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Navrat: Redefining Jewellery Marketplace

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***Abstract*—Blockchain potentially acts as an immutable, transparent ledger for digital transactions. We equate jewellery to an NFT and model a Blockchain-based marketplace, thus enabling standardized purchase provenance and documentation. NFTs, or Non-Fungible Tokens, are unique and non duplicable, and thus ideal proxies for our use case. Additionally, it is possible to sell and buy products off the ledger, just as one can trade cryptocurrencies. Using NFT to manage jewellery sales would therefore make the sales secure, and make it easier to keep track of assets. We propose a model and UI, "Navrat", that would allow users to create, buy and sell NFTs of jewellery, adding the value of digital rarity and legacy along with its physical attributes. The users can check details like allied previous transactions in the marketplace, the price at which it was sold, and buyer and seller details. We identify the key strengths of Navrat as secure documentation and an added dimension of digital landscape in the jewellery market, of employing the model. We also acknowledge that there is scope for improvement when it comes to feature enhancements and analysis of environmental impact of implementing the solution.**

***Index Terms*— jewellery, NFT, blockchain, marketplace, platform.**

I. INTRODUCTION

From festivals to marriages, jewellery is a considered to be a crucial and auspicious part of life and celebrations across India. Large retail stores like Tanishq and Malabar offer proper documentation with receipts of the purchased items. Several times, the jewellery is inherited from ancestors. Alternatively, people buy jewellery from local shops, often without a proper sales documentation. It then becomes difficult to verify the purchase, say when a person must declare possessions to the government. Since jewellery is a crucial asset for several Indians, having a system that can keep track would be very beneficial. We connect this business need with the blockchain technology to propose a solution.

Blockchain provides a uniquely decentralized, scalable and standardised ledger platform which is well suited for the proposed issue. Non-fungible tokens (NFTs) are assets that have been tokenized via a blockchain. They are assigned different metadata and identification codes that are unique, and cannot be duplicated or exchanged without record. NFTs can be traded for cryptocurrencies or other NFTs, based on the value the owners and markets have placed on them. The most apparent advantage of NFT is market efficiency. By tokenizing a tangible asset, NFTs simplify sales processes and eliminate intermediaries, enabling sellers to connect directly with their target audience. Traditionally, NFTs have been associated with cryptocurrencies, gaming and digital art. However, the trend of jewel and jewellery NFT has already picked up in the global market, as Tiffany & Co released NFTiff, a collection of 250 custom NFTs designed to become a digital and physical pendant of the beholders CryptoPunk.

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In our paper, we elucidate the model for jewellery marketplace, equating the jewellery to NFTs. This provides a uniquely scalable landscape – the value of a jewellery article now being potentially associated with its digital rarity and legacy in addition to its physical characteristics. We record the jewellery ownership and sales history details like buyer and seller, price, and provenance. This makes sales and verification secure and easy. In the light of high value goods being traded, we are now able to define additional security protocols for the platform conducting business. Finally, we present and discuss the developed prototype, Navrat, for the said product.

II. Literature Review

Multiple studies illustrate the advantages of deploying Blockchain for various use cases. In their study, K. Divea and R. Surjit[6] discuss how blockchain can be highly helpful in solving the counterfeiting of luxury fashion brand products, helping the industry restrict the losses it faces in billions each year owing to the traceability that the platform offers. They have done a detailed study on the intricacies of the technological solutions by brands pioneering in the industry. This study helps us gauge specifically the utility of s secure ledger when dealing with high value goods, which directly translates to jewellery for our use case. Jiabin Baoa and Debiao[3] comprehensively review blockchain technology, and how it can be deployed in energy applications, from energy management to peer-to-peer trading to electric vehicle-related applications to carbon emissions trading. They study existing architectures and solutions, emerging security and privacy challenges, and explore other potential blockchain applications in the energy sector. In another paper, Davor Dujak and Domagoj Sajter[7] present the blockchain concept and its applications in logistics and supply networks, discussing how the new implementations within supply chain are shifting from blockchain to a broader notion of distributed ledger technologies. Francesca Antonucci and Simone Figorilli[2] indicate that food security could benefit from the technology's transparency, relatively low transaction costs and instantaneous applications. Ye Guo and Chen Liang[11] detail the implications of deploying Blokchain for the banking industry, and the the effect economic transformation, Internet development, and financial innovations. They propose the urgent establishment of allied "regulatory sandbox" and the development of industry standards. Anandhi et al.[21] interestingly use blockchain to simulate an NFT marketplace for traders.

Further on using NFTs to design solutions, Noura Alnuaimi and Alanoud Almemari[1] have shown how NFTs and Ethereum blockchain can be used for digital certification, proof of ownership, sales history, quality, and evidence of delivery for fine jewellery and gemstones – a very relevant study for our model. Their proposed NFT and blockchain-based solution can provide superior alternatives in terms of verifiability, traceability, immutability, and security when compared with paper-based certification and traditional auctioning, delivery, and ownership management. Mingke Wang and Newman Lau[20] propose a digital strategy based on the NFT digital twin application to preserve and maintain Miao silver technology in the context of the metaverse era, beneficial in expanding use scenarios, extending their lifespan, and increasing the commercial value of Miao silver. They also discuss the relationship between industrial manufacturing and traditional handicraft industries, contributing to the inheritance and development of Miao silver and putting forward innovative solutions to promote the prosperity of intangible cultural heritage worldwide. In a related study, Umer, Sheikh Muhammad, Kishan, and Vishwas[18] discuss how NFTs have been a source of exclusivity ownership, resulting in brand loyalty, contributing to sustainable development in terms of ethical production, which cuts down on using natural resources. In his research, Sebnem Ozdemir[15] studies the development, features, and ecosystem of NFTs, which are becoming popular day by day.

Building on the discussed concepts, we propose and build a first of its kind marketplace model with UI for buying and selling jewellery, enabling highly secure, point to point, and well-documented sales and ownership. We combine NFT modelling with frontend design for an end-to-end, seamless simulation or the jewellery marketplace.

III. Methodology

We have built a model that creates NFTs of jewellery and stores them on a blockchain. Each piece has a unique identification code, making verifying easy. It also contains details like previous transactions of each token on the marketplace, transaction hash, buyer and seller details, and the price at which it is sold. The model does the following:

- Create: a jewellery creator can place their designs on the marketplace, for display or sale
- Sell: the sellers can sell the pieces of jewellery they own on the marketplace
- Buy: the buyers can buy jewellery from each other

• Record transactions: the model will have the whole transaction from the maker to the last buyer so that every purchase can be tracked and verified

A. Creating the Blockchain Application

We follow the steps below to develop the application:

1. **Create marketplace contract**: Marketplace is a contract where anyone can buy or sell NFTs. It allows users to list NFTs for direct auction or sell them at a fixed price. Other users can place offers or bids or buy the NFTs for the listed amount. There are several technical components involved in building a marketplace, including smart contracts, blockchain integration, and digital wallets. We create the said marketplace contract using thirdweb, naming it "NFTJewel@RB."
2. **Create NFT drop contact**: An NFT drop contract is made with the name “Eternal Adornments." This is a web3 based dashboard where all the NFTs are created by lazy minting, listed and claimed. It is the database for the website. It is integrated with the frontend using hooks of thirdweb[22]. The NFT Drop[23] contract is ideal for releasing unique NFTs using the ERC721A Standard[24]. ERC721A is an improved implementation of the IERC721 Standard[25] that supports minting multiple tokens for close to the cost of one. We deploy both contracts. In contrast to NFT Collection, NFT Drop enables users to mint NFT straight into their wallets passively. This removes the requirement to mint the NFT in the creator’s wallet and then move the asset to the wallet of a different user.
3. **Integrate users**: There are several ways to login to the website - social media, or wallets like MetaMask, Coinbase Wallet or WalletConnect can be connected directly. The wallets are also connected using thirdweb’s hooks.
4. **Transaction features**: The marketplace has integrated multiple features - options to create, buy and sell NFTs are main aspects, as the website's target audience is jewellers, designers and buyers. Auctions and bids for jewellery are other attributes that are added to the buy option. Each NFT's transaction history is a key feature of the website. It is added to the buy page of the NFTs. The transaction history is shown using Etherscan APIs.

B. UI of Navrat

1. **Application deployment**: After deploying the contracts, a suitable UI is designed for the website using Tailwind CSS[27] and Chakra UI[26]. Chakra UI is a simple, modular, and accessible component library that provides the building blocks for any React application.
2. **Page design**: An app on Chakra UI is made using next.js. Three pages are designed for the website: the buy page, the sell page and the create page. On the buy page, several designs of jewellery are added and their listings can be seen on that page. The buyer can see if the jewellery has a direct listing or is on auction. The sell page allows the user to see the NFTs they have put up for sale. The create page has an option to mint new NFTs.
4. **Linking frontend with backend**: Once the frontend and the backend are complete, both are integrated using hooks of thirdweb to make the final website.

Figure 1: Home Page

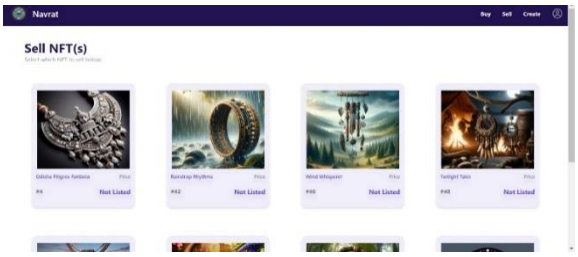

Figure 2: Sell Page

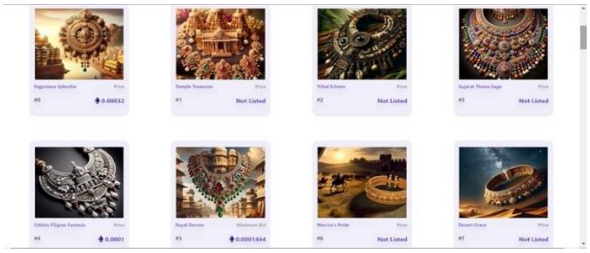

Figure 3: Buy Page

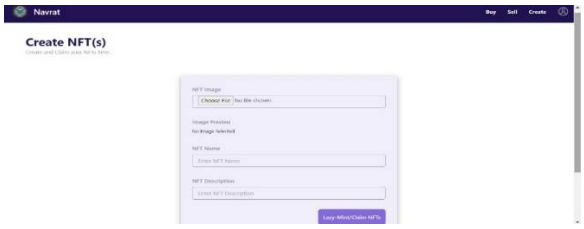

Figure 1: Create NFT Page

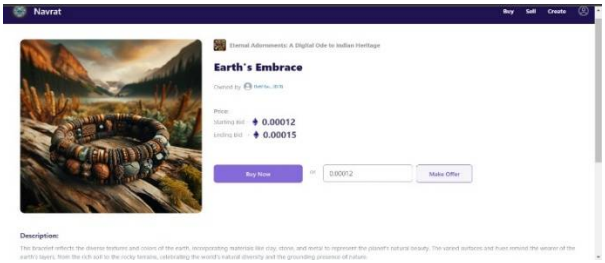

Figure 5: NFT Detail

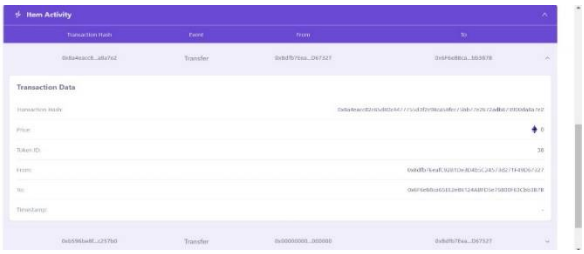

Figure 6: Transaction Details

IV. SOLUTION

The developed prototype, Navrat can be accessed at https://navrat-xi.vercel.app/. The application has the following components:

- Figure 1 shows the landing page. First, one can connect their wallets like MetaMask or log in through Google. After logging in, the user can buy, sell, or create NFTs.
- Figure 3 is the buy page, which lists all the available NFTs for sale. After opening a particular piece, the user can see the details. They can see the price or if the piece is on auction. By clicking on any token, its auction listing, transactional information, etc, can be seen. Figure 5 shows how users can also see the direct listing of the selected piece of jewellery.
- The buyer can check the item's activity and its transaction activity. They can look up who the last owner was, when the last purchase was made, the transaction hash etc. A sample of that is seen in Figure 6.
- The sell page in Figure 2 is where users can put their NFTs up for sale. Either one can directly put their designs on sale or put them on auction with a starting bid.
- Any jewellery item can be listed by adding the beginning and ending listing dates and the price. Similarly, it can be put in an auction listing by adding the starting bid, a buyout price, and both of the listing dates.
- NFTs can be created in the Create tab, as in Figure 4. Details like name, image, price and description must be added by the creator. Now, it can be sold or put on a bid.
- On clicking the profile icon on top, the NFTs owned by the user can be seen. It shows all the NFTs that they have bought or created.

V. CONCLUSION

Navrat is a first of its kind marketplace for jewellery where the jewellery is modelled as an NFT, thus making it secure and easier to document and verify purchases and ownership.

- This website is one of a kind marketplace for jewellery where NFTs are used. NFTs make it easy to document and verify the purchases. It is also very secure.
- We created a model to solve the problem of buying jewellery from local stores. With this, all purchases will be documented and verified anytime. All previous transactions can be tracked, so the purchases can be validated whenever required.
- This model makes it easy for the sellers to keep track of their sales as it shows all the transactions of all their jewellery pieces. They can check the owners, when the transaction of made, the transaction hash etc.
- Also, this is a platform where the jewellery designers can present their designs directly to the buyers and increase their reach and exposure. As usually the designers are not recognised, this model will acknowledge and appreciate them.
- The website will also be beneficial for small-scale jewellers as it would give them a broader audience to cater to. They would get a better reach and thus would help their business grow. Thus, customers and sellers both benefit from it.
- Navrat is based on blockchain, so it is very secure as previous blocks cannot be changed after a block has been added to the end of the blockchain. It uses a digital signature feature to conduct fraud-free transactions, making it impossible to corrupt or change the data of an individual by the other users without a specific digital signature.

- It is also decentralised, which means transactions are done with the mutual consensus of users, resulting in smoother, safer, and faster transactions. It also means no one has to know or trust anyone else. Each member in the network will have a copy of the exact same data in the form of a distributed ledger.

FUTURE WORK

The model can be extended to incorporate more features in order to scale and cater to a broader audience.

- NFT card packs - Creating NFTs for jewellery sets or any jewellery groups would enable people to buy multiple pieces through a single purchase. This is a feature that can be inculcated in the model to introduce more variety to buyers.
- Virtual gold - Virtual gold is an asset that enables users to exchange and own gold digitally without having any metal physically. This can potentially attract a broader set of investors.
- Further research can be dedicated to enhancing the security features of NFTs for jewellery. This includes advanced cryptographic techniques to ensure that the digital certificates of authenticity for each piece of jewellery are tamper-proof and verifiable across different blockchain platforms.
- The model can include other luxury items like watches, art pieces, and designer apparel. The feasibility and challenges of applying NFT technology to a broader range of products can be explored.
- Investigation of the environmental impact of using blockchain and NFT technology, especially considering the energy consumption of specific blockchain networks, is a relevant tangential study.

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