# MAJOR PROJECT - 1 REPORT

**ON**

## SOUL CERTIFICATE

**Submitted By**


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# 1. Abstract

In late 2017, a brand-new class of distinct and undivided blockchain-based coins called non-fungible tokens (NFTs) was introduced. While fungible tokens have made it possible for new use cases, such as initial coin offerings, it is yet unknown if NFTs have the potential to be a useful component. The success of NFTs in the area of certificate verification is demonstrated by this project. We create a prototype of a certificate-verifying system based on NFTs and rigorously evaluate it using a design science research methodology. In this way, we show how NFTs can tokenize digital products, stop fraud, and enhance secondary market transaction management. Additionally, we provide useful information about the advantages and difficulties of NFTs and draw conclusions for both researchers and practitioners. Finally, this project offers management suggestions for developing NFT-based applications and makes its findings and design ideas available to other researchers.

# 2. Introduction

## BACKGROUND

The first real instance of digitally verifiable and transferable non-fungible tokens was the decentralized application CryptoKitties, developed by Dapper Labs and released on the Ethereum blockchain in 2017. These collectible video game characters known as non-fungible tokens, or NFTs, have randomly selected attributes and range in rarity based on the CryptoKitty. Using the native digital signature method on the blockchain, it is simple to verify the authenticity, unique qualities, and owner of each CryptoKitty. The inconvenience and fraud risk related to the transfer of these assets to a new owner are also significantly reduced. The distributed ledger known as blockchain contains records of every transaction. It's similar to your bank passbook in that all of your transactions are transparent, visible to everyone, and immutable once they've been recorded. An NFT can be anything that can be transformed into a digital format. An NFT can be created from whatever you create, including your drawings, pictures, films, GIFs, music, in-game goods, selfies, and even tweets. The NFT can then be traded online using a cryptocurrency. But the fact that NFTs are supported by Blockchain technology sets them apart from other digital forms. For those who are unaware, NFTs utilize blockchain technology. Due to its unique design, every NFT has the potential for a variety of applications. For digitally portraying tangible assets like real estate and artwork, a digital asset management platform is the best option. Because NFTs are based on blockchains, they can act as identity management platforms in addition to eliminating middlemen and bringing artists and audiences together. NFTs have the ability to eliminate middlemen, increase transaction efficiency, and open up new markets.

NFT utilizes blockchain technology because it grants users full ownership of digital assets. Simply said, when you list your NFT on a marketplace, you pay a "gas fee" (transaction cost) for the use of the Blockchain. Then, your digital artwork is recorded on the Blockchain, saying that you (your address) possess the specific NFT. You now have complete ownership, which nobody—not even the owner of the marketplace—can amend or change. To obtain exclusive ownership rights, an NFT is subsequently manufactured, or as crypto aficionados refer to it, "minted." There can only ever be one owner of an NFT. In addition to having sole ownership, NFT owners have the ability to digitally sign their works of art and keep particular data in the metadata of their NFTs. The person who purchased the NFT will be the only one who can view this. Cryptocurrencies and NFTs are significantly different from one another. While they are both based on Blockchain, it is the only similarity between them. NFTs, or non-fungible tokens, are distinct cryptographic tokens that are created on a blockchain and cannot be duplicated; they have a unique identification code and metadata. NFTs perform the same functions as communicators or information tokens, but they are neither fungible or interchangeable like cryptocurrencies like Bitcoin. The proponent of NFTs asserts that these tokens offer a visible certificate of validity or proof of ownership, but the legal rights they transmit may be ambiguous.

## ABOUT OUR PROJECT:

Consider a situation when a student wishes to attend a university abroad. Therefore, there is a procedure for checking the marksheets. Two methods can be used for verification. The documents can be given to the university first, where they will be verified after the university receives them from the student's school. The second method involves the student having a government office certify the document before sending it to the overseas university. In both situations, the verification process is quite demanding and lengthy, taking anywhere from 8 to 10 days. Additionally, there's a danger that the document will be destroyed, misplaced, or never delivered. The student can experience problems as a result and lose out on a great chance.

The goal of this project is to provide a platform that will convert their physical transcripts into Soul Bound NFTs so that they can be quickly and easily sent to any university. SBTs are additionally non-fungible tokens (NFTs) that are not transferrable, in contrast to standard NFTs (though people can revoke them if they choose).

SBTs can genuinely assist us in real life and provide a solution to the aforementioned issue. SBTs are more like the way we exchange information about ourselves on our CVs, to put it simply. However, in this instance, more than one Soul may issue or vouch for it. A corporation might offer a letter of reference for a worker as SBT, for instance. As a result, when universities begin offering degrees as SBTs and employers start awarding SBTs to employees, these credentials will make it more difficult for scammers to pass themselves off as someone else. “The idea is to bolster people's social identities by customizing them with unique, non-exchangeable badges. In theory, the tokens could help solve some of the problems ravaging decentralized finance, like scams and theft," Buterin said.

# 3. Problem Statement

Problems faced:

- Forgery and fake Certificates
    - According to research 33% of documents in India are fake or forged.

- Verifying Certificate
    - Verifying a Certificate takes at least two weeks.

- Document safety
    - Save Document from getting damaged.

# 4. Literature Review

Every question ever posed regarding cryptocurrencies is addressed in **"Cryptoassets by Chris Burniske and Jack Tatar".** When investing, investors must take into account the distinct characteristics of cryptoassets. Burniske and Tatar made the decision to offer an investor's guide for one of the fastest-growing industries as a result. Then, Cryptoassets provides guidance on avoiding upcoming bubbles, clarifies the significance of cryptoassets for the future, and aids in the accurate valuation of cryptoassets. Many people think of cryptocurrencies like bitcoin as the money of the future. We associate them with cutting-edge, high-tech items like jetpacks and advancements in technology. But many individuals are unaware of the nuances of bitcoin's functions and how it works. Knowing the background, genesis, and purpose of something is crucial because of this. It is crucial that you become familiar with the background, roots, and purpose of bitcoin. Once you know that knowledge, you may determine if you want to buy profitable cryptoassets for yourself or invest in the currency of the future.

Don and Alex Tapscott's "**Blockchain Revolution**", this book provides a thorough review of the major currencies, including Bitcoin and Ethereum, as well as information on their implementation and the services they make possible. The book's several chapters examine how blockchain technology will affect entrepreneurship. The section of the book devoted to how blockchain can alter democracy is the most futuristic. One significant change made possible by blockchain is the ability to return to individuals all of the identity-related data previously held in governmental systems. The authors do a great job of explaining how blockchain might facilitate many of the changes that are already taking place outside of the formal democratic institutions rather than replacing representative democracy. The fragmentation of public discourse, the growth of ignorance online, and complex policy and execution are three significant issues that now impact democracy, and the authors go on to describe how blockchain might help with each of them.

# 5. Objective

The goal of this project is to provide a platform that will:

- Enable students/candidates to swiftly and easily convert certificates in the form of soul-bound NFTs.
- Minimize the process of verifying a certificate.
- Prevent certificate from external damage like fire and water.
- Save time
- Make it impossible to fake a certificate.
- Make application process more effective

# 6. Design and Methodology

## 1. Blockchain part:

- **REMIX**: Solidity is the language used to code in blockchain technology. Here we have used REMIX to code Solidity also known as Smart Contracts. We deployed our remix Smart Contracts on **Goerli**, which is Ethereum's Blockchain TestNet.

- **INFURA**: Infura provides the tools and infrastructure that allow developers to easily take their blockchain application from testing to scaled deployment. Here we created a gateway to call an API from smart contract with the help of interactive frontend. At the end we get two credentials used to connect to the smart contract.

## 2. Frontend part:

- **HTML**: we used html to create a basic structure to our website.

- **CSS**: CSS was used to make our web page more attractive.

- **REACT**: we used this to build interactive user interface.

## 3. WEB3:

- Here web3 is connecting our React side to the smart contract which is being deployed on Goerli TestNet. With the help of Infura, Web3 connects with smart contracts through the credentials on Infura.

# 7. Implementation

## RESULT and OUTPUT SCREEN

1. This webpage shown below (Fig 1.) is the page where the admin logs in. The page has admin username and password field.

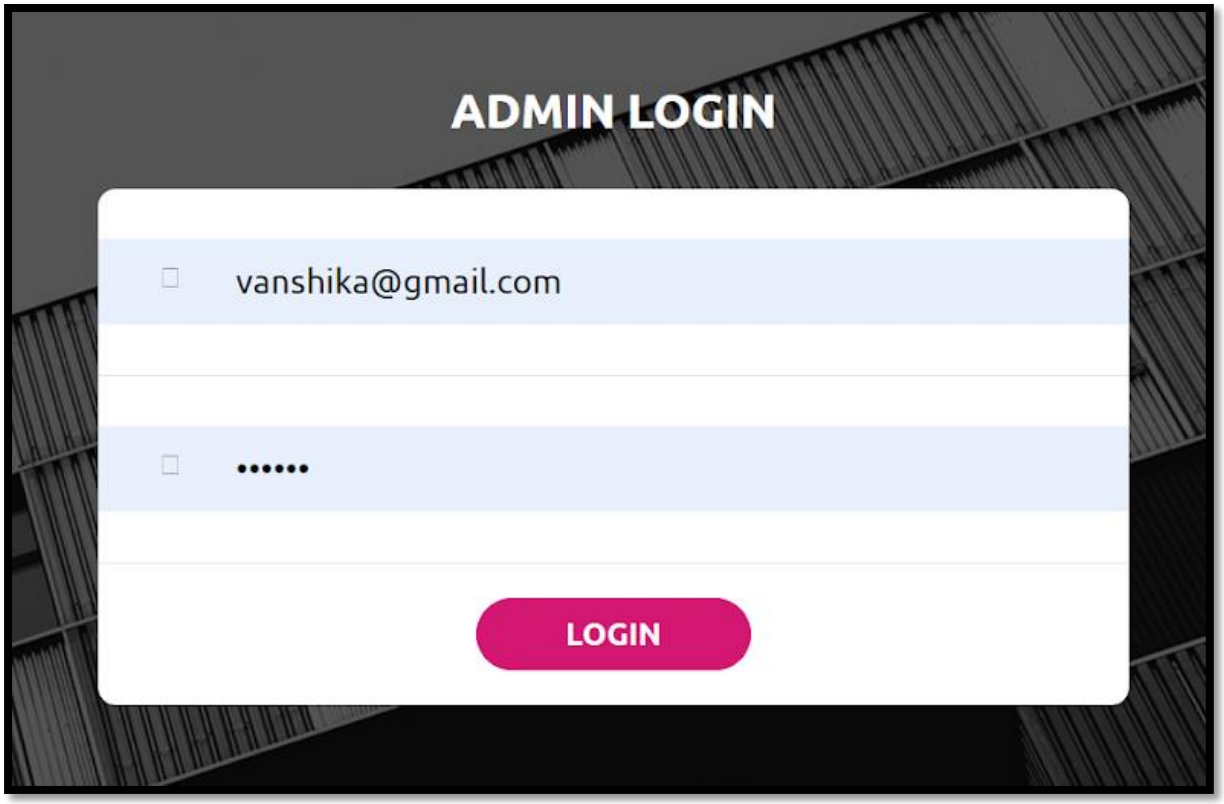


**Fig 1.** Admin login page

2. The webpage shown below (Fig 2.) is the page where the admin enters the candidate's details for creating the Soul Certificate.

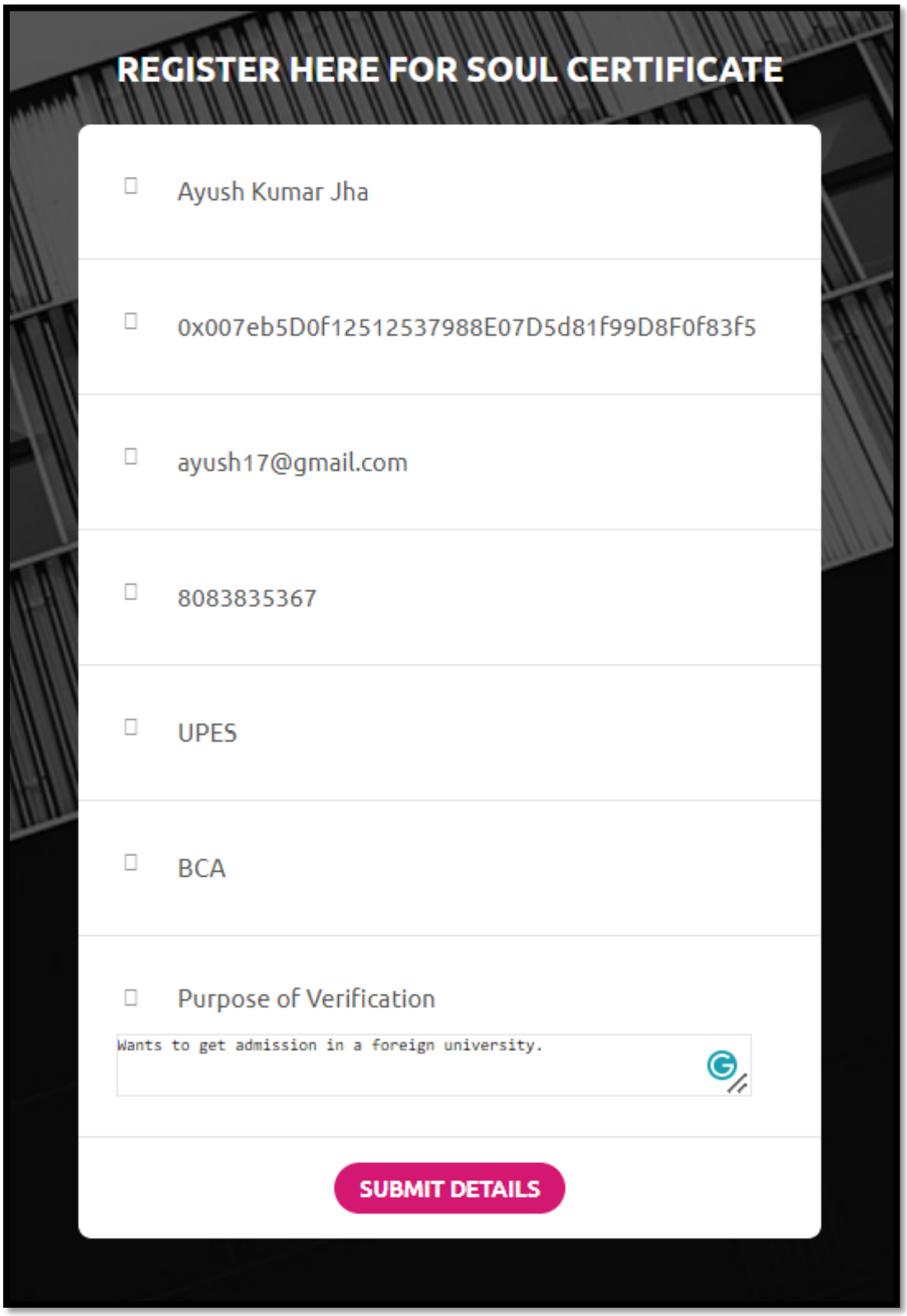


**Fig 2.** Webpage 2

3. After submitting the candidate's details, MetaMask comes into action (See Fig 3.). It helps in creating a transaction.

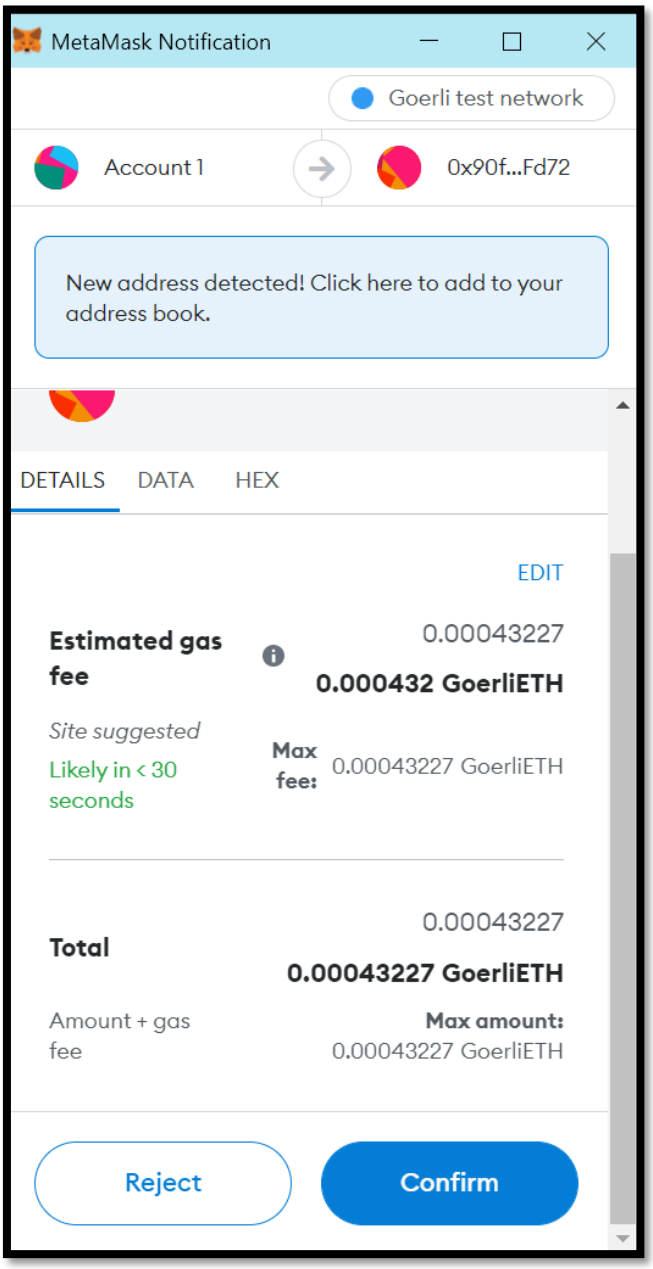


**Fig 3.** MetaMask confirmation

# 8. Important Theory related to Result Section

The "handleSubmit" method is called when the submit details button is pressed.

The data from all the fields is now stored in a variable called "final_AfterLogin" by the same procedure. Following that, a call to the "mint" function is made that collects "final_AfterLogin and Candidate's Wallet Address" data.

As soon as the admin clicks the confirm button, a transaction is created with a unique transaction hash. (See Fig 4.)


**Fig 4.** Unique Transaction Hash

The contract address(of the deployed smart contracts on Infura) can be used to view the transaction's details.


**Fig 5.** Top Address: Admin's Wallet address, Middle Address: Smart Contract's address, Bottom Right Address: Candidate's Wallet address

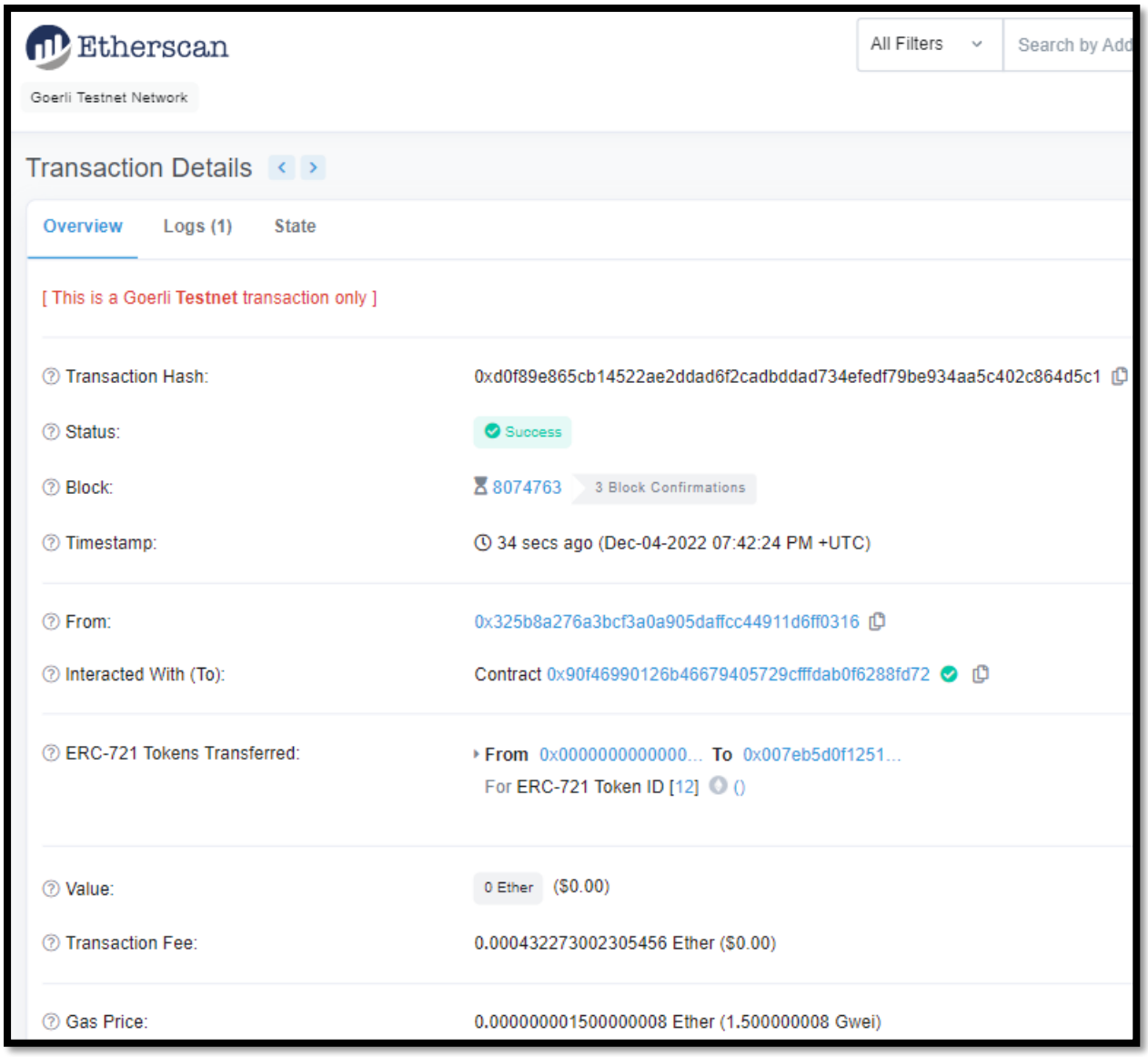


**Fig 6.** Transaction details

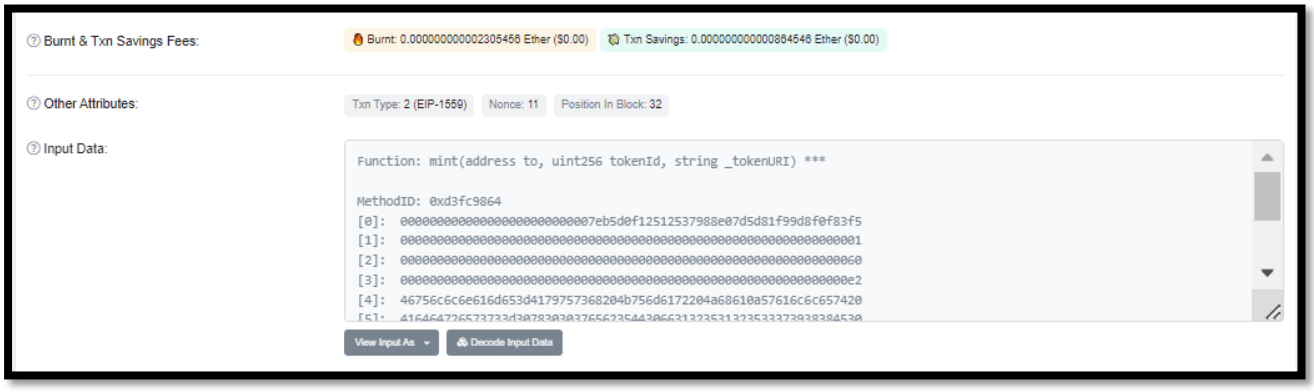


**Fig 7.** Encrypted data

Through Etherscan, the encrypted data can be decoded. Etherscan is the platform where all the transactions are stored.


**Fig 8.** Decoded Data

# 9. Conclusion and Future Scope

Until now, the primary focus of cryptocurrencies has been on money. The use of SoulBound tokens signals a significant shift away from money and toward the advancement of society. With the help of SBTs, a person can put more of their attention on developing their own digital identity and less on accumulating wealth. This has the potential to fundamentally alter both online and offline societies.
Verifying the reputation and identity of the token holder is another crucial benefit of SBTs. The complexity of SBTs makes it more challenging to fabricate skills on resumes. As a result, because token holders can more readily prove their identity and other personalised variables, SoulBound NFTs encourage confidence in a decentralised community. This has immediate, positive effects on the job market, healthcare, and other areas. SBTs may reduce the prevalence of cryptocurrency scams by enhancing verification capabilities.
Tokens for SoulBound are still in development and won't be completely functional until 2024, according to expectations. Although there aren't any yet envisaged use cases, their potential in a decentralised society is tremendous. Our project's practical applications, including those for streamlining the management of medical records, applying for a mortgage, joining organizations, and the hiring process, are already anticipated and under development. Once SBTs are embraced by the general public, there might be a wide range of additional functionalities.
The decentralised society that SoulBound tokens support makes it easier to handle data and transmit reliable data. They also advocate social scoring in theory to reduce the possibility of prejudice and other comparable wrongdoings. In the future, a person could use SoulBound tokens to aid in college applications, choose a contractor, find a qualified applicant for a job opening, select the most effective charity organisation for donations, and more.
In a Web 3.0 society, users have full control over their data and are able to transfer it quickly and accurately. Privacy, speed, equality, and other aspects will improve as SoulBound token technology develops and becomes more widely used.
The subsequent stage in the development of cryptocurrency is represented by SoulBound tokens. They have the potential to drastically alter many areas of both the digital and physical worlds, despite the fact that their technology is still in the development stage. It is almost certain that the promises made by SBTs will be improved upon in the future. Now, talking about the future scope of our project we can have:

**1. Expansion in soul certificate**:
When a hiring manager examines a college graduate's diploma and discovers that the graduate holds a B.tech degree, It is time-consuming and challenging for hiring managers to confirm a college degree certificate. The hiring manager or the third-party education verification provider can simply verify through Etherscan, which is a universal space that carries all the specific transactions done through MetaMask, and whether the student has acquired a certificate or not. It allows users to easily search and browse transactions and blocks.

**2. Limitless evolution:**
The section of soul certificate can be available for 10th, 12th, diploma and any other certificate that can be issued. Through this soul certificate process, any form of certificate can be awarded, including diplomas, 10th grade certificates, and certificates for sporting events.

# 10. References


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[2] AWS, *Non-Fungible Tokens.*

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