Cryptocurrencies Prediction & Forecast

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Overview

Novelty/Originality

- Reframe the problem - Predict the timing of **buy and sell** instead of price
- **Self-invented method** to predict the sweet buying/selling timing
- Monitor large transactions
- Real-Time whale alerts
- Event subscription

Big data challenge (volume, variety, and velocity)

1. **Volume**
   - The volume of transaction price/volume
   - Twitter posts
   - Reddit posts
   - Google trend
   - Wikipedia pageview
2. **Velocity**
   - Twitter streaming data
   - Transaction streaming data
3. **Variety**
   - Cryptocurrency transaction structural data
   - Cryptocurrency wallet in and out data
   - Twitter text data
   - Reddit text data
   - Google search popularity
   - Wikipedia Bitcoin topic popularity

Business value

- Provide valuable and accurate metric
- Offer a powerful tool for investors to increase their profit
- Help investors earn more money

Method & Challenges

Data labelling

Labels: Buy, Hold, Sell

Problem

To few buy and sell points. Only 3% of the data is labeled as buy or sell point, highly **imbalanced dataset**.

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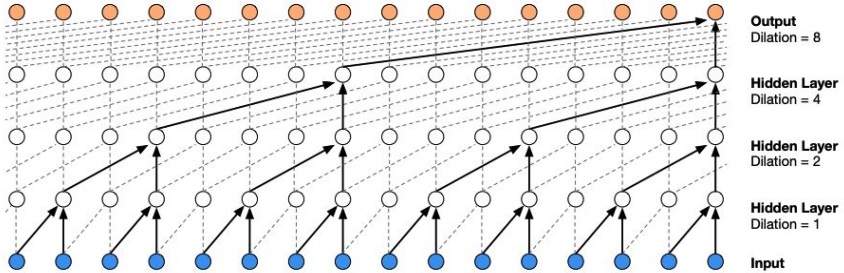
Solution: Loss Weight + Smooth data

Set a tolerant threshold (0.03). For example, if price 100 is one of our buy points, any price point that is smaller than 100*1.03 will also be labeled as “buy” point.

Deep Learning Models

WaveNet

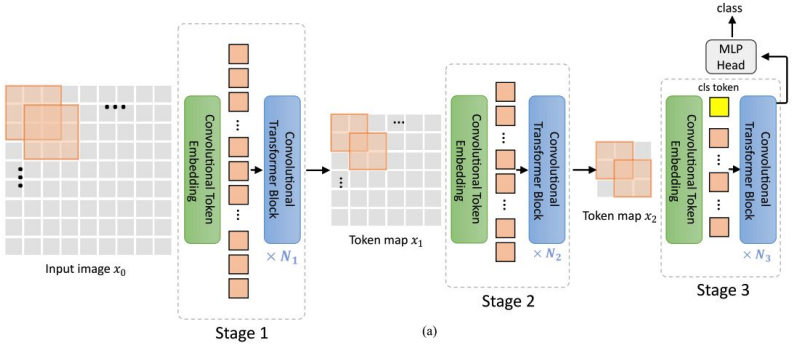
Parameter size ~ 40K



https://arxiv.org/pdf/1609.03499.pdf

CvT
(Convolution Vision Transformer)

Parameter size ~ 1M



https://arxiv.org/pdf/2103.15808.pdf

Problem

At the beginning, the result is too noisy. The model obviously doesn’t provide good strategy.

Solution

We use three strategies to solve the problem:

Probability Distribution:

(buy:0.8, sell: 0.1, hold: 0.1 v.s. buy:0.4, sell: 0.3, hold: 0.3)

1. Use entropy as a threshold.
2. Use highest percentage as threshold.
3. Use difference between the highest and the second highest percentage as threshold.

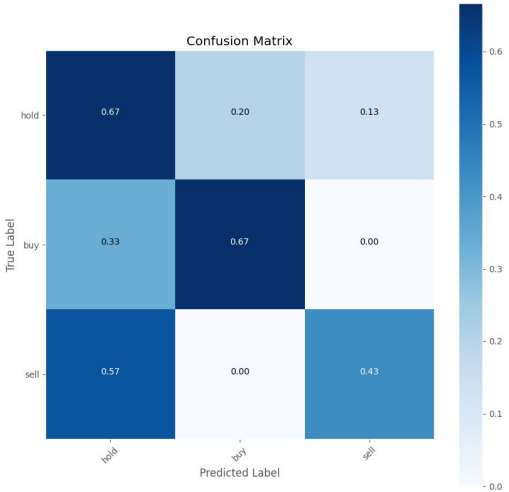
   In our observation, **result 1 and 2** usually have better performance.

Result

Cleaned version:

How to evaluate our model?

- **Confusion matrix**: Confusion matrix can give us the preliminary concept of how good our model is. However, because our model is used to predict “buy” and “sell” points, the accuracy doesn’t fully explain our result at all.



How to evaluate our model?

- Confusion matrix
- **Backtesting**: Backtesting is one the most straightforward solutions. In our model, we just try to imitate the actions of real people: buy at buy points and sell at sell points. Here, we suppose we have one million US dollars in the beginning. And see how much we can earn at the end.

Training data and Test data

Training data: from 2015-07-20 to 2021-03-03

Test data: from 2021-03-04 to today

Why? Because the Bitcoin price on 2021-03-04 is about 49000 (USD), and the price today is about 47000 (USD). We choose similar start price and end price to avoid biased output.

Backtesting Result: every 1 day data

Model1: BTC price/volume

Model2: BTC price/volume + Google Trend

- Use entropy as threshold: $1369306
- Use percentage as threshold: $1215603
- Use difference as threshold: $1162341

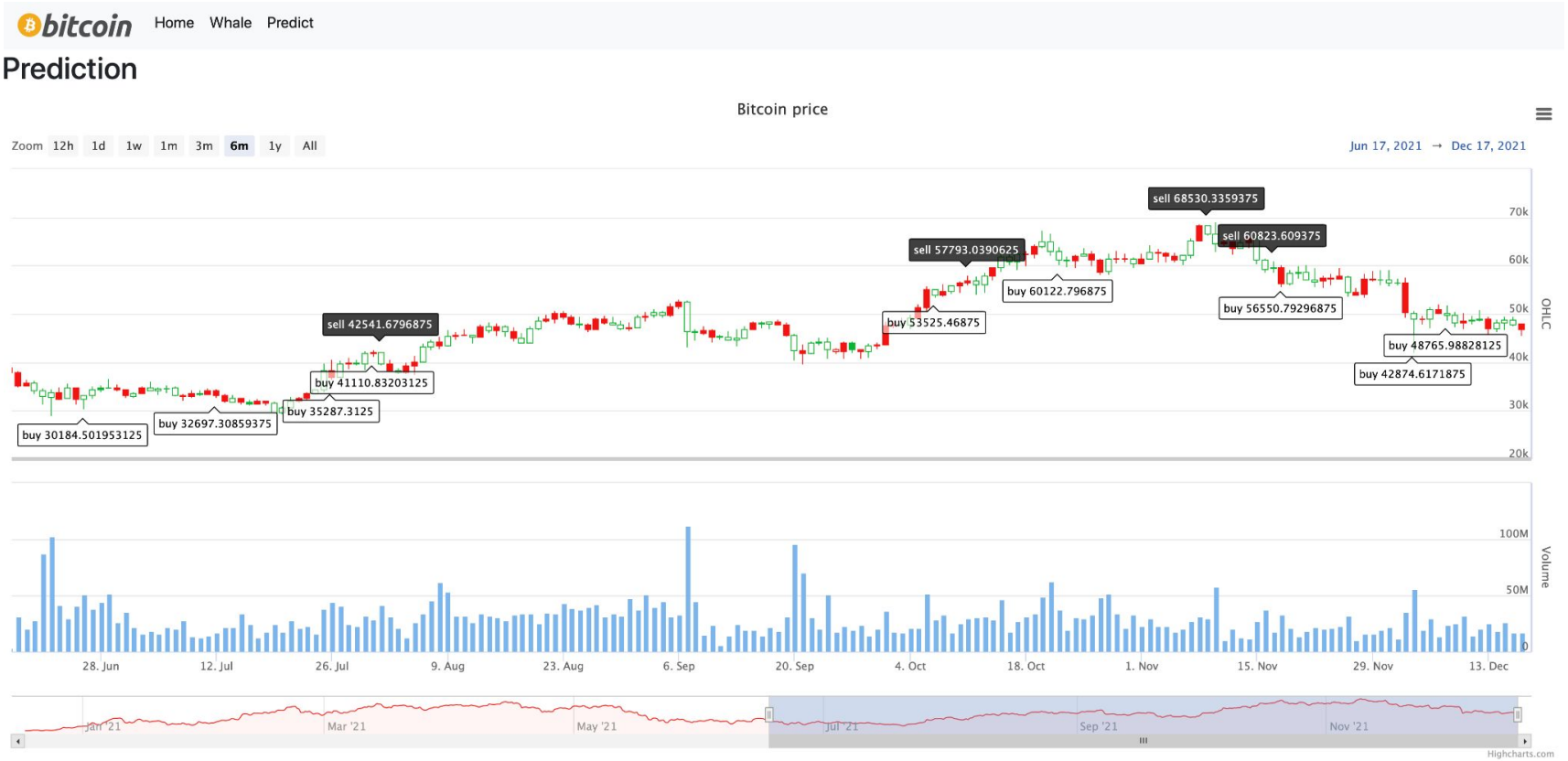
Model3: BTC price/volume + Wikipedia Pageview

- Use entropy as threshold: $1143567
- Use percentage as threshold: $1032401
- Use difference as threshold: $982564

Model4: BTC price/volume + Google Trend + Wikipedia Pageview + (Sentiment analysis + huge amount transaction information)

- Use entropy as threshold: $2122670
- Use percentage as threshold: $1570829
- Use difference as threshold: $1177225

Backtesting Result: 1 day data



Backtesting Result: every 1 hour data

Model1: BTC price/volume

Model2: BTC price/volume + Google Trend

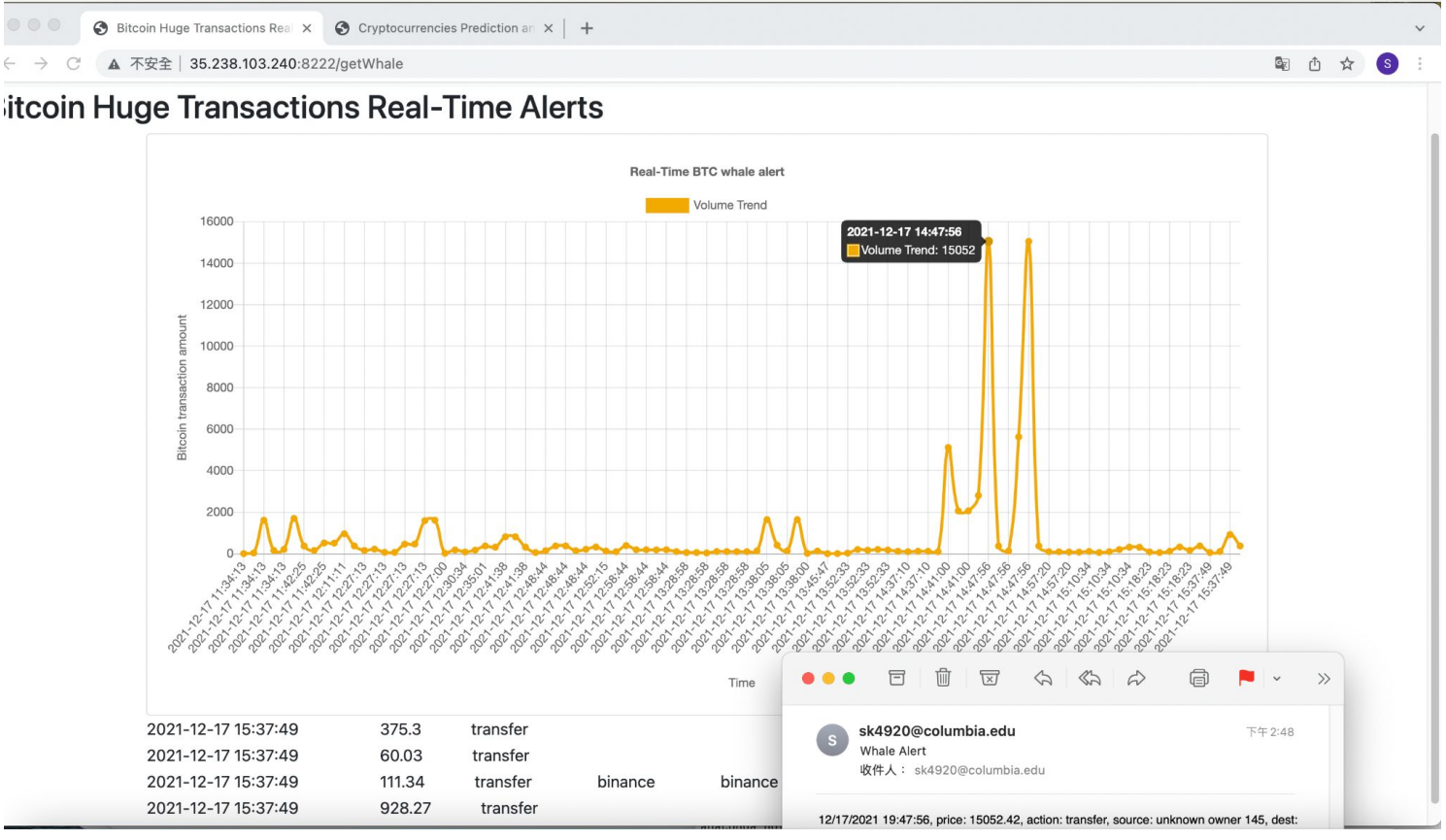
- Use entropy as threshold: $1145321
- Use percentage as threshold: $1032654
- Use difference as threshold: $9821547

Model3: BTC price/volume + Google Trend + (Sentiment analysis + huge amount transaction information)

- Use entropy as threshold: $1183372
- Use percentage as threshold: $1282376
- Use difference as threshold: $1014512

Backtesting Result: 1 hour data

Real-Time Whale Alert and Event Notification



DEMO

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Q&A