

# NFThis - A Blockchain-Based Neo Bank and NFT Marketplace for Minting, Lending and Borrowing NFTs

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**Abstract**—NFThis is a safe, efficient, and time-saving application that allows you to take instant loans with NFT as collateral. NFThis reduces the complication of taking loans for both borrower and lender and makes sure that all the transactions are secure and transparent. In the current borrowing process, loans are not flexible, forcing the borrower to pay the exorbitant interest charged by banks. This is an application that will allow users to borrow money at a low-interest rate and use their digital assets to secure a loan. The funds and the NFT ownership are transferred over Ethereum for additional security. We aim to reduce risks for both the borrower and the lender by releasing loan funds through appropriate smart contracts. Additionally, we attempt to limit fraud on our platform by incorporating Escrow smart contracts that help build trust between the lenders and prevent discrepancies. We also included an algorithm to calculate the risks associated with lending the amount to the borrower. The interest on loans is less to encourage cash flow on the platform, ultimately benefiting the nation's economy.

**Index Terms**— NFT, Blockchain, Web3 loan, Non-Fungible Token, Collateral, Blockchain, Decentralized Finance, Escrow, NFT Marketplace, low-interest loans, Defi.

## I. INTRODUCTION

The current loan application process is time-consuming and tedious. Furthermore, because the loans are not flexible, the borrowers risk paying for money they are not using. High-interest rates make it difficult for borrowers to repay the loan before the end of the loan term, especially if the interest rate is fixed. To address these issues and transform the way we borrow and lend, we want to redefine the process of acquiring loans using web3 and blockchain, making the process more secure and transparent. People will soon be able to mint their Non-Fungible Tokens (NFTs) and use them as collateral and access loans on the same platform utilizing a library of NFTs. We aim to create an ecosystem where users can do everything they need within one platform.

NFThis is a long-term project to create an ecosystem that will allow users to mint their own NFT tokens, sell them on our decentralized marketplace, and use those tokens as collateral for loans, this way they don't lose ownership of their assets while also making them work for you. The decentralization aspect is crucial to keep the platform and its users safe while maintaining trust. Additionally, to give the borrower the best price based on the NFT, we will integrate our algorithm to gauge the value of NFT and issue the loan amount accordingly. The ideal amount will be 50% of the value of NFT so as to avoid defaulters and decrease the number of bad loans.

The authenticity of the user and NFT is validated using the IPFS hash. IPFS, or Interplanetary File System, is a peer-to-peer secure hypermedia protocol aimed at preserving and expanding humanity's knowledge by making

the web more resilient and open. We have also considered some of the aspects that are speed bumps for NFT lending in the Indian Market, for example, the tax levied on the transfer of Virtual Digital Assets(VDA) which is not considered by any of the competitors because their solution is not India-centric. Our solution does not promote the lend-to-acquire policy, we also have a system to protect our borrowers from risking their digital assets. We will strive to protect the interests of both the lender and the borrower.

## II. LITERATURE SURVEY

Taking out a new loan is unquestionably preferable for objectives like schooling, enhancing one's lifestyle, establishing a new business, and much more. According to a report on Indians' propensity to take out loans by [K. R. Srivats]<sup>[9]</sup>, there are about 67% of Indians are willing to take loans to fulfill the above-mentioned objectives. Although another survey by [Dilsher Dhillon]<sup>[4]</sup> reported that just 33% of the Indians that are eligible for a loan have access to a bank account, this gap provides a market opportunity for the alternative non-bank lending industry. The study of [Insider Intelligence]<sup>[5]</sup> identified that many attempts had been made by platforms like SoFi, Quicken Loans, Kabbage, and OnDeck.

However, non-bank loans are not without deep shortcomings, as mentioned by [Biswas, Swarnava]<sup>[3]</sup> these loans are more expensive for borrowers when the capital is less available from banks, especially when borrowers face financial constraints. Trust will always be a concern, which is why they have higher interest rates making these loans impractical for a small capital. One of the ways to address this issue was to integrate blockchain distributed data storage, point-to-point transmission, consensus mechanisms, and encryption algorithms, as discussed in [Guo, Ye, and Chen Liang]<sup>[6]</sup>. The study also described how blockchain can be used in a situation where there is a lack of mutual trust among parties, thereby resolving the high costs caused by the non-technical aspects of centralization.

Talking about the interest rates that are charged by non-bank financial institutions and for bank loans. We have different types of loans, house loans to build a house, car loans to buy a car, and educational loans for educational purposes. In this study, we have emphasized personal loans more as their objectives are more diverse and intersect with the objectives of people willing to take loans using NFT as collateral. For Bank loans, the personal loan interest rates vary from about 12-31% and also need proof of income or pension, while non-banking loans are quick but their interest rates are relatively higher. One of the leading NBFCs in India takes about 24% interest rates for small amounts. There are other charges like loan processing fees, documentation charges, etc making availing loan an expensive affair. Hence to tackle this problem, we have fewer interest rates in comparison to the market interest rates. We also have a loan-to-value ratio of about 60% to avoid bad loans and provide a no-loss ecosystem to the lender. To expand on this, If the borrower defaults on the loan, the lender gets ownership of the digital asset for which he only had to pay 60% of the actual value. One of the leading NFT liquidity pools has a loan-to-value ratio of 50%, the borrowers have flexible interest rates ranging from 2-30% and it also charges the lenders with a 5% interest rate for every loan.

The NFT market is gaining a lot of traction. There is no surprise that every brand wants to be the first to introduce their own NFTs, or at least get the first to have exposure and have NFTs in their merchandise. According to [Bitsrunch]<sup>[2]</sup> by August 2021, NFT sales had climbed from \$0.3 billion to \$2.5 billion. Old and new NFT collectibles have a nearly ten-fold rise in market size. A study on NFTs as an alternative investment by [Schaar, Luisa]<sup>[15]</sup> shows that although the economics of NFTs are not well yet understood, the explosive expansion of the NFT market has attracted a lot of investors and collectors to invest in digital assets.

NFTs are not only looked at as digital art and investment but also as Collateral thanks to the massive interest of investors, collectors, and artists. Books, paintings, sculptures, and other works of art have all been used as collateral for as long as people have been creating art. With NFTs today, it is the same. It provides content creators with a way to monetize their art for the right valuation and in a community that equally understands the art. Some of the shortcomings of NFTs as collateral have been identified by [Helmanis, John M]<sup>[7]</sup> who concluded that NFTs do not make good use as collateral when they are either highly volatile, overpriced, or in a bubble. Although [Helmanis, John M]<sup>[7]</sup> agrees that there are solutions that can be implemented to solve this problem by comparing the NFT basket with a modern art basket to get the right valuation and avoid huge price discrepancies.

NFTThis is an attempt to provide loans based on NFT as collateral and charge low-interest rates while ensuring profit on both lenders' and borrowers' sides. The NFTs listed on the platform have a physical asset that can be linked to provide the right valuation and solve the problem of volatility of these NFTs. We provide flexible interest rates for the borrowers based on their borrower score which is based on the credibility of the borrower and the NFTs valuation. This flexible interest rate is from 7-15%, lower than the market interest rates.

### III. ARCHITECTURE DESIGN

After signing up for an account on the platform, the account holder must link their cryptocurrency wallet. Users are directed to choose a category from a brief list of popular NFT categories to receive relevant feed to lend and borrow on the platform. The users can engage on the platform using like and comment features. The user can upload their content on the inbuilt NFT marketplace to showcase their work. The content can be in the form of memes, artwork, music, or video clips. Once uploaded the content is minted as NFT and stored on an IPFS distributed database. They are given an option to list their pre-owned NFTs with a single click. The crypto wallet connected to the user's browser is required to perform quick transactions. Additionally, users can also make use of the installed application on their remote devices to complete the payment.

### IV. IMPLEMENTATION

#### A. Smart Contracts and IPFS

Smart Contracts are similar to triggers that activate when certain conditions are met. Smart contracts allow users to transfer ownership and provide proof of ownership for lenders. In addition, we use IPFS to store the content that users have listed.

IPFS is a distributed file system that aims to connect all computing devices to a single file system. In some ways, this is similar to the original goals of the Web, but IPFS is more akin to a single BitTorrent swarm exchanging git objects. IPFS could become a new major internet subsystem. Further, we allow a user to mint their content as NFT on our platform, and then store the image on IPFS. The hashcode generated by the file system is used to render content on our platform.

Also, to solve the trust issue among buyers and lenders, we use Escrow Smart contracts. An escrow is a third party who holds the asset (money, bonds, or stocks) while the sender and receiver are present. Upon the fulfillment of requirements, the Escrow will release the fund.

For instance, Peter is a lender, who can lend money and John is a borrower who wants to borrow money from Peter in exchange for his NFT. To complete the transaction both John and Peter approach Kim, a third person (The escrow agent) who will hold the money until John receives the money. When the condition is met, Kim will transfer the ownership of NFT to Peter. This resolves the trust issue and eliminates any discrepancy.

Both parties send the appropriate amount to the Escrow contract. This establishes trust among both parties and they can securely complete the ownership and transfer of funds over the blockchain.

When the lender receives NFT from the borrower, the lender sends a message to the smart contract to recover the initial amount. This greatly reduces the possibility of illicit practices on the platform. When the smart contract receives the confirmation, it releases funds for the borrower and returns the additional amount collected for both parties. If the lender fails to respond to the received NFT and tries to acquire the borrower's NFT and commits fraud, they will lose twice the value of the NFT and the lender's crypto wallet account will be blocked.

It is inappropriate to ask a borrower to initially send two times the worth of NFT, as the borrower requires money. To solve this issue, we incorporated a unique Borrower Score algorithm, which considers various factors like the number of NFTs owned, and past loan history, and the borrower is demanded to give an appropriate amount to the contract making it affordable for the borrower to borrow the money. If the borrower tries to commit fraud on the platform, they will lose their NFT and be blocked from the platform. Figure 4.1 and 4.2 explains the escrow smart contract in a simple way.

#### B. The Borrower Score

The borrower score estimates the risk involved in doing a transaction with the borrower. It gives a heads-up to the lender on the risks involved while lending money to a borrower so that the lender can decide to lend money. The borrower score takes the following attributes into account:

1. Timely payments
2. Amount owned
3. Number of NFTs owned by person
4. The number of times lent amount
5. The number of loans taken
6. Length of history
7. No of NFT sold

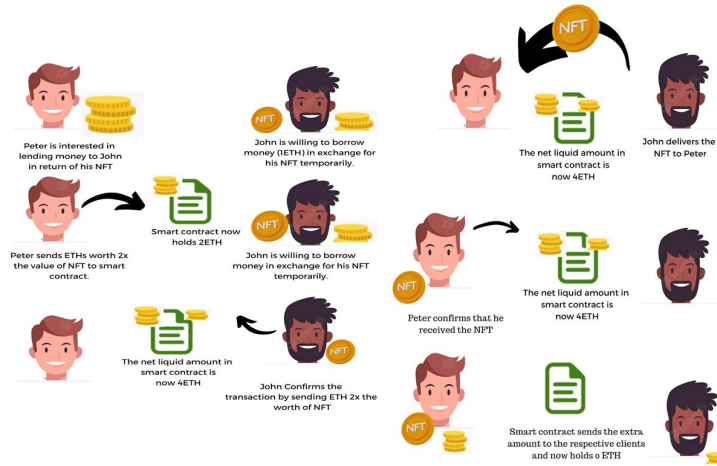


Figure 1. Process of Lending and Borrowing using escrow smart contract

$$\frac{0.3(\text{payments} * \text{amnt\_owned}) + 0.2(\text{avg\_nft\_owned} * \text{loans\_taken}) + 0.2(\text{history} * \text{lend\_amnt})}{0.3(\text{nft sold} + 1)}$$

In the above formula more weightage is given to payments and amnt\_owned because that's crucial. We divide by NFT-sold and loans\_taken because selling NFT might be due to not being able to repay the amount. Multiplying history with lend\_amnt because history can be zero like he might not lend or borrow amount and still can have a good score because of his other data. If a new user logs in then he still gets some score and can improve it by lending and borrowing and the more he lends, the more the score increases

NFT owned and lend\_amnt are multiplied because they both are proportionate, more NFTs you own more u can liquidate which implies this is the borrowing part.

- So logically, the first term i.e; (payments\*amnt\_owned) is the same for borrowers and lenders
- The second part is for borrowers (nft\_owned \*loans\_taken)
- The third part is for lenders (historylend\_amnt)
- The denominator is to adjust the score if a borrower fails to give back on time

### C. Taxation

The Indian Digital assets market is very different from that of the other countries, many parameters are needed to be considered from the valuation of the asset to actually trading them.

One of them is the tax implications on digital assets. This is one of the biggest obstacles to the creation of a robust Indian market for digital assets and calls for the need for a project that acknowledges and caters to the taxation issues of digital assets in India.

Let's try to understand how taxes are levied on VDAs (Virtual digital assets) in India.

***"As per Section 115BBH(1), the income arising from the transfer of virtual digital assets shall be taxed at the rate of 30%."***

That is, In India if the investor sells his digital coins or token at a gain then he is subjected to a tax. Even if a customer makes a benefit of ₹50 on one asset and a loss of the same ₹50 on another asset, although their net profit is zero they are still subject to tax on the profit of ₹50 gained from the first asset. Hence it becomes even more important to give the user a good enough margin on their profit.

We have a loan-to-value ratio of 60%. Let's say an NFT is valued at ₹ 10,000. The loan that can be taken is about ₹6000. Now taxation is levied only when there is a transfer of the digital assets, so let's say due to some given circumstances the borrower defaults before the first payback and the NFT is subject to transfer. The lender now is making a profit of ₹4000 and is subject to pay ₹1200 as tax and can save up to ₹3800 as profits.

### D. Interest rates on loans

The biggest factor that restricts people from applying for loans is the huge interest rates. Huge interest rates restrict the cash flow breaking the economy. While working on the application, we designed an approach that is

profitable to all the stakeholders involved in the process of lending and borrowing money. we have fewer interest rates in comparison to the market interest rates. We also have a loan-to-value ratio of about 60% to avoid bad loans and provide a no-loss ecosystem to the lender.

We offer the borrowers adjustable interest rates depending on their borrower score, which is determined by the NFT's valuation and the borrower's trustworthiness. This adjustable interest rate is between 7 and 15 percent, which is less than the market rate. NFThis takes roughly 3–5% of the interest and returns the remaining amount to the lender while maintaining the loan-to-value ratio at 60%.

NFThis takes roughly 3–5% as shown in figure 4.3, of the interest and returns the remaining amount to the lender while maintaining the loan-to-value ratio at 60%. This way we ensure profitability while making sure our stakeholders are at benefit. A part of this money will be used in promoting Art NGOs and listing their NFTs on the platform for selling and generating money for the NGOs.

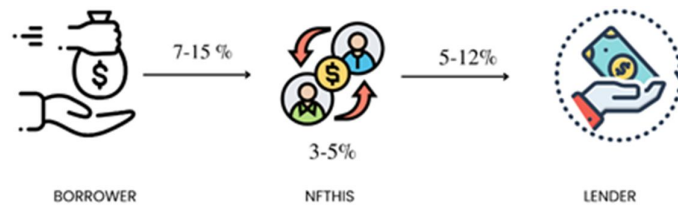


Figure 2. Revenue Model

## V. RESULTS

The Loan to value ratio is fixed at 60%. We've used a lot of examples to calculate the ideal and fair interest rates. Some of them are shown in table 1.

- For a low loan amount, we will be using an NFT of 3,00,00 INR as collateral. The loan amount one can collect is 180,000.
- For a high loan amount, we will be using an NFT of 10,00,000 INR as collateral. The loan amount one can collect will be 6,00,000.
- Users with high borrow scores, will avail fewer interest rates in comparison to users with a low borrow score.
- By having less interest rates for the high loan amounts and high borrow scores we want to reestablish the trust in the high borrow score bearers.
- While a low-interest rate on lower borrow score users is to avoid bad loans and welcome new users with fair interest rates.
- Figure 3 shows the competitor analysis and effectiveness of our borrower score.

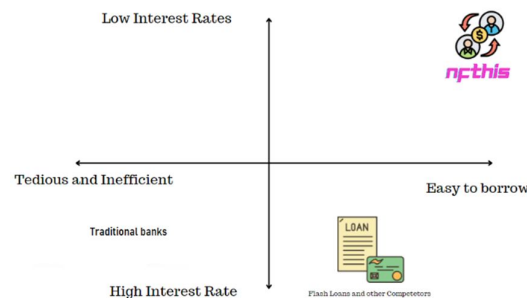


Figure 3. Competitor analysis

TABLE I. INTEREST RATES FOR USER PERSONAS

| Borrower Score | Loan Amount | Interest borrowers must pay (%) | Interest lenders get (%) |
|----------------|-------------|---------------------------------|--------------------------|
| High           | 180000      | 10                              | 7                        |
| High           | 600000      | 8                               | 5                        |
| Low            | 180000      | 12                              | 9                        |
| Low            | 600000      | 15                              | 11                       |

## VI. CONCLUSION

In this article, we discussed the challenges with the existing financial institutions' loan ecosystem, and how NFTs fill in the gap with its decentralized ecosystem that fosters trust and provides low-interest rate loans while being simple to borrow. We have maintained a fair loan-to-value ratio to give the borrower the right valuation and have a safety net for the lenders. The low and flexible interest rates based on the borrower scores help the active users get the benefits while not imposing very high-interest rates on the user. This gives artists and content creators a way to monetize their art without having to lose access to their digital assets. We have addressed the issue of price volatility of NFTs, by limiting the marketplace to NFTs linked to a physical asset or those having a strong comparable value. The only potential factors we consider that should influence the valuation of the NFT are the prominence of the artists, the technology available in NFTs, and other very minor aspects that affect art appraisal.

## FUTURE WORK

To make it easier for users and make the process of taking loans on the platform more secure and transparent we want to incentivize the minting of NFTs on our platform.

As discussed in [Priyadarshini, D]<sup>[1]</sup> CBDCs (Central Bank Digital Currencies) have been proven to boost the country's economy where they were implemented. We envision the same goal by promoting the use of the Indian Digital Rupee on our platform for transactions, once it is released and approved by the Government of India. Additionally, to make the process of taking loans customer friendly, we would embed AI software that analyses the market condition and estimates the future worth of the NFT. If the future worth of NFT turns out to be more than the current value, the borrowers are given flexible interest rate options.

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