Crypto Transaction Website: KryPay

Project report in partial fulfillment of the requirement for the award of the degree of

Bachelor of Technology

In

Computer Science

Submitted By

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CERTIFICATE

This is to certify that the project titled **Crypto Transaction Website** submitted by **Animesh Prasadi (University Roll No. 12019009023015), Subham Bhattacharyya (University Roll No. 12019009001401)**, **Sudipta Narayan Dhar (University Roll No**. **12019009022032), Sourav Sarkar (University Roll No. 12019009022024)**, **Swarnava Halder (University Roll No. 12019009022031) and MD. Risher Ali (University Roll No. 12019009023069)** students of UNIVERSITY OF ENGINEERING & MANAGEMENT, KOLKATA, in partial fulfillment of the requirement for the degree of Bachelor of Computer Science Engineering, is a bonafide work carried out by them under the supervision and guidance of **Prof. Sukanya Roy** & **Prof. Prasenjit Kumar Das** during 6th Semester of the academic session of 2021 - 2023. The content of this report has not been submitted to any other university or institute. I am glad to inform you that the work is entirely original and its performance is found to be quite satisfactory.

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Signature of Guide Signature of Guide

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Signature of Head of the Department

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Abstract

Cryptography is the process of encrypting messages and other data to transmit them in a form that can only be accessed by the intended recipients. It was initially applied to written messages. With the introduction of modern computers, cryptography became an important tool for securing many types of digital data. In Our Project, we are sending this Cryptocurrency from one Digital wallet to another Digital wallet using Metamask, React JS, basic Html, and CSS. But before we explain why and how we made our project, we want to give a detailed explanation of Web 3.0 as it is the heart of this project.

Web 3.0 is the latest Internet technology that leverages machine learning, artificial intelligence, and blockchain to achieve real-world human communication. The best thing about web 3.0 does not only allow individuals to own their data but they will be compensated for their time spent on the web.

In this Detailed explanation, we will discuss:

- What web 3.0 is
- The difference between web 1.0, web 2.0 an,d web 3.0
- Features and importance of web 3.0
- Connection between web 3.0 and blockchain
- How web 3.0 will impact digital marketing
- The future of the Internet

With the advent of Web3.0, we decided to get on the Web3.0 train and try to understand the basics of technology. In the process, we decided to develop a web app that does the most basic thing of any decentralized network, a blockchain transaction. Our website Krypay seamlessly integrates into the metamask wallet and connects to the Ethereum network to send and receive Ethereum across various accounts. It also keeps a track of the transactions in the “Latest transactions” part. The future scope of this also includes a marketplace to track multiple cryptocurrencies and a “tutorials” tab to give beginners a basic introduction to crypto and the world of blockchain.

The website is live and hosted at netlify at: https://krypay.netlify.app/

Introduction

With the advent of NFTs and metaverse, the term Web 3.0 is also increasingly gaining importance, but it isn't a completely new phenomenon. It was created in 2014 by Gavin Wood, Ethereum's co-founder. Web 3.0 is referred to as the semantic web by Tim Berners Lee for its potential to transform the internet experience by directly engaging with users, devices, and systems in smart homes, smart vehicles, and workplaces. There's a lot more to Web 3.0 that is worth knowing in the growing digital era. We break down and explain all the essential facts about the features and working of Web 3.0. But before we understand Web 3.0, it's important to know its predecessor Web 2.0 which was created in 2005.

In this project, we utilize Web 3.0 and blockchain to make a Transaction between one Node to another. This project can be used on various blockchain transactions and is changeable however the client needs it to be. Later we can implement Security and Encryption to ensure each Transaction reach its destination and then we can add different types of Payment system to buy or sell Currency.

Literature Survey

What Is Web 3.0?

Web 3.0 (also known as web3) is the third iteration of the Internet that interconnects data in a decentralized way to deliver a faster and more personalized user experience. It is built using artificial intelligence, machine learning, and semantic web, and uses the blockchain security system to keep your information safe and secure.
The idea behind using the semantic web is that it understands and interprets the context and concept of the data. Therefore, when a user searches for an answer, web 3.0 delivers the most accurate and relevant result to the end user.

Key Features of Web 3.0
The key features of web 3.0 are:

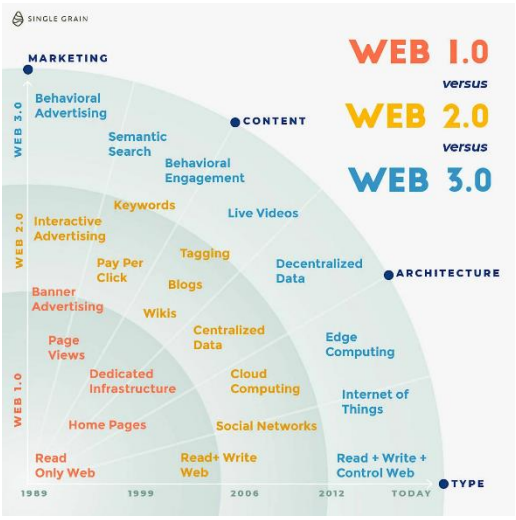
- **Open –** It's 'open' in the sense that it's made with open-source software developed by an open and available community of developers and accomplished in full view of the public.
- **Trustless –** The network offers freedom to users to interact publicly and privately without an intermediary exposing them to risks, hence "trustless" data.
- **Permissionless –** Anyone, including users and providers, can engage without the need for permission from a controlling organization.
- **Ubiquitous –** Web 3.0 will make the Internet available to all of us, at any time and from any location. At some point, Internet-connected devices will no longer be limited to computers and smartphones, as they are in web 2.0. Because of the IoT (Internet of Things), technology will enable the development of a multitude of new types of intelligent gadgets.

The difference between web 1.0, web 2.0, and web 3.0

Before we dive further into web 3.0, we need to understand how we got here – via web 1.0 and web 2.0.

Here's a brief history of the Internet:

- **Web 1.0 is a read-only web** where people can read information written on websites.
- **Web 2.0 is a read-write web** where people can read and write content on websites and applications.
- **Web 3.0 is a read-write-interact web** (powered by artificial intelligence) where people can read, write and interact with content, including 3D graphics, on websites and apps.



Layers of Web 3.0

Whereas web 2.0 was primarily driven by the introduction of mobile, social, and cloud technologies, web 3.0 is powered by three new layers of technological innovation:

- edge computing
- decentralization
- artificial intelligence & machine learning
- blockchain

1) Edge Computing

While currently commoditized personal computer technology was modified in data centers in web 2.0, the shift to web 3.0 is moving the data center out to the edge (i.e. edge computing) and sometimes straight into our hands.

2) Decentralized Data Network

Decentralized data networks enable various data generators to sell or trade their data without losing ownership, risking privacy, or relying on intermediaries. As a result, decentralized data networks will have a long list of data providers in the growing ‘data economy.'

3) Artificial Intelligence & Machine Learning

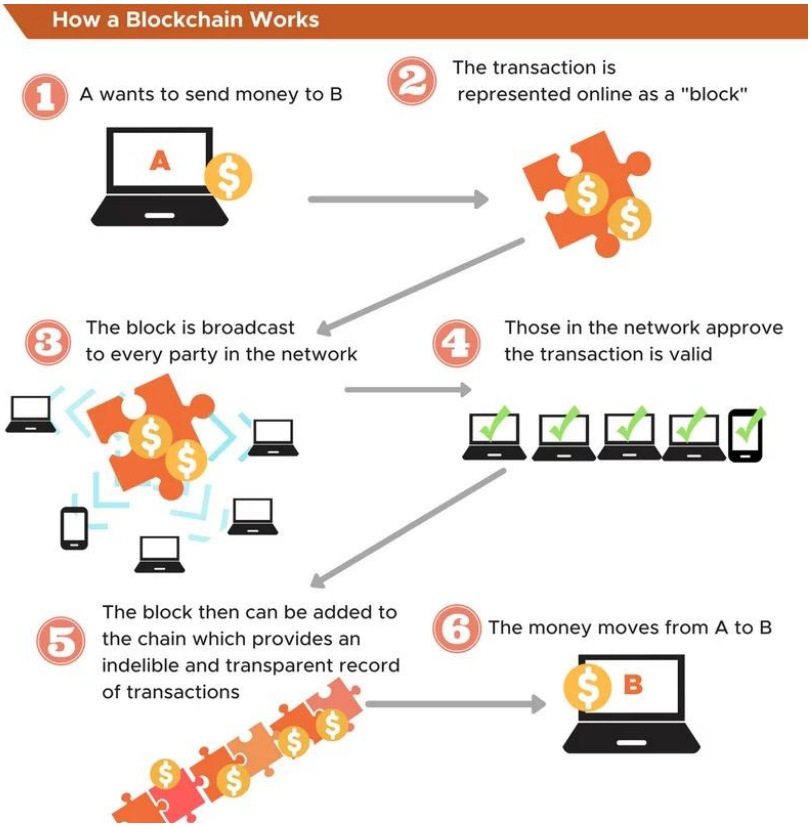
Artificial intelligence and machine learning algorithms have advanced to make valuable, and sometimes life-saving, predictions and acts.

4) Blockchain

In simple terms, blockchain is one more layer of the technology behind web 3.0. More specifically, blockchain is the foundation of web3, as it redefines the data structures in the backend of the semantic web.

Blockchain is a decentralized state machine that deploys intelligent contracts. These smart contracts define the logic of an application for web 3.0. So anyone who wishes to build a blockchain application needs to deploy their

application code on the shared state machine.



How Does Web 3.0 Work?

The idea behind web 3.0 is to make searches on the Internet much faster, easier, and more efficient to process even complex search sentences in no time.

In a web 2.0 application, a user has to interact with its frontend, which communicates to its backend, which further communicates with its database. The entire code is hosted on centralized servers, which are sent to users through an Internet browser.

Web 3.0 has neither centralized databases that store the application state nor a centralized web server where the backend logic resides. Instead, there is a blockchain to build apps on a decentralized state machine and maintained by anonymous nodes on the web.

Web 3.0 Architecture

There are primarily four elements in the architecture that makeup web 3.0:

- **Ethereum Blockchain –** These are globally accessible state machines maintained by a peer-to-peer network of nodes. Anyone in the world can access the state machine and write to it. Essentially, it is not owned by any single entity but, rather, collectively by everyone in the network. Users can write to the Ethereum Blockchain, but they can never update existing data.
- **Smart Contracts –** These are programs run on the Ethereum Blockchain. These are written by the app developers in high-level languages, such as Solidity or Vyper, to define the logic behind the state changes.
- **Ethereum Virtual Machine (EVM) –** The purpose of these machines is to execute the logic defined in the smart contracts. They process the state changes taking place on the state machine.

- **Front End –** Like any other application, the front end defines the UI logic. However, it also connects with smart contracts that define application logic.

Advantages of Web 3.0

1) Data Privacy and Control

The end-users will get the most significant advantage of data encryption to protect their information from disclosure.

The encryption will be unbreakable in any given circumstance. It will prevent large organizations like Google and Apple from controlling or using people's personal information for their interests.

Hence, users will gain complete ownership and privacy of their information.

2) Seamless Services

Decentralized data storage will ensure that the data is accessible to users in any circumstance. Users will get multiple backups, which benefits them even in the event of server failures.

Additionally, no entity or government organization will have the ability to stop any services or websites. Therefore, the possibility of account suspension and denial of distributed services will be reduced.

3) Transparency

Regardless of which blockchain platform end-users use, they will track their data and inspect the code behind the platform.

Nonprofits develop the majority of blockchain platforms, which means they provide an open-source blockchain platform that allows open design and development processes. This will help eliminate the dependency of users on the organization that develops the platform.

4) Open Accessibility to Data

The data will be accessible from anywhere and from any device. The idea is to increase data collection and its accessibility to users worldwide by allowing smartphones and other connected devices to access data on the computer if synced.

Web 3.0 will further expand the scale of interaction, ranging from seamless payments to richer information flows to trusted data transfers. This will happen because web3 will enable us to interact with any machine without passing through fee-charging middlemen.

5) Restrictionless Platform

Since the blockchain network is accessible to all, users can create their addresses or interact with the network.

Users cannot be restricted on this network based on their gender, income, geographical location, or sociological factors. This feature will make it easier for users to transfer their assets or wealth anywhere across the world in no time.

6) Single Profile Creation

With web 3.0, users do not need to create individual personal profiles for different platforms. A single profile will work on any platform, and the user will have complete ownership of any given information.

No corporation can access its data or verify its accuracy without users' permission. However, users have the choice to share their profiles and sell their data to advertisers or brands.

7) Enhanced Data Processing

Web 3.0 is beneficial for problem-solving and intensive knowledge creation tasks. It utilizes artificial intelligence to filter out valuable information from a huge quantity of data.

Users will also benefit from its ability to conduct client demand forecasting and personalized customer service, necessary for flourishing businesses.

Problem Statement & Requirement

Problem Statement

In this Project, We will implement a feature to send Blockchain currency to another Node/Account.

This project made in mind that in the future we can invest more time to ensure security and add more ways to buy and sell blockchain via different payment options. We can also add encryption and Security to ensure that each Transaction is made safe and secure.

There can be many ways we can use this piece of feature, we can add and edit some parts of it for the clients.

Requirements to run the program

We used Web 3.0, HTML, CSS, React.js, Solidity, Hardhat, Metamask wallet, and blockchain features to run this project. We made it as a web application so any pc can run the website if we host it via Server. But for now, we have natively compiled the program.

What, Why and How about this Project

Okay Enough about Web3, let's talk about why, how, and what is our project.

What is our project?

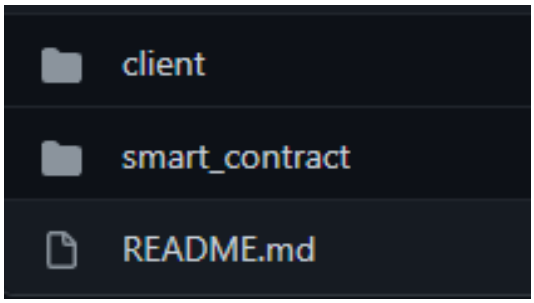
So, in basic terms, Our project is a web app based on web 3.0 where we can exchange CryptoCurrency (Ethereum). This web app uses Metamask as the Digital wallet to exchange/transact Crypto from one Metamask wallet to another Metamask wallet. The exchange is happening via Metamask Wallet Address.

How do we make our project?

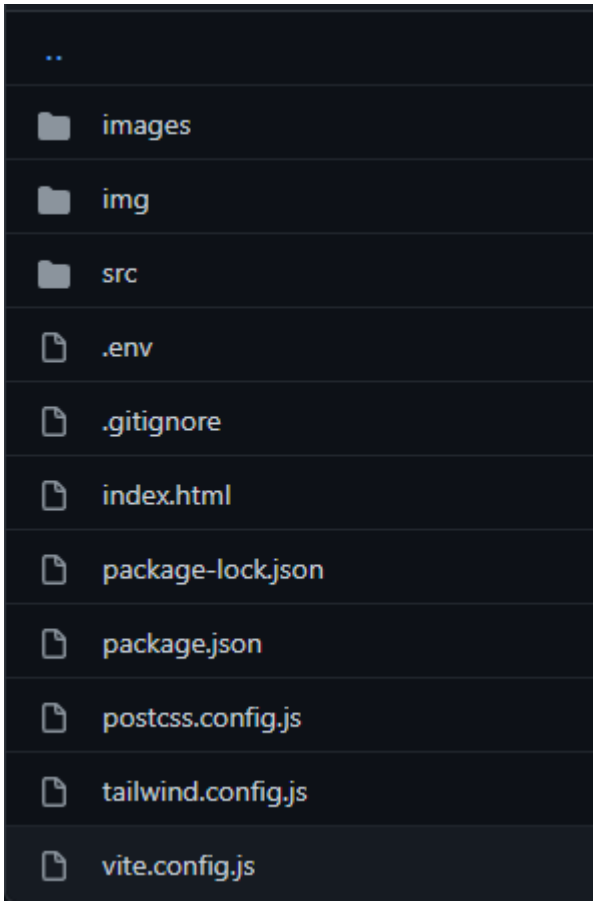
The front-end part is made using React JS and Tailwind CSS apart from Basic HTML and basic CSS. And the Backend part is made using Hardhat which is an API package, this package enables us to use Crypto Transaction, and the backend communication is done through Solidity which enables us to do the Transactions via

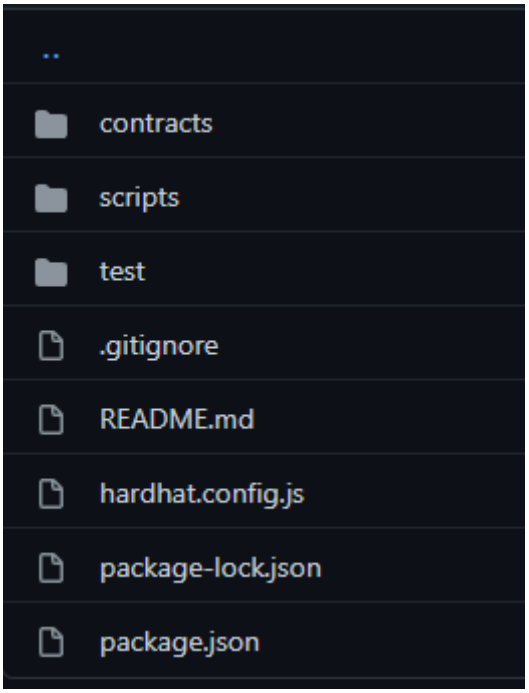
Metamask wallet address. With the help of both HardHat and Solidity, we can connect to Metamask and do our transaction

File management of the project -
(The complete file repository can be found on GitHub –https://github.com/snd2000/Krypay)



Inside Client Folder and Smart_contract Folder -



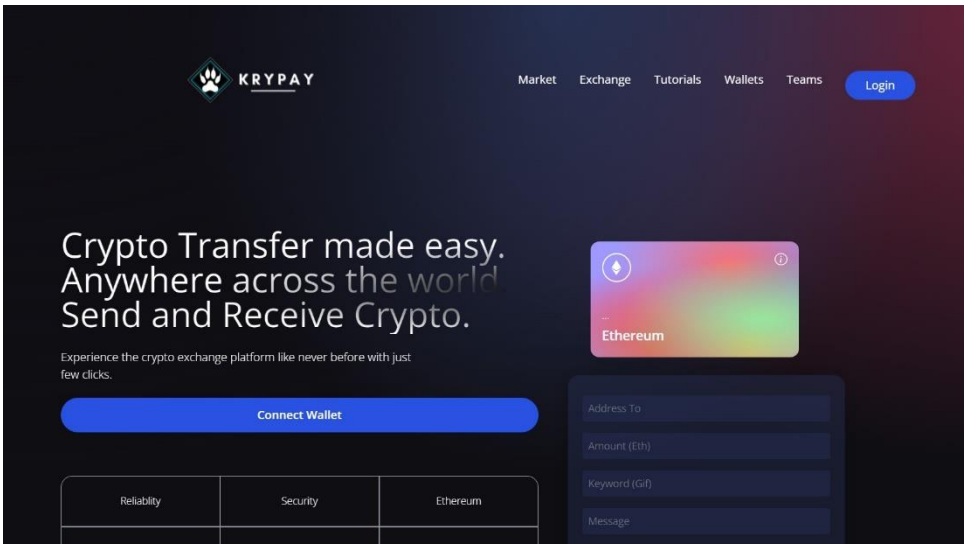


Why do we decide to work on this project?

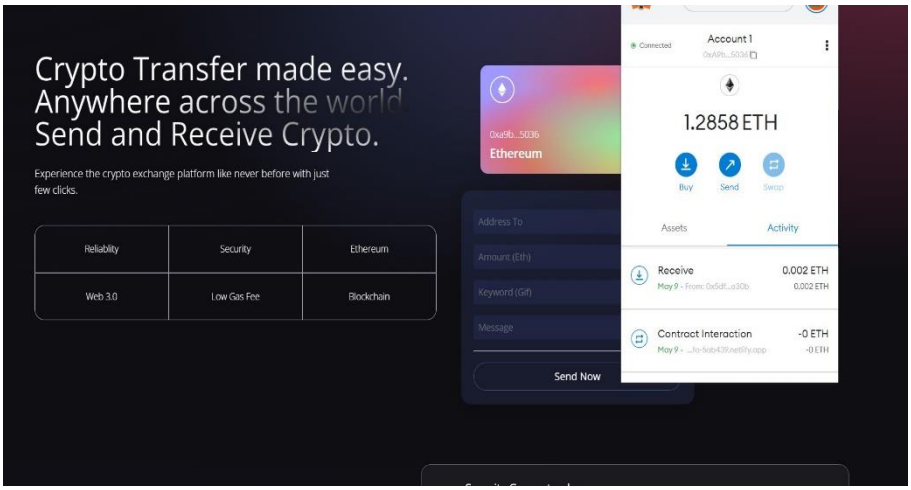
All members of the project group wanted to learn about Web3 and React.JS which lead us to work on this project. We believe that by doing so we created a simple and one space solution and an easy way to send and receive cryptocurrency that an end-user can easily follow through. This web app has a Transaction History which saves every Transaction so that we can easily track how much and to who we send that crypto. It is a very fast and reliable way of Transaction. We tried our best to minimize the transaction time and connect between wallets. We hope to keep improving and keep learning more ways and features to add into it later down the road.

Results Analysis

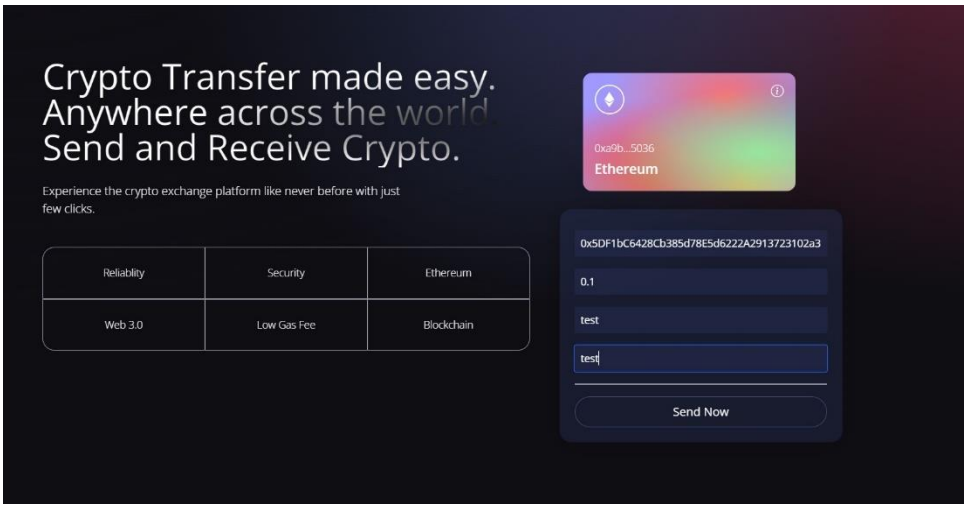
Before Connecting to the wallet



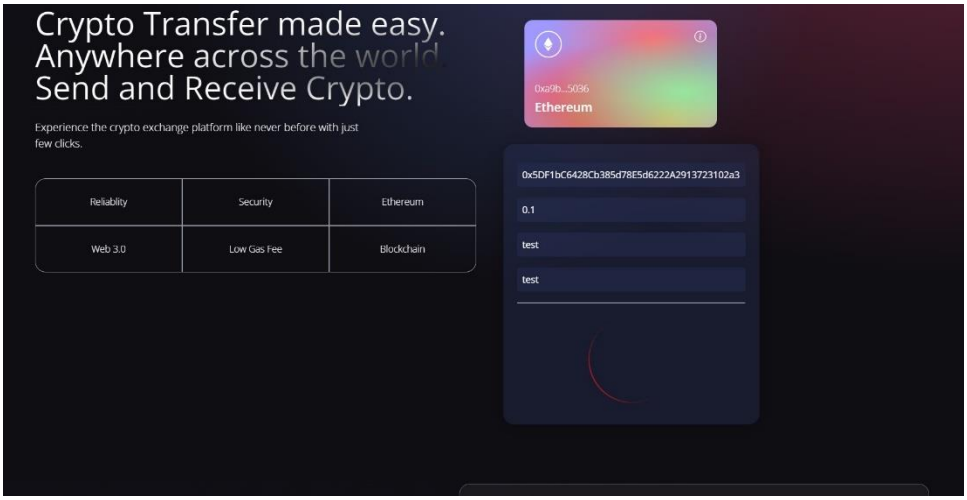
After Connecting to the wallet



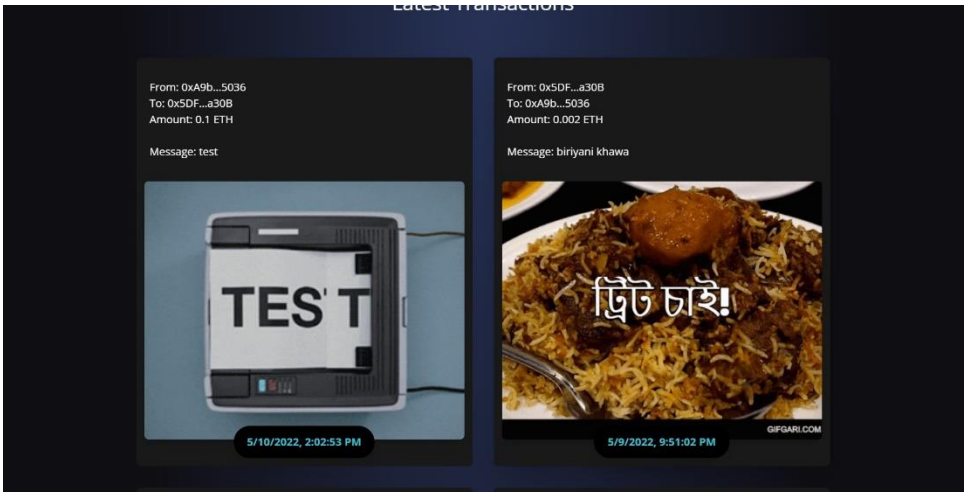
After adding Amount and Address



Connecting to wallet and Transaction ongoing



The transaction was done along with a GIF



Future Scope

Why Web 3.0 Is Important for the Future

Web 3.0 is a system *for* users, designed *by* users in the form of creator-driven platforms.

Here are the top reasons why web3 will become important in the coming years:

- **Less reliance on centralized repositories**: Web 3.0 will attempt to make the Internet a diverse source so that hackers, leaks, and reliance on centralized repositories are avoided. Using verifiable data scarcity and tokenized digital assets, there will be the possibility of users owning their data and digital footprints. No platform will be held accountable for data usage.
- **More personalized interactions**: Web 3.0 will become increasingly important in 2022, as most users continue to prioritize customized and individualized browsing encounters on the web.
- **Better search assistance powered by AI**: There will be an increasing demand for humanized digital search assistants that are far more intelligent, pervasive, and powered by semantics, blockchain, and AI.
- **Reduced dependency on intermediaries**: It will help disintermediate businesses, remove rent-seeking intermediaries, and give this value directly to the customers and providers in a network. Network users will work together to address previously hard-to-control problems by mutual ownership and governance of these new decentralized intelligence structures.
- **Rise in peer-to-peer connectivity**: Through new Internet inventions, the connection between members and organizations will remain innately robust to keep in line with more adaptive peer-peer interaction and governance. With peer-to-peer connectivity, humans, businesses, and machines will be able to share more data while maintaining greater privacy and security.
- **Enhanced trust**: With the knowledge of the next Internet generation, we can reduce dependency on individual platforms to future-proof entrepreneurial and investment activity.

We are heading towards an Internet where people will have complete control over their data and privacy, and permit companies to use their data (or not). All this will be powered by blockchain.

Therefore, web 3.0 will accelerate the honest and transparent use of user data, from personalized search results to cross-platform development tools and the use of 3D graphics. The web will become more immersive and interactive.

Conclusion

In Conclusion, Web 3.0 has made a lot of advancements and by using these advancements and with the help of React.js, HardHat, Solidity, Metamask wallet, and a lot of under the hood APIs and packages, we can make a very easy and user-friendly web app. This project can be further improved with enough time and effort and may create an easy to plug-in transaction app on many websites and we are willing to do that if possible.

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