Metasurance

Blockchain-based Insurance Administration System with ML-driven Dynamic Pricing for New Metaverse Products

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01

NFT & METAVERSE

Introduction to NFT market and metaverse

02

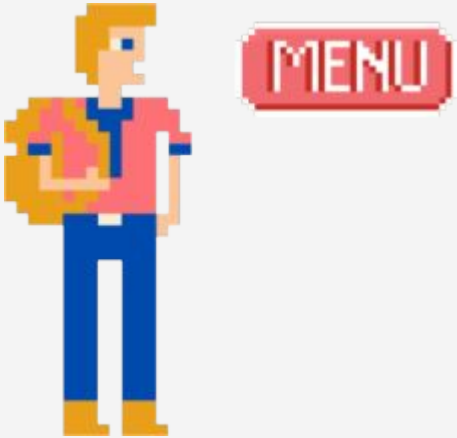
NFT RISK | INSURANCE

NFTs can get lost, stolen or destroyed. What to do?

03

P1: NFT VALUATION

NFT Price Appraisal in Turbulent Market



04

P2: RISK PREDICTION

Calculating risk for an NFT

05

FUTURE WORK

What Next?


Pretext | NFTs

NFTs

[ˈen,ˈef,ˈtēs]

noun COMPUTING

Cryptographic tokens that live on blockchain

– each with its own unique identification codes and metadata that can not be replicated.

NFTs exist in many different formats

Collectibles

Doodles

Limited collection of digital items with different attributes, resulting in varying rarity and trait scarcity. Most popular for trading or flipping.

Metaverse

Virtual representations of real-life objects that have functionality and can be interacted with in the digital world. Tradable for value.

Gaming

Representation of cosmetics and functional in-game items and avatars that can be traded and enable Play-to-Earn (P2E) monetization models.

Art

BEEPLE

Similar to physical art, these are digital versions of images, videos and music. There are supplementary physical items in addition to these digital art.

Sports

sorare

Collectibles, event tickets and rights to events and communities within the sporting realm. Similar to physical baseball trading cards.

Others

ENS

UNSTOPPABLE DOMAINS

Digital assets with features that provide owners with rights on certain platforms. Could be domain names, de-fi collateral, governance tokens, insurance.

What can NFT do?

Provenance

NFTs gives you the ability to track the ownership and the original creator of that content. A feature non-existent in today's current state of the Internet.

Digital ownership

With provenance, comes ownership. Unlike fungible digital files, NFTs create a unique file that specifies original creators and owners of a digital asset.

Digital scarcity

Since these digital contents can now have owners, NFTs brings scarcity to the Internet. With supply and demand dynamics, NFTs can accumulate value.

Metaverse

/ˈmɛtəvəːs/

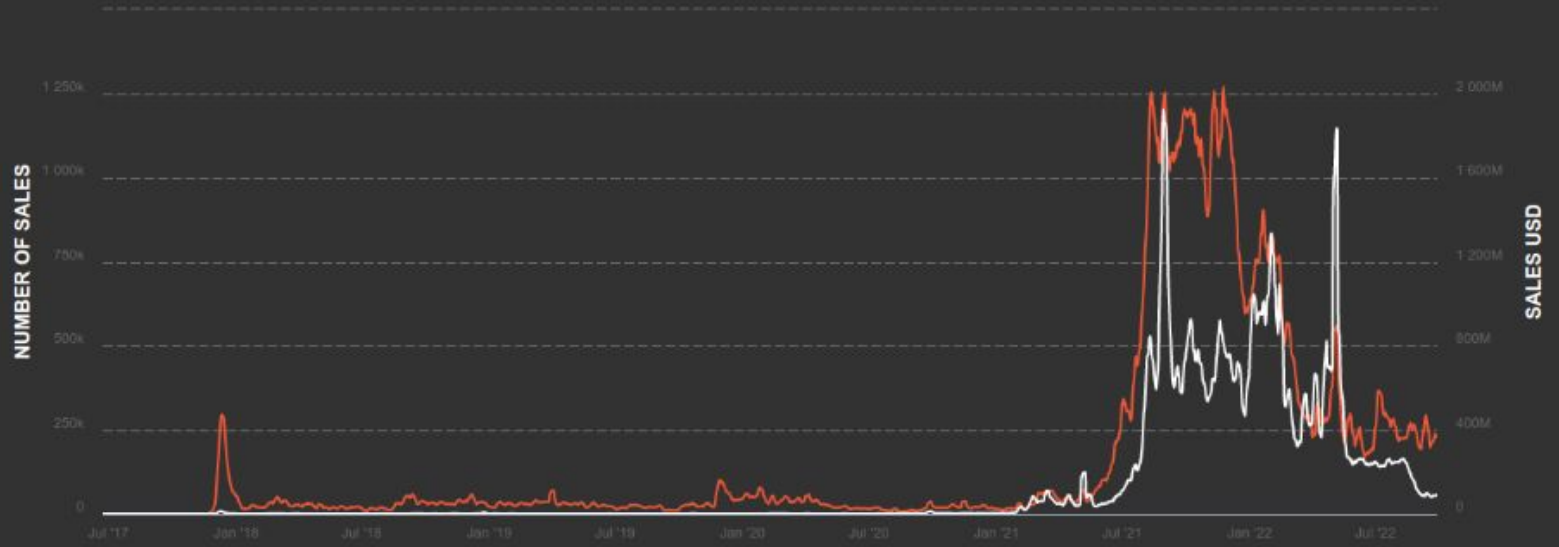
noun COMPUTING

- A public digital space featuring unique, customisabl
  avatars representing individual users,
- Where digital ownership ranges depending on how
  decentralized the platform is,
- where you can engage with other users,
- interact with elements of the digital world, and
- share experiences with others based on the platform

Virtual land in nemesis

Exponential Growth of NFT Market

Number of sales · Sales USD · All · Weekly



Number of sales 230K 1209342.11%	Sales USD US$90M 8791319.80%	Average USD US$390 626.91%	Active market wallets 74K 927312.50%	Primary Sales 107K 595305.56%
Secondary sales 123K 12259300.00%	Primary sales USD US$5M 514228.18%	Secondary sales USD US$85M 127738418.64%	Unique buyers 51K 639612.50%	Unique sellers 38K 1908500.00%

The boom in NFTs has led to a spike in crime around digital collectibles.

More than $100m worth of NFTs stolen since July 2021, data shows

Fake Bored Ape NFTs Outsell Their Original Versions, Calls NFT Authenticity to Question

Marketplace suspends most NFT sales, citing 'rampant' fakes and plagiarism

NFT Insurance

TOKEN PROTECTION

Token theft equates to loss of ownership

INHERITANCE PROTECTION

Contingency plan for release of assets to beneficiaries

PROTECTED TECHNOLOGY

Protection that we can stand behind

VALUATION

Appraisals and qualified valuation of digital assets

AUTHENTICATION

Authenticated assets maintain market value

DISASTER RECOVERY

Not your keys, not your NFT

ASSET STORAGE

Possess the media you own

Insurance pricing model

Given a asset A,
Total Loss (L) = Total Claims (N) x Average Claim Severity (S) / Risk Exposure (e)

The technical price π (or: pure/risk premium) then follows as:

$$\pi = \mathbb{E}\left(\frac{L}{e}\right) \overset{\text{indep.}}{=} \mathbb{E}\left(\frac{N}{e}\right) \times \mathbb{E}\left(\frac{L}{N} \mid N > 0\right) = \mathbb{E}(F) \times \mathbb{E}(S)$$

assuming independence between the frequency and the severity component of the premium.

For an NFT insurance, N (No. of claims) = 0/1 only in the given year
And S (Claim severity) = min(x% of NFT price as declared in policy, Maximum insured amount)
Thus, L (Total loss amount) = 0/S

∴ π (pure/risk premium) = E(claim is made in a given year) ✕ Insured NFT price

E(claim is made in a given year)= P(claim is made in a given year) since maxClaim=1

Working on lst Challenge – The Underwriter's Dilemma

Underwriters face the problem of lack of data and volatility related to NFT market that makes it difficult to calculate a premium and coverage price that would keep the balances green.

We intend to train a ML model that calculates

- NFT Valuation at the time of insurance proposal
- Risk Prediction


NFT Valuation

Previous Work

Mapping the NFT revolution: market trends, trade networks, and visual features

The results of this paper include the statistical properties of the market, a network of interactions between traders (linked by buyer and seller), and a clustering of objects by visual features and collections. The paper also proposes a linear regression model with features based on these results to predict NFT prices.

Group 1: Network Centrality	Group 2: Visual Features	Group 3: Sale History
- Degree centrality of seller - PageRank centrality of seller - Degree centrality of buyer - PageRange centrality of buyer	Five PCA components extracted from the AlexNet vector of the NFT.	- Median price of primary and secondary sales made in the collection of interest. - The prior probability of secondary sale.

Results

	β coefficients						
Feature	**All**	**Art**	**Collectible**	**Games**	**Metaverse**	**Utility**	**Other**
const.	-0.029	0.030	-0.086	-0.181	0.210	2.054	0.149
k_{buyer}	-0.018	0.022	-0.032	-0.132	-0.078	-0.010$^{\bullet}$	-0.207
k_{seller}	-0.166	-0.211	0.000	0.026	0.166	0.198$^{\bullet}$	-0.347
PR_{buyer}	0.129	0.077	0.162	0.317	0.206	-0.241$^{\bullet}$	0.336
PR_{seller}	0.302	0.367	-0.031	-0.066	0.009$^{\bullet}$	-0.382	0.459
p_{resale}	0.029	-0.041	0.079	0.023	0.046$^{\bullet}$	0.465	0.251$^{\bullet}$
medianprice	0.769	0.711	0.970	0.815	0.436	0.478	0.687
vis_{PCA_1}	0.098	0.153	0.049	0.174	0.175	-1.136	0.021
vis_{PCA_2}	-0.120	-0.130	-0.044	-0.064	-0.669	-0.817	-0.181
vis_{PCA_3}	0.019	0.027	0.063	0.203	0.112$^{\bullet}$	-1.292	-0.037$^{\bullet}$
vis_{PCA_4}	0.040	0.028	-0.003$^{\bullet}$	0.130	-0.018$^{\bullet}$	-0.911	-0.116
vis_{PCA_5}	0.063	0.018	0.276	0.102	0.296	0.071$^{\bullet}$	0.301
#NFTs	407,549	251,369	69,015	78,848	2,693	314	5,297
#Collections	3307	114	73	48	12	6	3054
R^2_{adj}	**0.6**	**0.589**	**0.709**	**0.535**	**0.408**	**0.562**	**0.44**

Previous Work

The NFT Hype: What Draws Attention to Non-Fungible Tokens?

This paper focuses on utilizing vector autoregressive models (VARs) to show that core cryptocurrencies, namely Bitcoin (BTC) and Ether (ETH) draw the most attention towards predicting future NFT price.

This team utilizes the S&P 500, google search trends, and the prices of cryptocurrencies as indicators for future price of an NFT. This team highlights that google search trend data is associated with major cryptocurrency returns and NFT collections. In addition to VARs this team uses wavelet coherence techniques to investigate co-movement between cryptocurrency returns and NFT levels of attention.

The results of this paper show that there is no significant relationship between Ether returns and attention to NFTs but there is a relationship between Bitcoin and the prediction of an NFT.

Previous Work

TweetBoost: Influence of Social Media on NFT Valuation

This paper aims to answer two main questions:
a) What is the relationship between user activity on Twitter and price on OpenSea?
b) Can we predict NFT value using signals obtained from Twitter and OpenSea, and identify which features have the greatest impact on the prediction?

While answering this question, the paper seeks to create one of the first NFT datasets consisting of both OpenSea and Twitter data. Using both a Binary and Multi-classification model to first predict whether or not the NFT will be profitable and then classifying the profitable NFTs into varying price brackets. Kapoor et al. concluded that in adding Twitter data to their feature set they were able to increase the accuracy of their model by 6% when compared to a model only using data from NFT platforms (such as OpenSea). This paper gives insights into additional training strategies and features for use within our predictive model.

Aggregated Data Dictionary

Variable	Description
opening_date	Date of which information is being pulled.
average_volume_quote _day	Average price of the NFT as of opening_date.
unique_token_ids_sol d_count	The number of NFTs from a given collection sold in one day.
Relative Search Volume	Relative google search volume for collection name on a scale from 0-100
Events	-1,0,1 indicating bad news, no news, and good news respectively
Gas	A measure of network traffic, which indicates the transaction fee of purchase

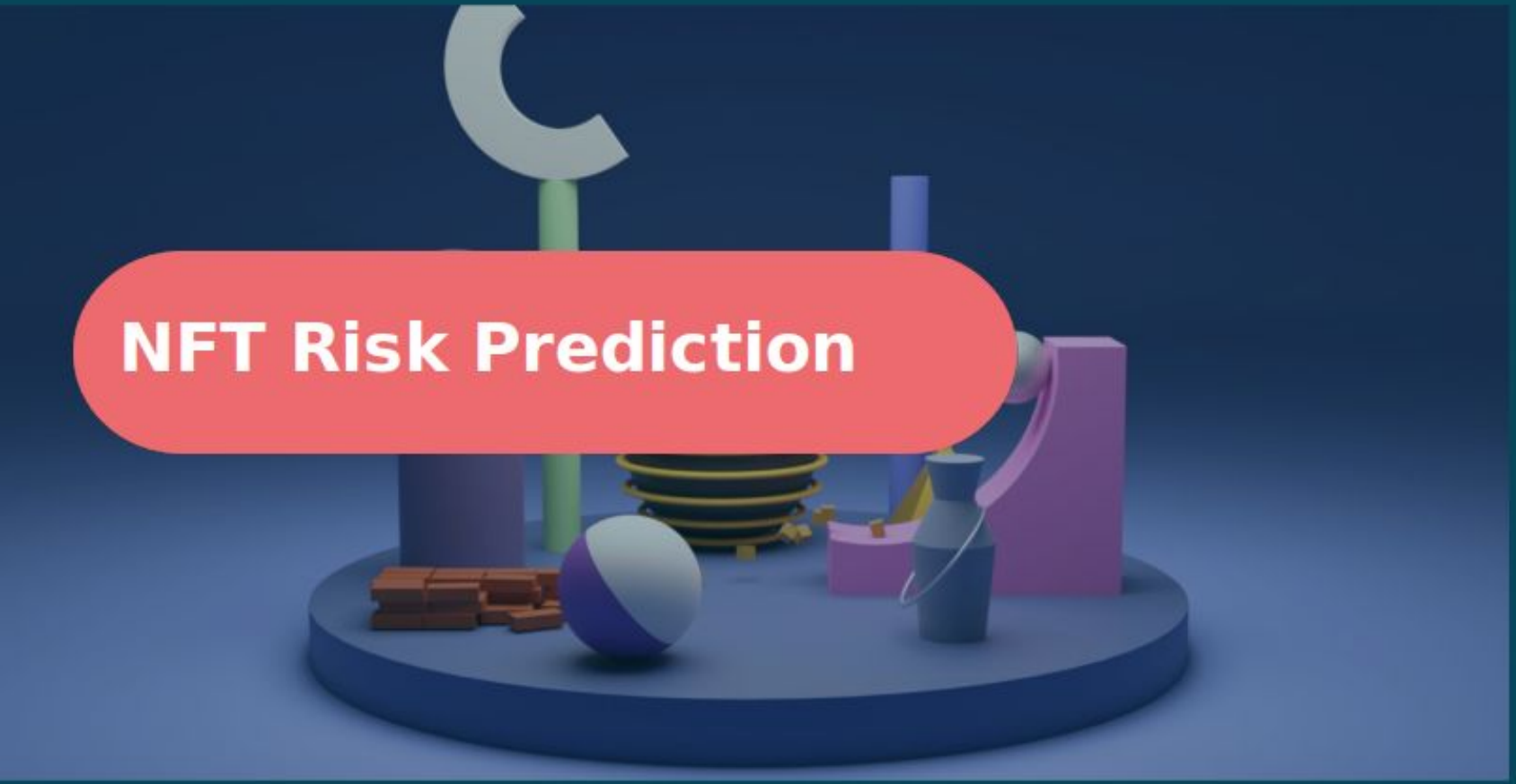
Variable	Description
ETH_USD	Closing price of ETH token.
BTC_USD	Closing price of Bitcoin.
GC=F	Closing price of gold.
^GSPC	Closing S&P value.
^DJI	Closing Dow Jones value.
^NDX	Closing Nasdaq 100 value.
MSFT	Closing Microsoft stock price.
AAPL	Closing Apple stock price.
NFLX	Closing Netflix stock price.
TSLA	Closing Tesla stock price.

Results

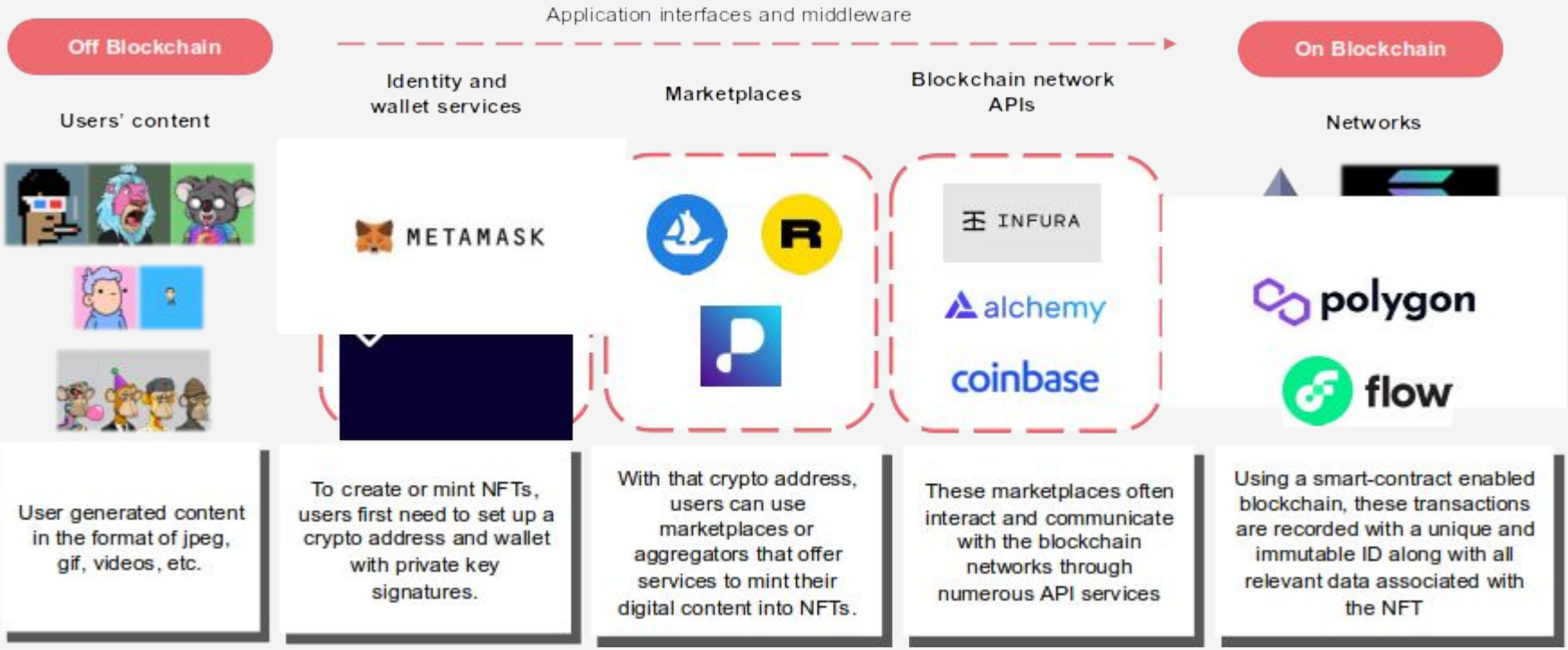
Accuracy is 65.44% and 70.02% for linear regression model on individual NFT collections

- Bored Ape Yacht Club (BAYC) and Cryptopunks respectively .

We are currently working on a RNN regression model that can predict NFT price of different collections simultaneously.


NFT Risk Prediction

NFT Pipeline



NFT Architecture

A set of rules for issuing uniquely identifiable tokens on a blockchain, like ERC-721 on Ethereum	A JSON doc with data that describes an NFT which lives outside the actual NFT and is located by a URI.	Software crypto wallets and cold hardware wallets provide access to underlying assets of the NFTs	NFTs often do not contain the image or video as storing digital data on blockchains is slow and inefficient	Clauses on IP rights such as copyright and ownership rights between creators and buyers	if/then and when statements written as codes that store data and executed upon meeting certain conditions
A standard interface for NFTs that provide basic functionality to track and transfer NFTs separately	Provides users with key information on the NFT such as names, descriptions, traits and links to hosted files	Users view and approve NFT transactions using crypto wallets protected by their seed phrases.	Acts as a mutable pointer to assets located off-chain (i.e. IPFS) and associates NFTs with URIs	Determines the authority of creators and buyers to use the underlying artwork within an NFT	Handles transfers, verifies ownership and authenticity whilst enabling the digital programmable aspect of an NFT

Future Plan

- Train the model for NFT valuation and risk factor with satisfactory results.

Thereafter, work will be done to complete the insurance framework including

  - Application procedure
  - Claim process
  - Claim review process
- Use of AI models
  - to prevent NFT plagiarism
  - to detect NFT wash trading

Thanks!