Ape Minders: Trading Cryptocurrency on NFT Signals

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Overview

- Market universe and data sources
- Feature extraction and regression models
- Trading algorithm
- Backtesting and portfolio performance

Introduction Main Strategy

- Trade in a universe of seven instruments - cryptocurrencies related to or directly used to purchase NFTs (mainly) on their respective blockchains

- Predict returns of these instruments using:

  - Technical factors of the instruments (rsi, bb, atr, macd, etc.)

  - Quantitative NFT data (sales, trades, volume, etc.)

  - Alternative NFT data (sentiment data analyzed from online posts)

- Trading strategy created using signals resulting from:

  - Technical indicators

  - Predicted returns

- Since these instruments are used to purchase NFTs, we hypothesize that NFT related data will work well as features for modeling their prices

Market Universe

- Large-cap cryptocurrencies: **Solana** (SOL), **Cardano** (ADA), **Avalanche** (AVAX)

- Medium-cap cryptocurrencies: **Polygon** (MATIC), **Decentraland** (MANA), **Flow** (FLOW)

- Small-cap cryptocurrency: **Theta Fuel** (TFUEL)

- Date ranges of the ingested data are [2017-10-02, 2022-04-17], but backtesting, model training, and strategy evaluation is done on the range [2021-09-19, 2022-03-20]

- OHLCV data, as well as market cap data, is sourced from https://coincodex.com/

AMI (Ape Minders Index)

- Treated as a benchmark using a buy and hold strategy

- Comprised of the 7 coins that we use as financial instruments for trading

- Is a weighted based on market capitalization-weighted index

- Rebalanced on quarterly basis

Feature Data: Quantitative NFT

- features associated with various NFT markets and collections is sourced from https://nonfungible.com/market-tracker
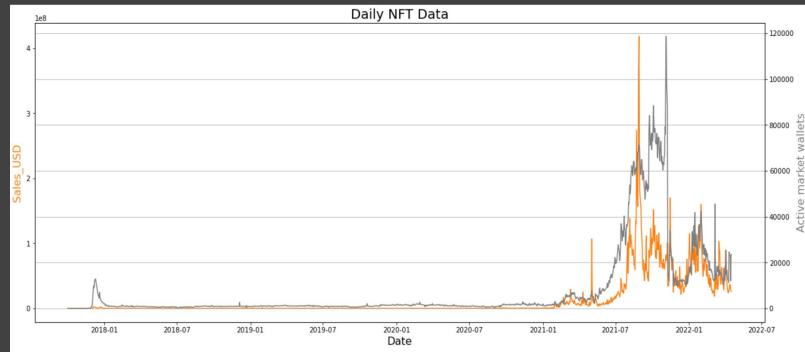

1. Date 2. Number of sales 3. sales USD 4. Average USD 5. Active Market wallets 6. Primary sales USD 7. Secondary sales USD 8. Unique buyers 9. Unique sellers 10. Primary Sales 11. Secondary sales
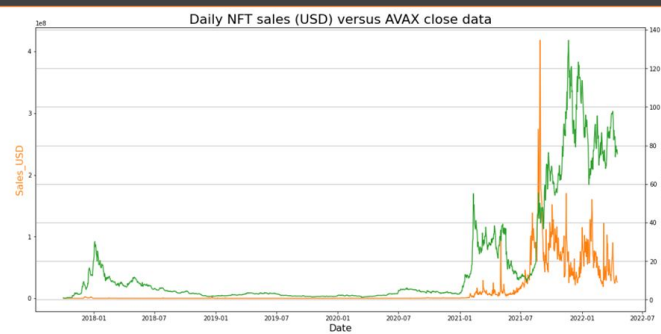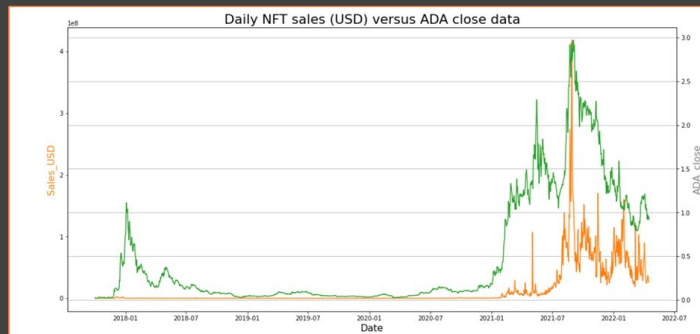
Feature Data: Alternative NFT Data

- Text data from the subreddit r/NFT, which was created in 2016, although the posts acquired from the API only date back to 2019-02-28

- Main posts, or "submissions" only, no comment / reply data analyzed

- Most posts have only a title and media, so we analyze both the title and the text of the post (if any) together

- PRAW and PSAW used to gather ~300k posts from r/NFT
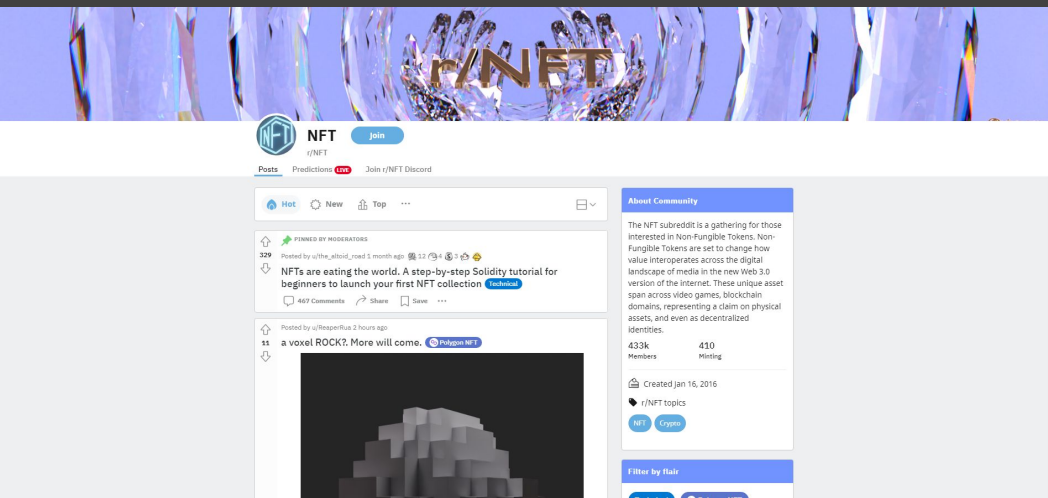
Date	Title	Selftext
2019-02-28	A NonFungible Token Stampede Is Coming – Coinm...	NaN
2019-02-28	Decentraland Creator Contest - Building on NFT...	NaN
2019-02-28	NFTY News	NaN
2019-02-28	'No Wallet Needed': Mobile Cryptopunk Game	NaN
2019-07-06	Yat Siu - NFT is why content will be king again	NaN

Feature Extraction: Alternative NFT Data

- Sentiment analysis on the titles and text of posts done using spaCy with the spacytextblob pipeline component

- There are many more posts from 2021-2022 than 2019-2020

- Two different aggregations (summed polarity and mean polarity) are done for each day

- Sentiment label (-1, 0, 1) threshold of -100< or >100 polarity sum score

- Daily polarity is mostly positive, most likely since not many anti-NFT or bad news posts would by allowed by the moderation
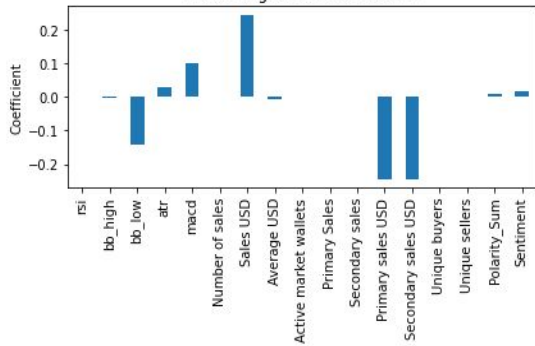
Date	Comb	Polarity
2019-10-16	BLVD Collectible Map Styles : Season 2 is here!.	-0.625000
2019-12-13	Formula0x : One of a kind F1 inspired custom l...	0.600000
2020-03-24	NFTs site for info and promotion. [http://www....	0.600000
2020-04-28	Crazy Defense Heroes NFT collectibles.	-0.600000
2020-04-30	Are you ready for the TrailBlazer? Got your St...	0.604167
...		...
2022-04-17	Nansen Report: The non fungible tokens' market...	0.625000
2022-04-17	PROUD LIONS CLUB 20% DISCOUNT ON WHITELIST SAL...	0.800000
2022-04-17	GIVEAWAY FACE X TRY TO WIN 100 WL...	0.800000
2022-04-17	giving my welcome with this donkey spirit.	0.800000
2022-04-17	"What? You are collecting jpeg son? Absurd!".	-0.625000

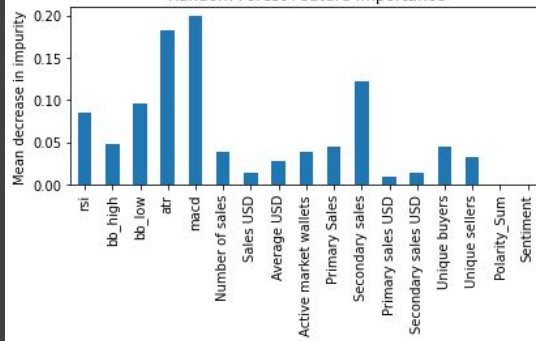| Date	Polarity_Sum	Polarity_Mean	Sentiment
2021-01-01	0.89	0.13	0
2021-01-02	1.37	0.11	0
2021-01-03	1.36	0.12	0
2021-01-04	1.42	0.08	0
2021-01-05	1.96	0.18	0
...	...	...	...
2022-04-13	69.98	0.15	0
2022-04-14	66.05	0.13	0
2022-04-15	61.89	0.14	0
2022-04-16	58.31	0.13	0
2022-04-17	66.96	0.15	0

Regression Models for Returns

▪ With technical factor data and NFT related data, regression models are trained using one-day forward returns as the target variable

▪ Technical indicators of each instrument, as well as NFT quantitative and sentiment data are used to train the model

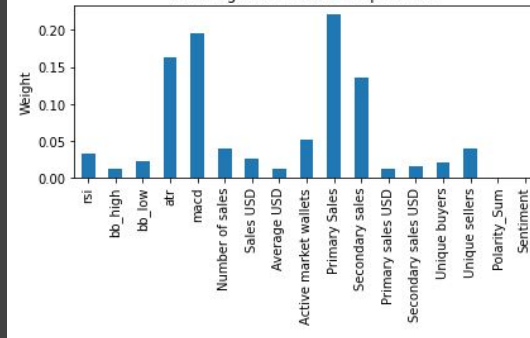▪ Linear regression, random forest, and XGBoost evaluated

Regression Models for Returns (cont.)

Trading Algorithm

Initialization parameters

- Initial portfolio value is 40k USD
- Maximum holding period is 18 days
- Commission percentage is 0.1%
- Spread of the slippage impact is set at 0.2%
- Stop loss variable is set at 2%
- Created equal weights of each coin to hold in our portfolio

Strategy

- Create long signals for the top 2 coins each day whose predicted forward returns are more than 1%
- Create short signals for the top 2 coins each day whose predicted forward returns are less than 0%
- Stop loss on long; sell everything if the coin's price drops lower than the 2% of the first bollinger band

Portfolio evaluation
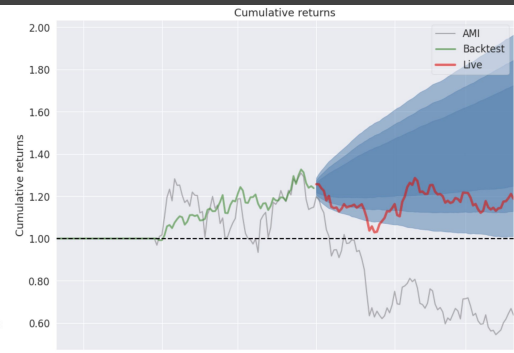
The portfolio's value started from 40000 USD to 47523 USD
By buying and holding the benchmark (AMI index), it starts from 40000 USD to 25504 USD
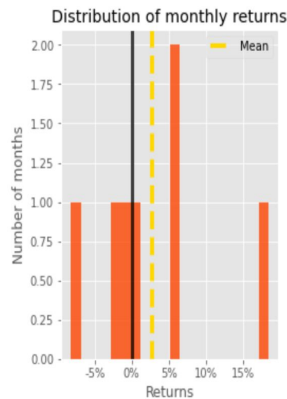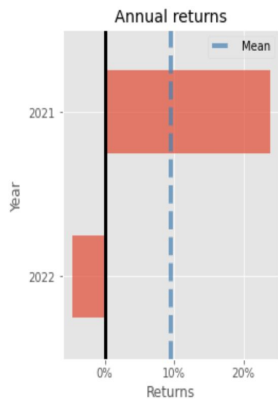
Start date = 2021-11-20
End date= 2022-03-20
In-sample months = 3
**Out-of-sample months = 3**
Live start date = 2022-01-01

In-sample alpha = 0.54
Out-of-sample alpha = 0.52

Additional plots for performance evaluation

Rolling Sharpe ratio (6-month)
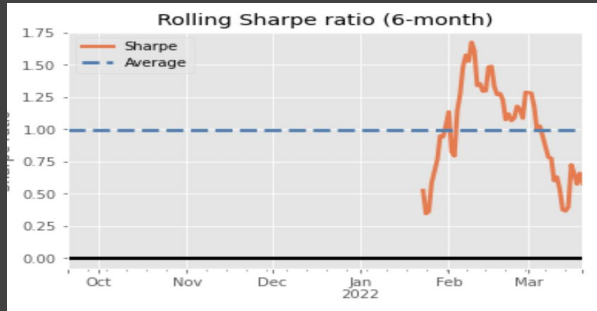
- Risk-adjusted return metric
- Sharpe-ratios above 1 are considered to be good
- Good means offering excess returns relative to its volatility.

- Drawdown plot provides an overview of the worst drawdown periods in the backtest
- The plots coupled together, shows where algorithm struggles. The less volatile an algorithm is, the more minimal the drawdowns

Underwater plot
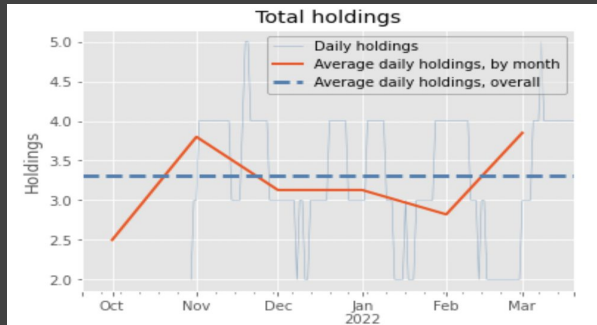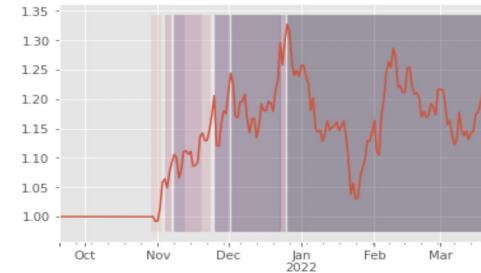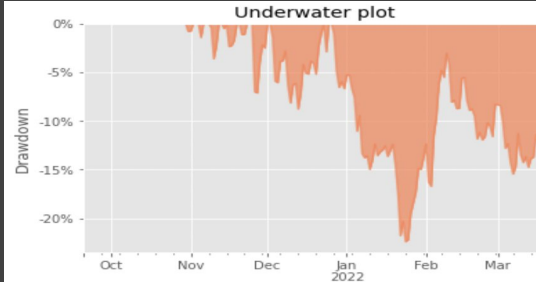
Total holdings

- Use plot to gain an insight into whether the total portfolio holdings fluctuate from day to day
- This plot provides a good sanity check with regards to the trading behavior of our strategy

Conclusion

- Our strategy is effective over our backtesting period, which is a difficult one to predict since it contains the all-time crypto highs

- It could perform differently in other periods

- Text sentiment from r/NFT didn't factor into random forest and XGBoost models, but did slightly in the OLS model

- NFT sales data was useful to all models

- All NFT data used was general and not chain-specific. The latter may increase accuracy / effectiveness