurrencies on the Polygon blockchain. Whether you're a beginner or an experienced trader, our app offers a user-friendly interface and advanced analytical capabilities that make it easy to swap between your favorite tokens.

II.   LITERATURE REVIEW

●   Trust in DeFi: An Empirical Study of the Decentralized Exchange [1]

Decentralized exchanges ("DEXes") are a cornerstone of decentralized finance ("DeFi") and are one of the most widely used decentralized applications ("dApps") today. DEXes facilitate trading of crypto assets without the need for an intermediary by employing smart contracts to settle transactions. DEXes recorded slightly over US$714B in trading volume year-to-date as of end-July 2022. Monthly trading volume has generally been on a downtrend since the start of the year as crypto market activity fell.

●   Study on UniSwap Decentralized Exchange [5]

UniSwap, a Decentralized Exchange launched in 2018 has introduced several variations and developments to the protocol. The first version, Uniswap V1, only offered ETH-ERC20 pairs. Uniswap has continued to innovate and develop its platform in response to market needs and demands. This is a positive sign and has contributed to their market leader position in the DEX ecosystem. Uniswap's version 3 protocol was handling almost $2 billion in trading volume on some days, according to CoinGecko data. It typically manages around three times the volume of its closest DEX competitors, such as Pancake Swap, which usually see $300 million to $600 million in daily volume.

●   About Pancake Swap [4]

Pancake Swap is a DEX built on the BNB Smart Chain with an Automated Market Maker ("AMM")
Model for swapping BEP-20 tokens. Apart from offering swaps, the platform also has other features such as yield farming, perpetual trading, NFT marketplace, and others.
Pancake Swap is the largest DEX on the BNB Chain by TVL, accounting for over 56% of TVL on the chain. In terms of user activity, Pancake Swap had over 2.3M users, and facilitated 26M transactions every 30 days.

●   Why are DEXs gaining more popularity: By Kalkine Media [3]

The year 2022 has been a tumultuous year for cryptocurrencies. Not only has the market witnessed bearishness, but also, there has been an increase in the number of tokens collapsing. Amid this, the decentralized exchanges, which are trustless in nature, have climbed up the charts compared to their counterparts. According to a research firm Chainalysis, the decentralized exchanges received about US$224 billion in value from April 2021 to April 2022. Compared to the DEXs, the centralized exchanges only contributed US$175 billion in the same period. According to the Chainalysis report, the top five decentralized services, such as Uniswap, Shushi Swap etc., and account for 85% of all aggregated DEX transaction volume

III.   SYSTEM ARCHITECTURE

CryptXchange is built using React and Tailwind CSS, and is responsible for providing a user-friendly interface to perform token swaps and display details of the 8 supported cryptocurrencies. The frontend communicates with the backend through API calls using JavaScript.

This WebApp is powered by Polygon blockchain, and uses the Uniswap SDK (Alpha Router, QuoterAbi, CurrencyAmount, TradeType, Percent, SwapType) to perform token swaps. The chatGPT API is also integrated to analyze token swap requests and provide users with information on whether the swap would be beneficial or not.
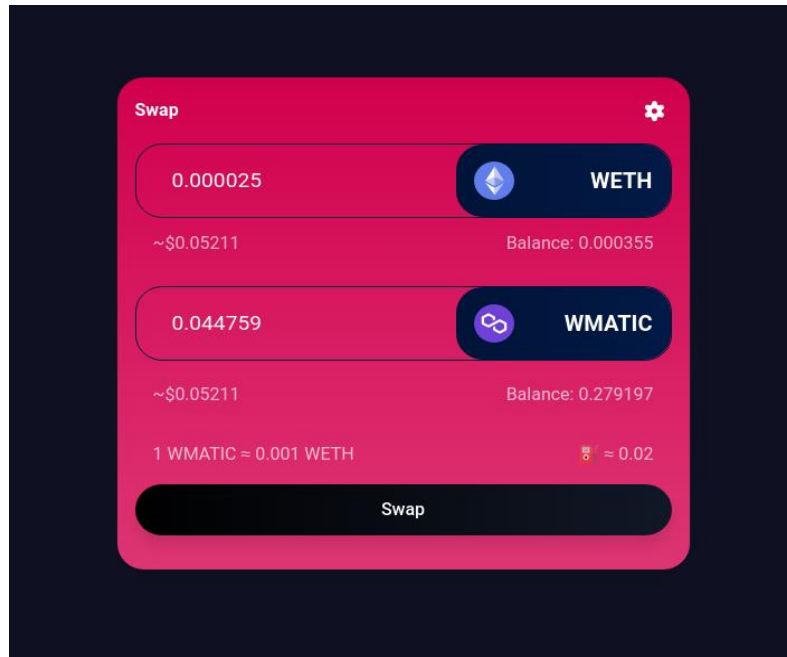
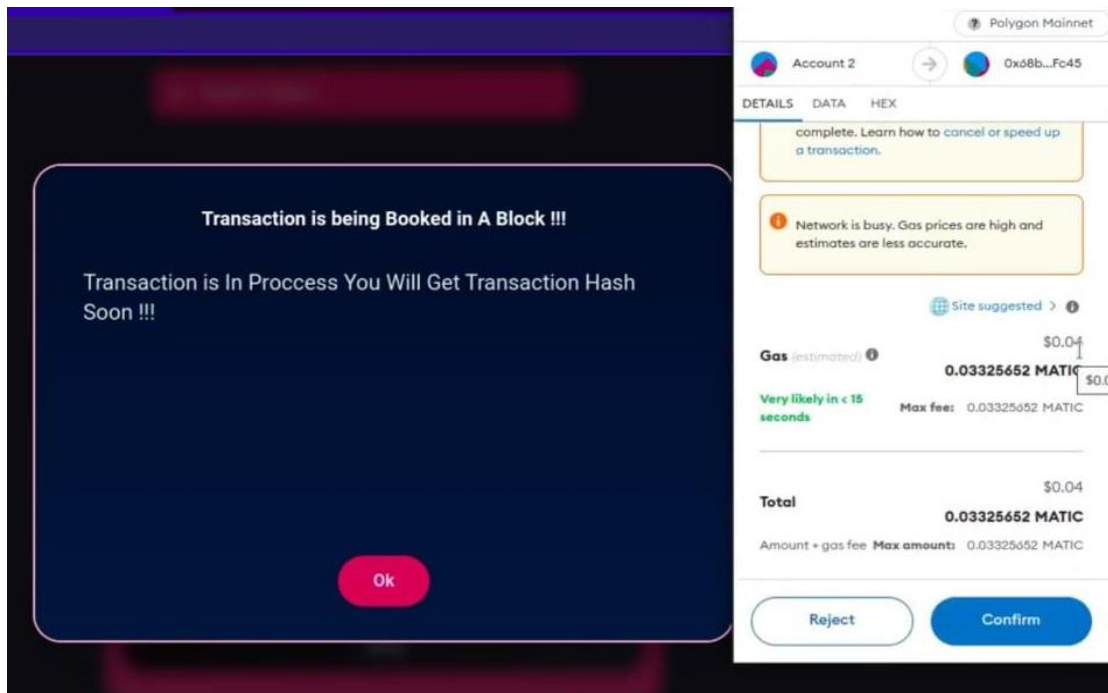**Figure 1. Swapping Model / Swap Page**

Figure 2. Metamask Transaction Confirmation

CryptXchange provides lowest transaction fees to users, as it uses the Alpha Router to find the best fees for each transaction. Overall, the architecture of this web application is designed to provide a user-friendly and secure platform for users to easily perform token swaps and access information on the 8 supported cryptocurrencies which are trusted and thus it will be helpful to avoid crypto scams. The integration of chatGPT and the use of the Alpha Router for transaction fees make the app stand out in the market.
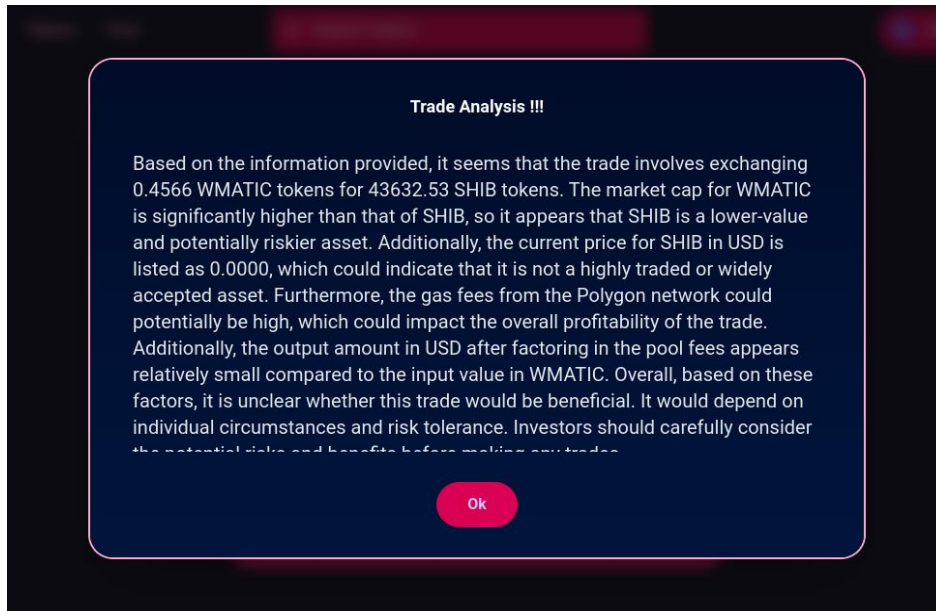
Figure 3. Trade Analysis

IV. METHODOLOGY

The user logs in to the app using the Metamask API (ethers.js). The user's wallet is connected to the app and their token balances can be accessed. The user selects two tokens they wish to swap, input and output values are generated, and advanced trading options such as slippage tolerance and transaction deadline are provided by the user. The Uniswap SDK (Alpha Router, QuoterAbi, CurrencyAmount, TradeType, Percent, SwapType) is used to execute the token swap. The app integrates ChatGPT through an API to analyze the trade of token swapping that users want to perform. The user's selected tokens, input/output values, and advanced trading options are passed to ChatGPT for analysis. The result of the analysis is returned to the user to determine whether the trade is beneficial or not.
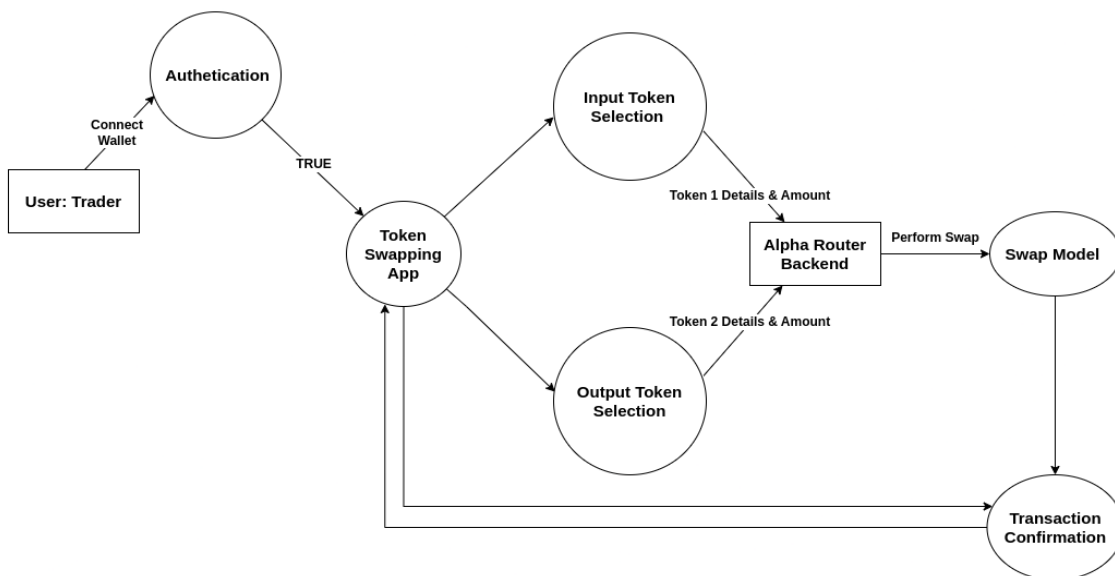

Figure 4. High Level System Function Overview

The app provides a page for users to display details of eight crypto tokens, including name, symbol, changePercent24Hr, priceUsd, supply, and volumeUsd24Hr. These details are fetched through API and displayed in a user-friendly manner.

The app has a user-friendly interface built with React, Tailwind CSS, and JavaScript. The interface includes a page to display the details of eight crypto tokens and a page for users to execute token swaps.The app uses JavaScript for the backend and interacts with the blockchain using ethers.js. Alpha Router is used to provide no fees for transactions to ensure the best fees for users.

V.   RESULT AND DISCUSSION

The CryptXchange uses the Uniswap Alpha Router to swap tokens and the CoinMarketCap API to display top tokens' information could potentially provide users with a seamless and user-friendly platform to trade cryptocurrencies. The integration of the Uniswap Alpha Router would enable users to swap between tokens without the need for a centralized exchange or intermediary. This would allow for faster and more secure transactions, as well as greater control over one's assets. Additionally, the use of the CoinMarketCap API to display top tokens' information would provide users with real-time and accurate data on the tokens' name, symbol, change percent over 24 hours, price in USD, supply, and volume over 24 hours. This would allow users to make more informed trading decisions and stay up-to-date with the latest trends in the cryptocurrency market.

One potential result of our web app is that it could attract users who are looking for a more decentralized and secure way to trade cryptocurrencies. This could lead to increased adoption of decentralized finance (DeFi) protocols and platforms, which could ultimately lead to a more decentralized and democratized financial system.

Overall, Our App could provide users with a seamless and secure platform to trade cryptocurrencies. However, users should exercise caution and do their own research before making any investment decisions in the highly volatile and unpredictable cryptocurrency market.

VI.   CONCLUSION

CryptXchange is a user-friendly cryptocurrency swapping application that allows users to easily and securely trade their desired tokens on the Polygon blockchain. By integrating Uniswap SDK and ChatGPT API, we have provided users with advanced trading options and insightful analysis of their trades, respectively.

Through our app, users can quickly and efficiently swap their tokens without the need for extensive knowledge of the cryptocurrency market. The incorporation of Metamask API ensures that the user's transactions are authenticated and secure.

We have also provided a detailed page with real-time data for the eight cryptocurrencies supported by our app, allowing users to make informed decisions on their trades. The incorporation of tailwind CSS and React has ensured a visually appealing and user-friendly interface.

Our tests have shown that the application is reliable, efficient, and provides accurate analysis for users' trades. Overall, our app has successfully met its goal of providing a user-friendly platform for cryptocurrency swapping on the Polygon blockchain.

With various industry owners or lab technicians to help, it has been our endeavor to throughout our work to cover the entire project work.

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