

SIR NFTs

USYD FinTech Bootcamp Capstone
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Agenda

- Project Overview
- Datasets used
- ML Models & Learnings
- DEMO
- Outcome
- Future Direction

Division of work amongst the team:

- Slide Deck Manager, coding for smart contracts, minting NFT and hosting on a blockchain: **Shayan**
- README.md file Manager, building + coding the WGAN model. Designing the digital artwork: **Isabel**
- GitHub Manager and project introduction: **Ram**

SIR NFTs



Concept: Create NFTs and use smart contracts to list them on the Ethereum blockchain

- Create artworks using AI/ML
- Create a smart contract
- Register and appraise the artworks
- List the artworks on a NFT marketplace (in our case OpenSea)
- Set the artworks up for sale
- Create a framework for commercialisation

Machine Learning Models



GAN

MNIST
CIFAR-100

- Initial GAN experiments on basic datasets: MNIST's grayscale digits and CIFAR100's colored images.



WGAN

Dmlab Dataset

- Advanced WGAN training on Dmlab: this dataset contains frames observed by an agent in the DeepMind Lab environment

All Things Data + Deep Learning

WGAN

Consists of a generator
and discriminator
Uses Wasserstein loss
for stable training

DATASETS

Started with simple datasets:
MNIST & CIFAR100
Advanced to more complex
dataset: Dmlab

TRAINING ENVIRONMENT

Google Collab leveraged for
GPU-intensive ML tasks

GENERATOR

Begins with a noise
vector

DISCRIMINATOR

Evaluates the "realness"
of images
Outputs a score rather
than a probability

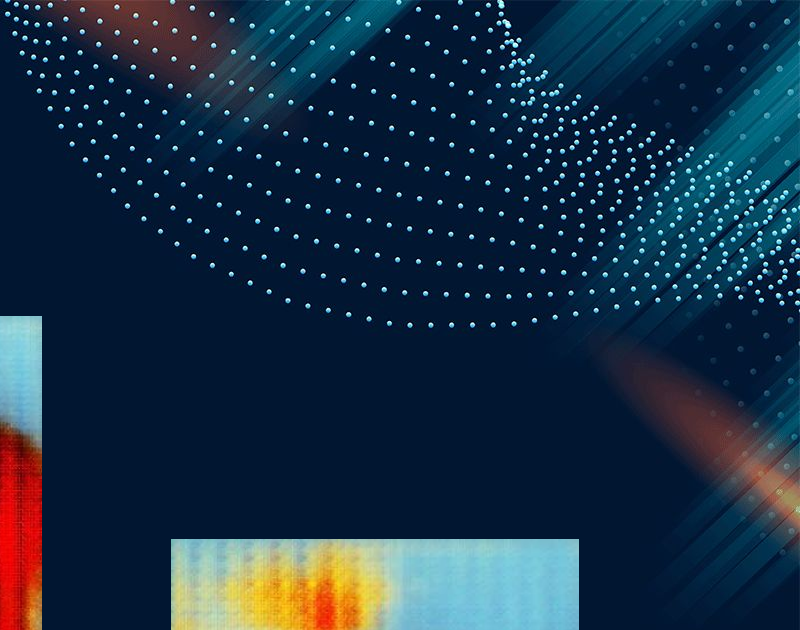
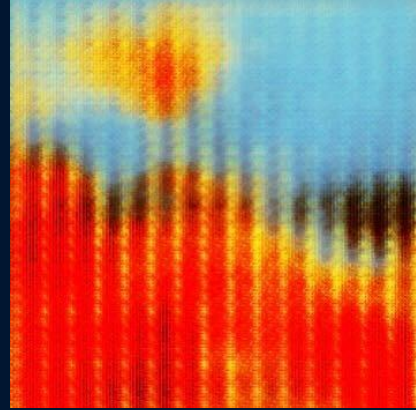
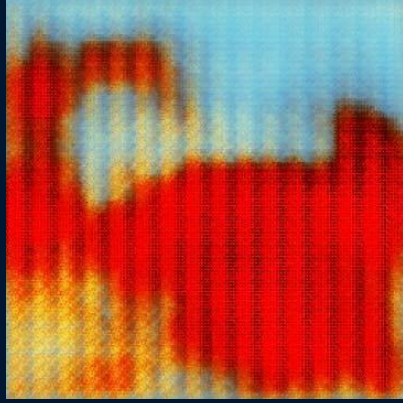
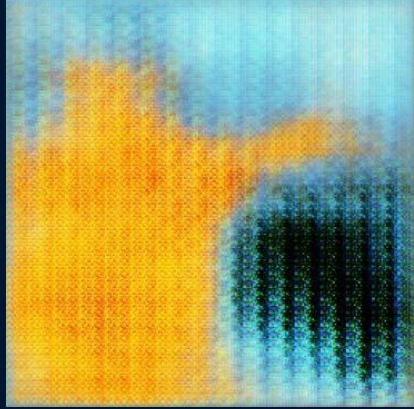
CONSTANTS

Batch Size
Noise Dim
Training Ratio
Epochs

Demo

Quick Code Runthrough





Learnings



Dataset Access

The training dataset could be accessed easily through Jupyter Lab but access was not possible through Streamlit



Copyright

Since the NFTs are planned to be put up for sales, we need to ensure we are not infringing on copyright

Outcomes

Machine Learning

- Model Selection: WGAN
- Training and Testing on Chosen Dataset
- Image Generation
 - Higher Epochs = More Detailed Images

Smart Contracts

- Remix + Ganache + MetaMask
- Python + Streamlit App
- Pinata IPFS

Future Direction



NFT Artworks

Detailed artworks created via higher processing power



Proprietary Images

Utilised authors' proprietary images to train models



Explore Pretrained Models

Tweaks can quickly generate desired outcomes/artwork



OpenSea Listings

Driven through API Connection



Marketable App

Open UI to other users to list their own NFTs



Marketplace Capability

Ability to list NFTs on multiple marketplaces beyond OpenSea

THANKS!

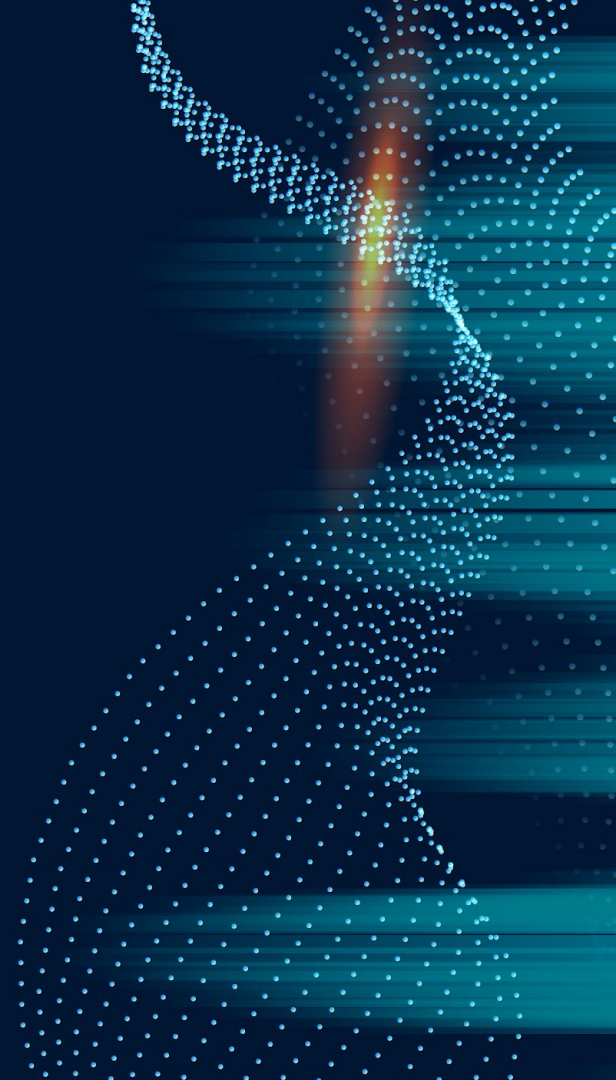
Isabel, Ram, Shayan

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Key Links

- [GitHub Repo](#)
 - Please refer to the **Evidence** folder for screen recordings of the code execution
- [Google Drive Folder](#)



Resources and References

- [Non-fungible tokens \(NFT\) | ethereum.org](#)
- [ERC-721 Non-Fungible Token Standard | ethereum.org](#)
- [A beginner's guide to NFTs — Linda Xie](#)
- [The Non-Fungible Token Bible: Everything you need to know about NFTs | OpenSea](#)
- [How to Create an NFT](#)
- [NFT tokenomics: ideas and examples](#)
- [NFTs Tokenomics: getting started for a successful NFT business](#)
- [NFT Image Size: Correct Dimensions for NFT Art \[With Examples\] - Ebutemetaverse](#)
- [opensea-api - PyPI](#)
- [API Overview](#)
- [Futuristic Background Google Slides and PowerPoint Template](#)
- [@inproceedings{liu2015faceattributes, title = {Deep Learning Face Attributes in the Wild}, author = {Liu, Ziwei and Luo, Ping and Wang, Xiaogang and Tang, Xiaoou}, booktitle = {Proceedings of International Conference on Computer Vision \(ICCV\)}, month = {December}, year = {2015}}](#)
- [Learning Multiple Layers of Features from Tiny Images, Alex Krizhevsky, 2009](#)
- MNIST is made available under the terms of the Creative Commons Attribution-Share Alike 3.0 license. In another source, it says mnist is available for non commercial use, but I would be careful in use
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