Lab 1 - Product Description

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CS 410

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2nd Draft

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1. Introduction

The distribution of art is how one can showcase the art for sale, and in today's landscape that distribution can be done digitally. A new form of digital art distribution called a Non-fungible Token (NFT) has risen in popularity as in 2021, with the NFT market reaching a value of forty-one billion dollars (Business Insider, 2022). An NFT is a digital certificate for a piece of digital art that is created and stored on the blockchain to signify ownership of said art (BBC, 2021). A NFT can be sold for a large sum of money as the musician Grimes was able to sell some of her art for more than six million dollars (BBC, 2021). With how lucrative the NFT market is in terms of turning a profit, there are bound to be people who desire that profit. The main obstacle for them is getting digital artwork to mint their NFT to sell to an audience. While some people create their own art to mint NFTs out of them, others steal pre-existing artwork created by other people to mint and sell NFTS. The art platform DevaintArt has sent out ninety-thousands alerts of possible NFT art theft, with the number of alerts doubling from October to November of 2021 to three hundred percent more alerts from November to December of 2021.

If an artist has their art stolen and used to create an NFT, what can they do about it? The artists would have to find the infringing NFT and submit a DMCA to takedown said NFT. This includes knowing the legal process and filling out the right documents for submission, which artists may not have the time or knowledge to do correctly. This issue is further quantified if more than one piece of their art is stolen. Art Guardian is an application that exists to help artists find infringing NFTs and send DMCAs to said NFTs. Art Guardian is a progressive web application that allows a user to upload their art to our application so that our app can monitor NFT marketplaces for infringing art NFTs. Once a stolen art NFT has been found, the application would generate a DMCA takedown request that requires the user's e-signature to

approve. Once the DMCA is approved, then the DMCA is sent to said marketplace to notify them of the NFT in hopes removing the NFT. This is a solution that would simplify and hasten the protection of the user's art.

2. Product Description

Art Guardian is a progressive web app where users upload their artwork into our database. The artwork has top be the user's original art, any violation will of this rule will be punished accordingly. Once the art is uploaded, the application will monitor popular NFT marketplaces for any NFT that is minted using artwork without the artist's permission. Our application will not add watermarks to the user's art as that changes the integrity of the art. Our application is also unable to prevent the act of minting of an illegitimate NFT beforehand, it only focuses on the created NFT afterwards.

2.1 Key Product Features and Capabilities

Art Guardian allows the user to upload their art into our database for NFT marketplace monitoring. An NFT with stolen art is found using an image matching algorithm that compares what art was uploaded to our database to the art used for the NFT. Once a stolen art NFT is found, the app will send the user a notification about the NFT. Once the user requests a DMCA takedown, our app will generate a DMCA and send it via email to NFT marketplace with the infringing NFT. If the marketplace does not comply, then it is up to the user to pursue further legal action. A user will also be able to whitelist any NFT they minted themselves so that their NFT is exempt from marketplace monitoring.

A profile on Art Guardian will contain the user's legal information so that the user's identity is verified and the DMCA can be generated with the information. The profile will also link to the

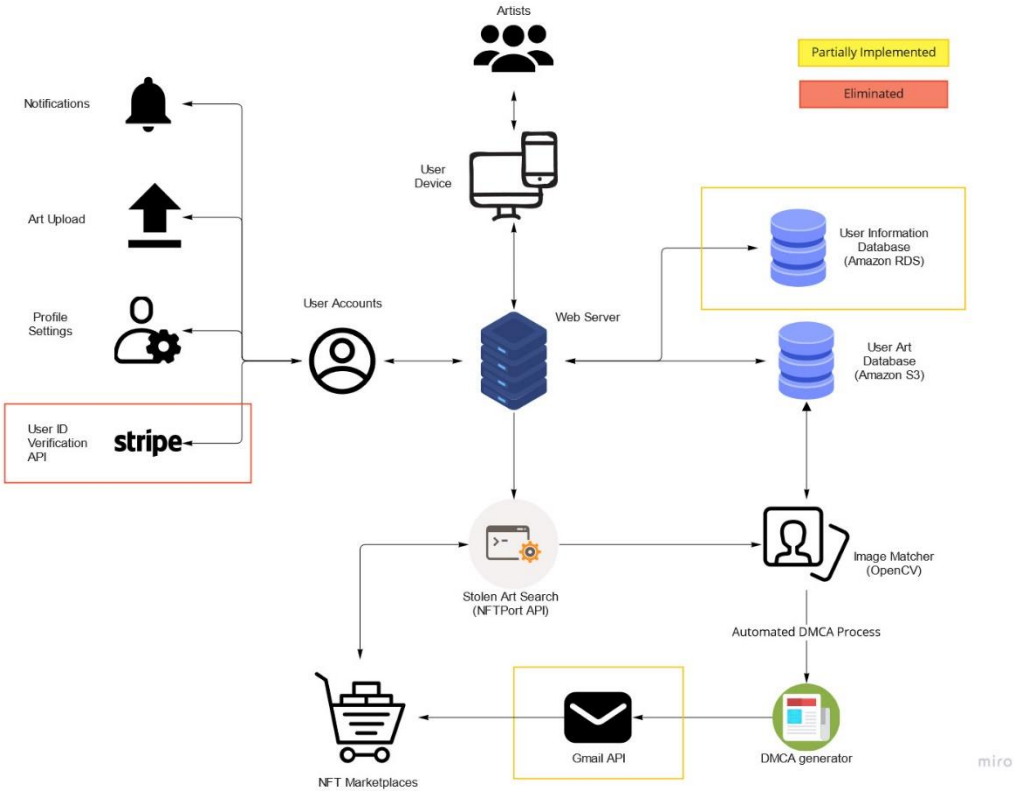
user's art account for verification that the art uploaded is their art. All DMCA requests that have been sent and or in-progress are stored in our database. The app will monitor and update the progress of their DMCA, and if the user chooses to pursue further legal action, the app will provide them with the necessary information. The app will also provide a "Tips and Tricks" and "FAQ " section to provide resources for defense against illegitimate NFT minting and troubleshooting.

2.2 Major Components (Hardware and Software)

Art Guardian will be available on IOS and Android devices and desktop computers. The desktop website will be programmed using HTML, CSS, and JavaScript while JavaScript is used for Android and React Native is used for IOS. Art Guardian will use Amazon RDS and AWS for storage and encryption of user data and art. Git will be used for version control and team development. The NFT Port API will be sued to monitor art NFTs on marketplaces, with OpenCV being responsible for image matching using art uploaded from the user. The user's identity will be verified using the Stripe API. A DMCA generator will automatically generate DMCAs that will be sent via email through the Gmail API. The Major Functional Diagram in this section illustrates how our application is built and the ways it communicates with each of its components to perform its designated task.

Figure 1

Art Guardian Major Functional Component Diagram



The figure above shows Art Guardian's Web Server communicating with user account information, the users themselves, the databases used to store user information and art, and the NFT Port API.

3. Identification of Case Study

Art Guardian is intended for use by commissioned artists as their livelihood is dependent on them being able to sell their art. Art theft through the means of NFT minting threatens their livelihood as they aren't receiving the money made from those NFTs being sold. The case study group that will be used for the testing of this application will be ODU art students. The students would upload art that the application can use to test image matching. The students will also preview UI and notifications to provide feedback on how to streamline the application to be user

friendly. Art Guardian exists to protect commissioned artists and NFT artists with the eventual goal of expanding protection to all digital artists. It can also be used with art platforms for further protection.

4. Art Guardian Prototype Design Description

4.1 Product Prototype Description

4.2 Architecture (Hardware/Software)

4.3 Features and Capabilities

4.4 Development Challenges

5. Glossary

Art Platform - A website in which users can post their digital art

Blockchain - An immutable ledger that anyone can validate

DMCA (Digital Millennium Copyright Act) Takedown - A request sent by the owner of the copyrighted content to remove the infringing content from the internet or platform

Minting - The process in which the files become part of the blockchain

NFT Marketplace - An online platform in which NFTs are minted, sold, and collected

NFT - Non-Fungible Token, a certificate of ownership stored on a blockchain that links to a file

Non-Fungible - Unique, indivisible, and irreplaceable

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