NFT Based Secure Platform for Copyright Images[NFT-SPCI]

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Abstract - One of the current problems artists face regarding the use of their digital art without their consent. With the increasing accessibility and ease of sharing digital content online, it has become more challenging for artists to protect their work from unauthorized use or reproduction. Digital art can be easily copied, shared, and manipulated without the artist's permission or proper attribution. This can lead to no recognition for the artist or even in some cases, individuals may even profit from the unauthorized use of an artist's work, further exacerbating the issue. This is a wide spread issue in present found on social media platforms. To prevent this we have proposed block chain based platform with the implementation of NFT, where digital artist can create an NFT for their art and can claim the ownership and the authenticity of the digital art and their copyrights without any issue, and also sell their art using Crypto currencies.

Index Terms - NFTs, Block chain technology, Ownership verification, Authenticity verification, Digital images and secure platform.

I. INTRODUCTION

The current problem with this generation of artist is that every art piece is made digitally using tools like Photoshop, Procreate, etc, and being uploaded into sites like Etsy.com to sell their art piece. But these platform are not designed in a way where people can just download the images of the website without any purchasing or any permission from the creator. This poses a serious threat to the artist as his/her work is being used without any consent which is also the issue of copyright infringement.

Digital art can be easily be manipulated without the creators knowledge. This can lead to widespread dissemination of the artwork without any benefit or recognition for the artist. Another challenge is the difficulty in tracking and monitoring the unauthorized use of digital art. With the vastness of the internet and the ability to quickly disseminate content across various platforms, artists may find it challenging to discover instances of infringement or take appropriate action.

While copyright laws exist to protect artist rights, enforcing those rights in the digital realm can be complex and time-consuming. Artists may need to employ various strategies, such as watermarking their artwork, registering their copyrights, or actively monitoring online platforms for unauthorized use. To prevent this we have come up with a solution where we have created a platform for all types of digital art creators where they can publish their art and have unique hash generated for that specific image and a time line on when and how the art was created and the method used to make the image into NFT. Our platform also shows the age of the NFT, so that one can claim the ownership of the art.

We have provided detailed explanation of the concepts used by different researchers in literature survey part. And how we have combined it to solve the above mentioned issues faced in the current generation. We have also explained the current procedure for creating copyright claiming for a particular art in current system for applying copyright. We have proposed a procedure to creating our own NFT for our digital art.

Rest of this research paper has been organize as follows. Section 2 provides detailed explanation of the concepts and problems considered by different researchers in literature survey part. Present process of COPYRIGHT Registration has been discussed in section 3. Proposed system of our work has been discussed in section 4. Technological stack to implement is specified in Section 5. Results is discussed in Section 6. Then the final conclusion has been discussed in Section 7.

II. LITERATURE SURVEY

In recent years, they have discovered that online piracy has increased all around the world. The widespread practise of sharing images, photographs on social media has resulted in infringement of copyrights. One of the main causes of these infringements is the false belief that all content uploaded on social media is free, which is fuelled by ignorance of the existence of copyright in such works.

Guadamuz et.al [2] have found a way to prevent the visual arts such as painting, gif, and image from being tokenized and García et.al [4] created a unique piece of data and claim the ownership. Using the concept of block chain and smart contract, they have assigned a unique id for that image and add it into the block chain network and also create a smart contract for ownership. When it comes to rights, Murray et.al [3] have analysed and found a way to implement digital rights management to copyrighted images, particularly to managing the rights where transferring rights is one of them. Kireyev et.al [11] have also explored the opportunities and challenges while identifying points of convergence like digital art protection, NFT licensing and copyright enforcement. They have explained the relationship between NFTs and copyright while highlighting the necessity of additional legal policy and advancements.

Nagpal et.al [12] have examined the design of platforms being used to sell NFT images by pinpointing best development practices, as well the features and capabilities and the interfaces that different platforms provide. We are launching a platform for copyrighted images, providing a secure way for creators and collectors to buy and sell and trade unique digital assets, using the concepts provided by [1][2][3][4][12].

Since they have not yet addressed this issue in the digital art space, we have decided to create a platform where digital artist can create NFT of their art and store it in a Block chain network. Digital artist can ensure the ownership of their art in NFT-SPCI, and keep the copyright trademark for themselves without any hassle.

III. PRESENT PROCESS OF COPYRIGHT REGISTRATION.

To apply for copyright protection, determine if your work qualifies and locate the appropriate copyright office in your country. Conduct preliminary research to ensure there are no conflicts with existing copyrights. Prepare the required application materials, including a completed form and supporting documentation. Register your work by submitting the application and paying any necessary fees. Wait for the copyright office to process your application, which may take some time. Once approved, you will receive a copyright certificate as official proof of registration.
This procedure takes a lot of time and effort in order to obtain a trademark as shown in fig.1.

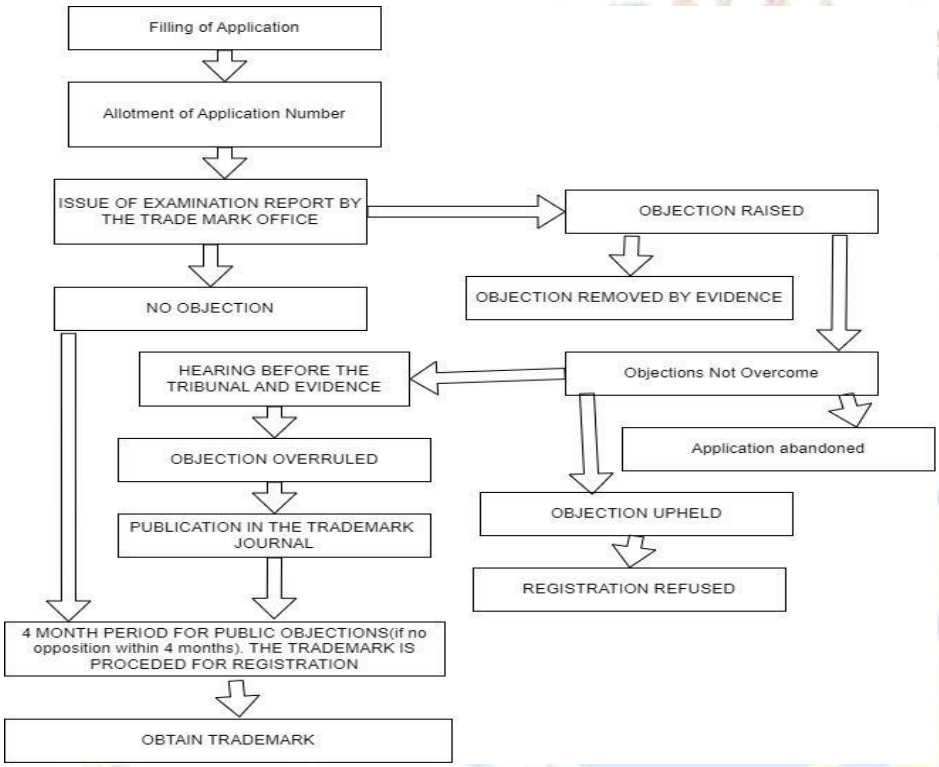

Fig. 1. Procedure for applying for a trademark.

IV. PROPOSED NFT BASED SYSTEM

To construct and manage the NFTs, select an NFT standard like ERC-721 or ERC-1155.
1: Create your digital art.
2: Prepare the metadata: input the title, description, artist details or any attributes associated with the art.
3: Set up a digital wallet: Connect the MetaMask wallet to the platform.
4: Minting NFT: By calling the function (CC^{NFT}), generates a unique token ID of your NFT.
5: Pay gas fees: Pay certain gas fees to execute the make item function (MK^{NFT}).
6: Deploy the NFT: NFT is deployed onto the BCN.

Whenever any art creator wants to register his/her art for copyright, as a first step he has to determine the type of image. The rights of the copyright holder, and any restrictions on how the NFTs can be used are all part of this. Then we need to connect out digital crypto wallet, Meta mask in our case, which stores our NFT's and facilitates transactions. After connecting our wallet, we can initiate the process of converting the image into NFT using CC^{NFT} function which uses smart contract to create the unique hash for that image. After generation of Hash, we need to pay gas fees which allows the execution of the function [MK^{NFT}] to convert the digital art into NFT. Next we can deploy the art onto the block chain network which stores the attributes of an image in the Block chain network [BCN].

V. NFT-SPCI

I. NFT-SPCI SYSTEM DESIGN

This platform has 2 types of end users, the Art creator who creates the digital art is the seller and the art collectors who collect these types of art is the buyer.

a) Buyer:

Whenever any end user wish to purchase an art, he has to,

- Connect to Meta Mask wallet.
- Browse the platform.
- View the details associated with NFT.
- Purchase the NFT with crypto.
- Authorize the transaction in the wallet.
- Figure 2 denotes the functionality of the buyer.

b) Seller:

Whenever the art creator wants to create NFT, he has to,

- Connect dedicated Meta Mask wallet.
- Select the digital art image.
- Declare the attributes of the NFT.
- List the art in the platform as NFT.
- Figure 3 denotes the functionality of the seller.

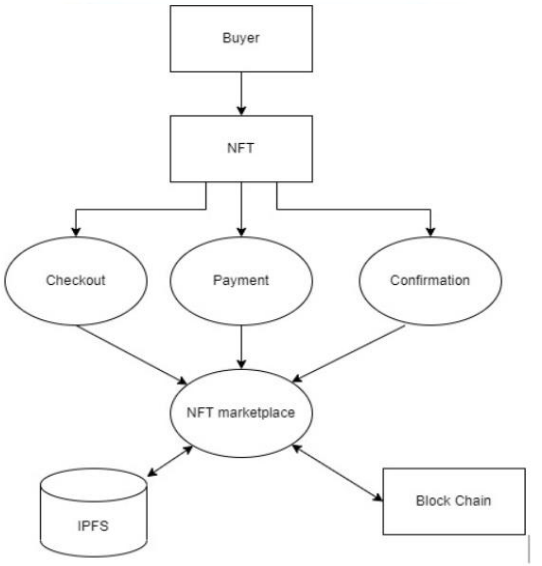

Fig.2. Functionality of Buyer

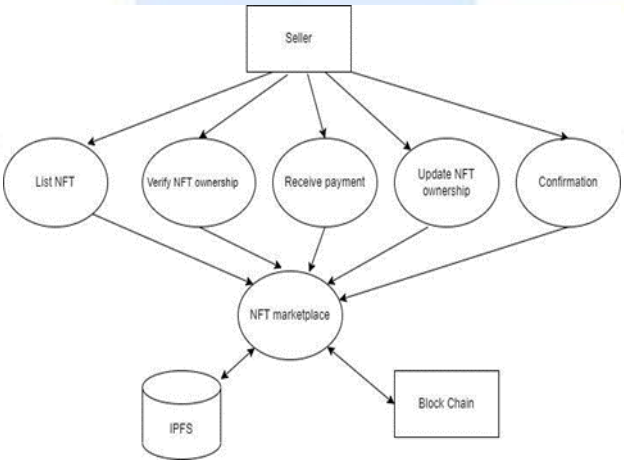

Fig.3. Functionality of Seller

ii. NFT-SPCI SYSTEM ARCHITECTURE

Figure 4 depicts the architecture of NFT-SPCI, where both seller and buyer connect their dedicated wallet to the platform. Buyer can view the NFTs after connecting the wallet and can view the existing NFT on the platform. Buyer can view the details [name, price with description of uploading and managing] of the NFT. If the collector wants to buy a NFT, the RPC protocol based function [RPC^{val}] is called to open the Meta mask wallet and initiates a transaction, after getting the approval for the transaction and paying of gas fees. A block in the BCN is generated with all the attributes of the NFT and stored in the BCN. The NFT is transferred from the creator's wallet to the buyer's wallet.

Creators need to connect their dedicated wallet and then import the digital art created and then specify the details of the art and then upload it. The image is converted into NFT using Mnt^{NFT} function in Backend and the NFT stored in IPFS system which is a decentralized system, and the NFT is displayed on the platform.

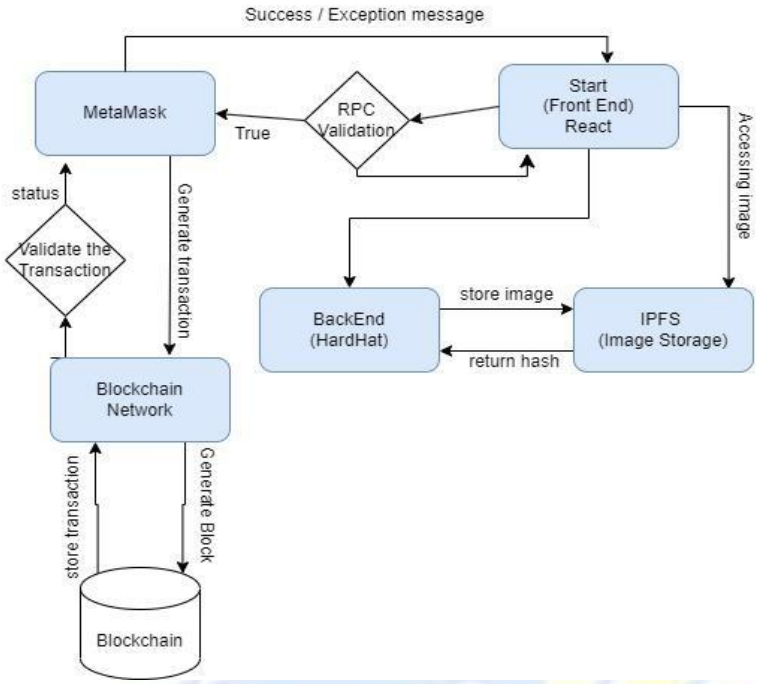

Fig.4 NFT-SPCI System Architecture

VI. IMPLEMENTATION

The actual environment for the implementation is set up using the following technologies.

- MetaMask.
- React JS.
- Hardhat.
- Solidity.
- Vite Framework.
- Ethereum.

NFT-SPCI: Front end (UI) is built using **ReactJS**, which is a JavaScript library that helps to develop user interface. Crypto wallet is integrated with the help of **Meta mask**. For deployment of BCN**, Hardhat** is used which is a development environment for Ethereum software. For smart contracts, **Solidity** is used which is for constructing and designing smart contracts on block chain platforms. For creating the web application, **Vite framework** has been used which is a front end tool for building web applications. **Ethereum** is used to get the crypto currency which is native to ether crypto.

VII. RESULTS

When the user visits NFT-SPCI, he/she is greeted with the landing page as shown in Figure 5. Whenever the seller aka Art creator wants to upload his/her art into the platform, seller must first connect the dedicated wallet to NFT-SPCI. Then is redirected to home page as shown in Figure 6. Seller can view his/her NFT details by clicking on more info button, which displays the details as shown in figure 7. Seller can create an NFT by going onto the create section from the home page and input the details of the Art and upload the art image as shown in figure 8. Then a popup appears which authorizes the transaction as shown in figure 9. After uploading, the art image is displayed which confirms that it is stored in the IPFS system as shown in figure 10. The seller can view the NFTs in his/her wallet by going into My Listed section as shown in figure 11. The seller can view the NFT that have been bought by other user in the My Listed section and sold division as shown in figure 12. Buyer who is art collector also needs to connect to wallet after going to landing page as shown in Figure 5. He/she can view the NFT by clicking on View Info on the NFT as shown in figure 13. If he/she is interested can buy the NFT from the view info section, and approve the transaction which deducts the mentioned crypto value from the wallet as

shown in figure 14. Buyer can also view the purchased NFT is purchases section as shown in figure 15. Either the buyer or the seller can view all the transactions made from their account by clicking on the wallet address in the home section, which redirects to the polygon scan section which display all the transactions as shown in figure 16.

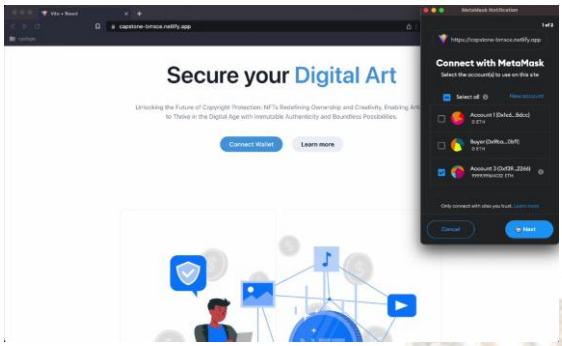

Fig.5. Connect wallet

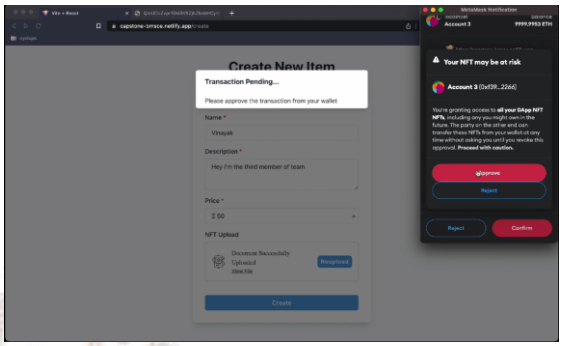

Fig. 9. Approving NFT

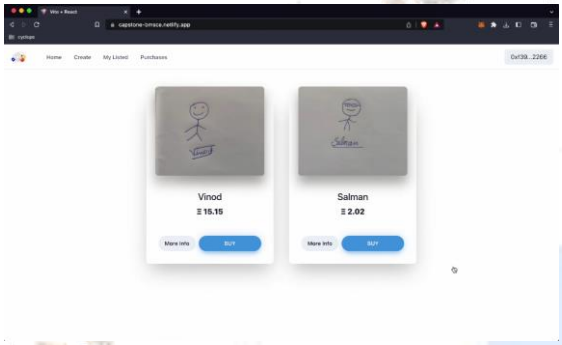

Fig.6. Home page

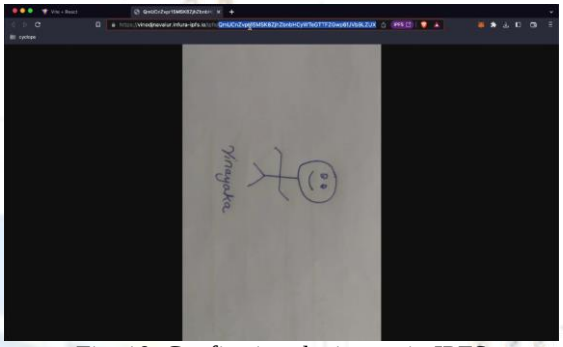

Fig. 10. Confirming the image in IPFS

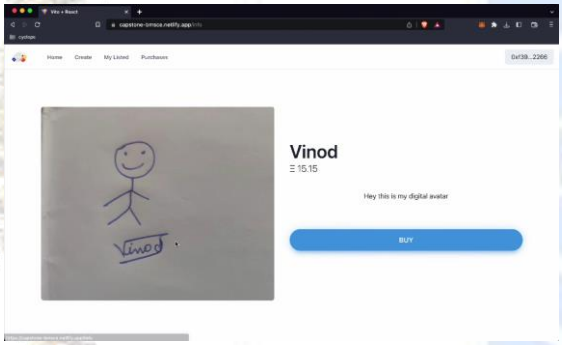

Fig. 7. Viewing info of existing NFT

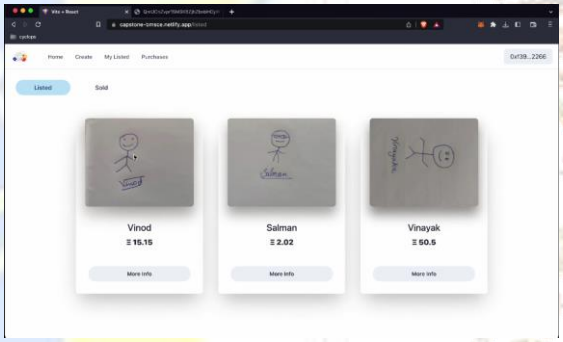

Fig. 11. List of sellers NFT

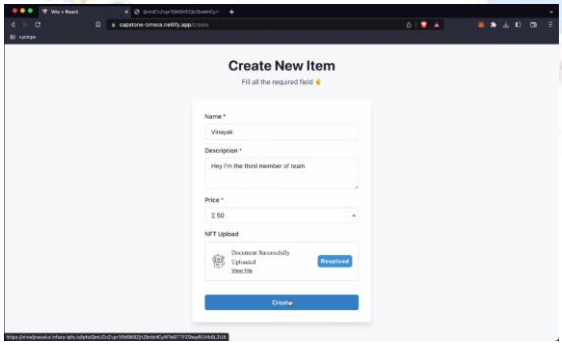

Fig. 8. Creating NFT

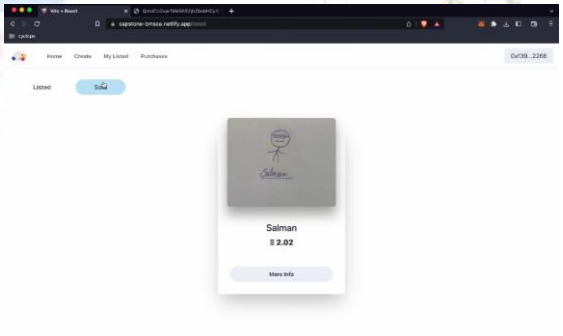

Fig. 12. Sold NFT

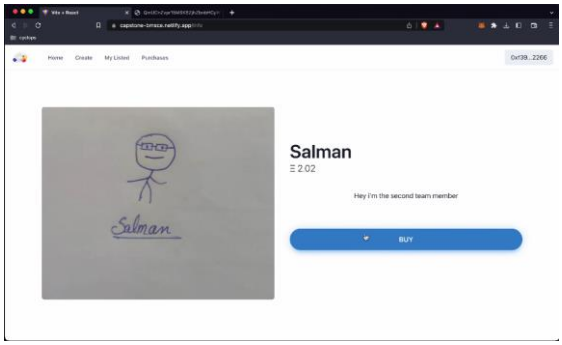

Fig. 13. Viewing NFT

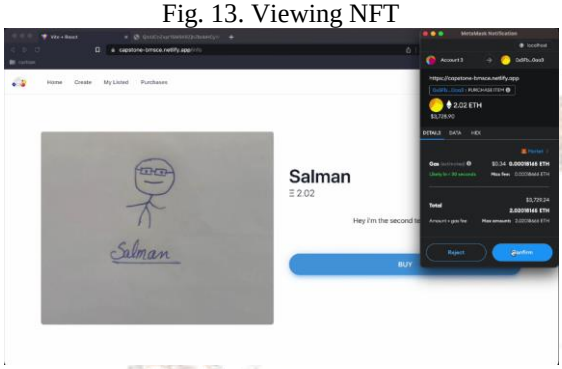

Fig. 14. Buying NFT

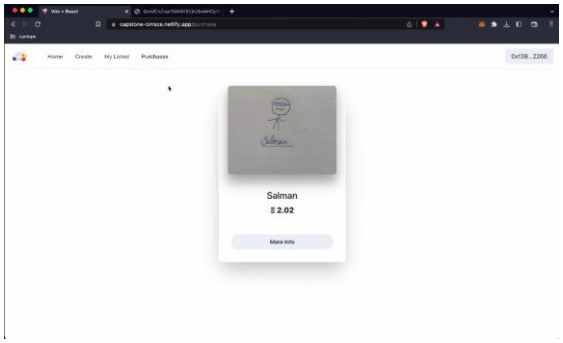

Fig. 15. Viewing purchased NFT

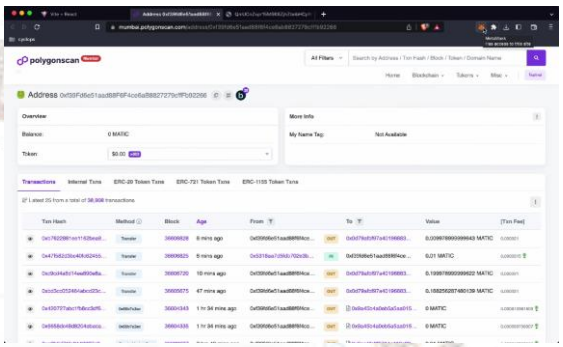

Fig. 16. Block chain record of all transactions

VIII. RESULTS

The propose idea of NFT-SPCI has been successfully developed using the key features including NFT minting, smart contract integration, and safe digital markets throughout the course of the work. Together, these elements create a strong ecosystem that protects the rights of creators and artists while fostering trust and transparency among consumers and collectors.

The NFT-based safe platform for copyright images presents a viable overall solution for the digital art market, solving the issues of provenance, fair pay, and copyright infringement. Results have proved that platform creates a safe and transparent ecosystem that benefits artists, collectors, and the larger creative community by utilizing block chain technology and NFTs.

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