Cryptocurrency Analysis and Prediction

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Background

Crypto Markets Surge Higher as Bitcoin Continues Upwards Ascent

Ripple (XRP) Surges Nearly 10% as Crypto Markets Continue to Climb

Bitcoin Surges Past $5,600 as Crypto Markets Approach New 2019 High

MARTIN YOUNG | APRIL 23, 2019 | 5:00 AM

Investing in cryptocurrencies has been the new direction in recent years. A lot of persons made their fortunes overnight by investing in cryptocurrencies.

Our team wonders if we can use what we've learned to predict the price of cryptocurrencies.
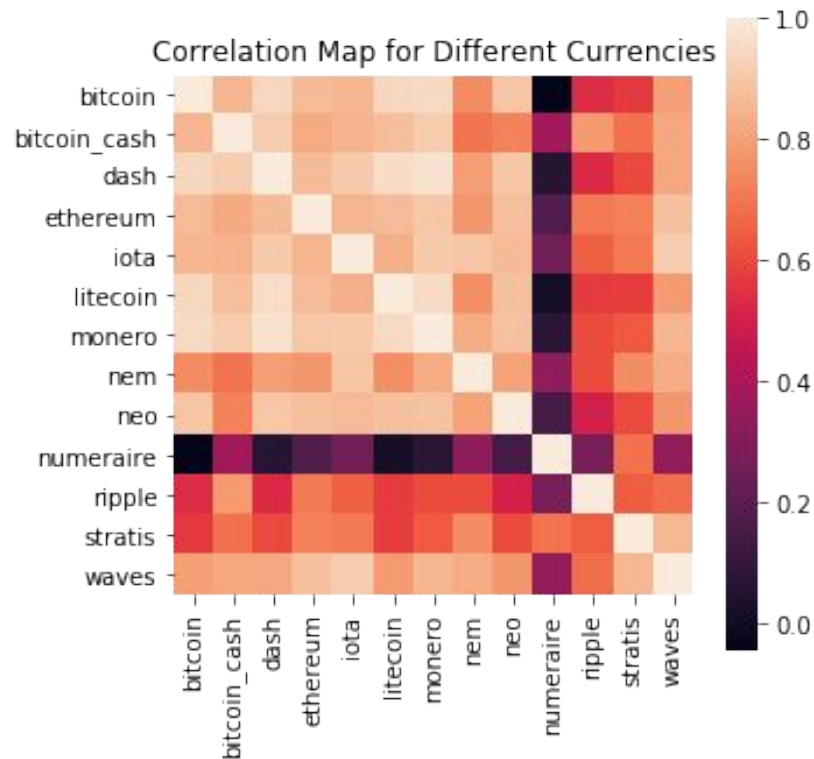
Data Source

- We get the dataset from Kaggle:

  https://www.kaggle.com/sudalairajkumar/cryptocurrencypricehistory

- We use two kinds of datasets.

  - Price DataSets: observed date, closing price, high and low price and market capitalization for 15 categories of cryptocurrencies.

  - Bitcoin and Ethereum Datasets: 24 kinds of features for Bitcoin and Ethereum which are the two most famous cryptocurrencies nowadays.

Data Analysis-Correlation Between Currencies

Spearman rank correlation: Spearman rank correlation is a non-parametric test that is used to measure the degree of association between two variables.
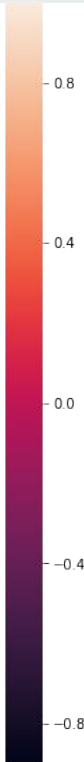
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Correlation Map for Different Currencies

Data Analysis-Bitcoin Dataset

General, after calculate the absolute value.

0-0.09: no correlation

0.1-0.3: weak correlation

0.3-0.5: moderate correlation

0.5-1.0: strong correlation

The standard may various

Correlation Map for BitcoinDataset

Data Analysis-Market Capitalizations

We first compute the market cap for the 15 categories of cryptocurrencies.
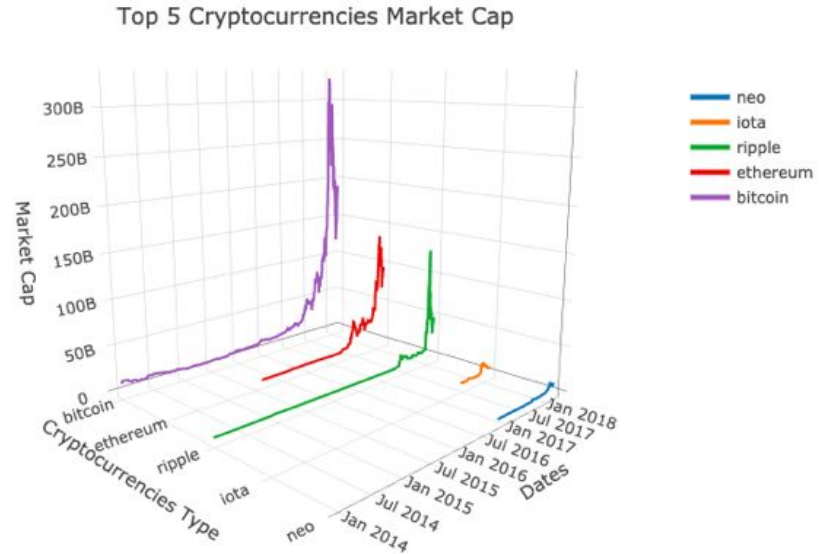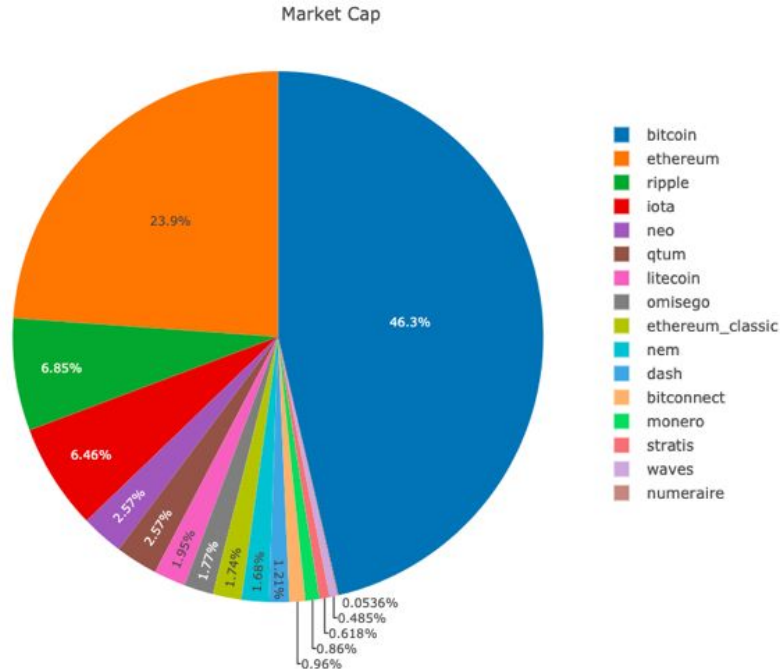
Prediction

- LSTM(Long short-term memory)
  - Time Series Analysis and Prediction
  - A special RNN (Recurrent Neural Network)
  - Can solve the gradient disappear and explosion
  - Remember what need to be remembered for a long time, forget information that doesn't matter

$$c^t = z^f \odot c^{t-1} + z^i \odot z$$

$$h^t = z^o \odot tanh(c^t)$$

$$y^t = \sigma(W' h^t)$$
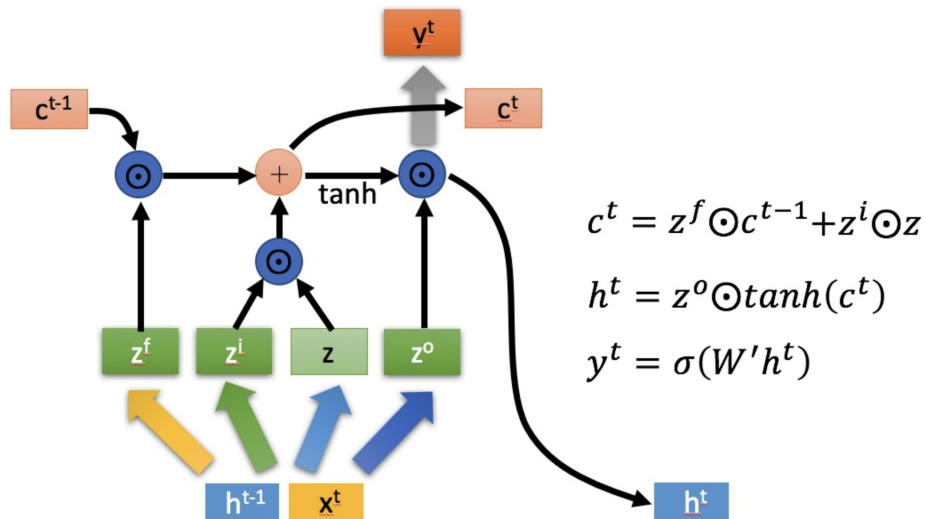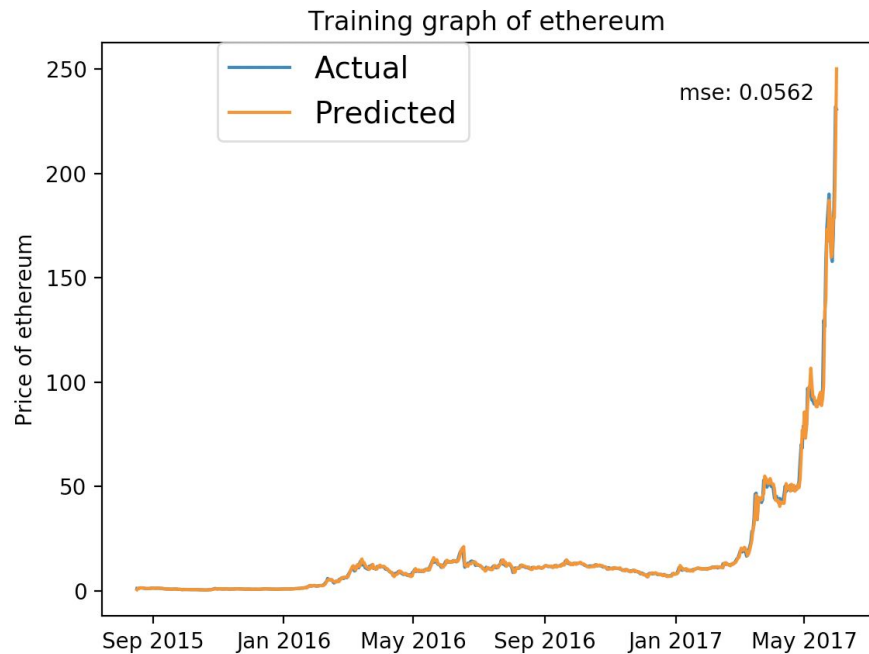
LSTM -- training

- Preprocessing

  - Lossing data in a long window: drop

  - Lossing data in small window: fill as the previous one

  - No outliers

- Parameters

  - Training Window: 10 days

  - Training Epoch: 50

  - Loss Function: mse

  - Activation function: Relu

  - Neurons: 50

Prediction -- training error

Training Error of ethereum

Training Error of bitcoin

Prediction -- training fits

Training graph of ethereum
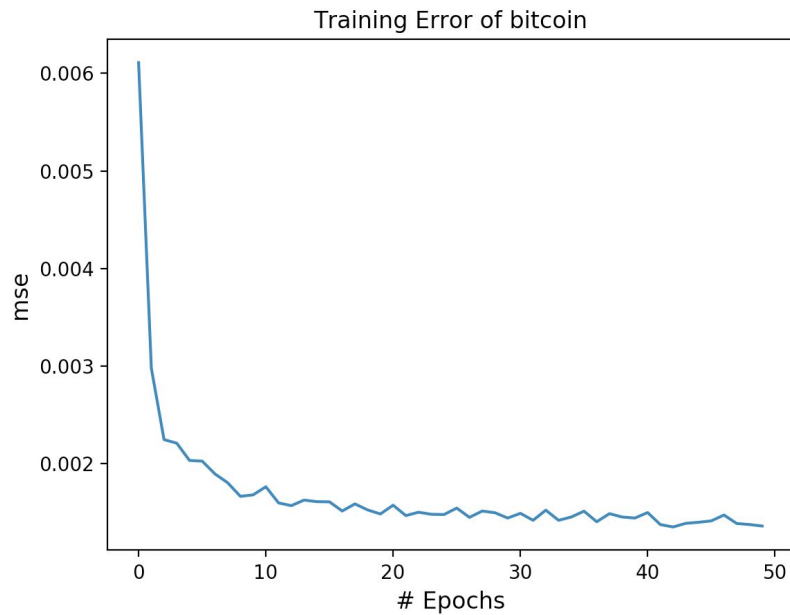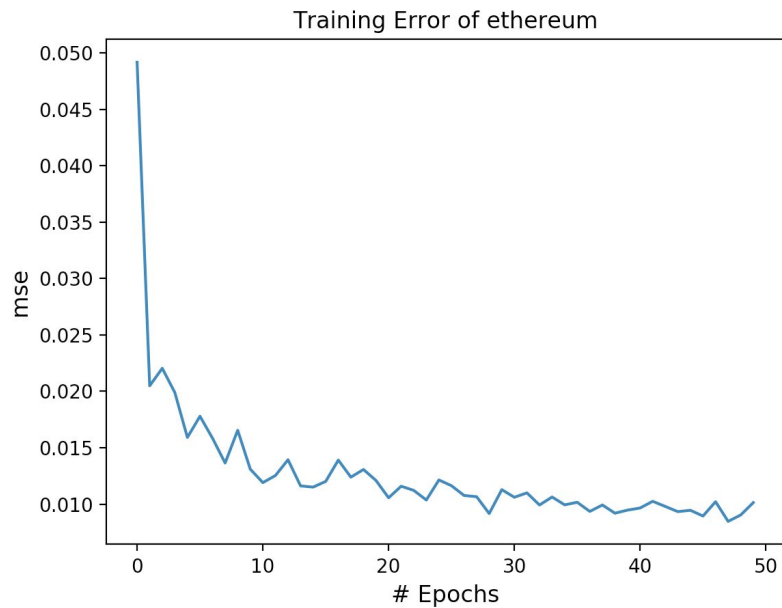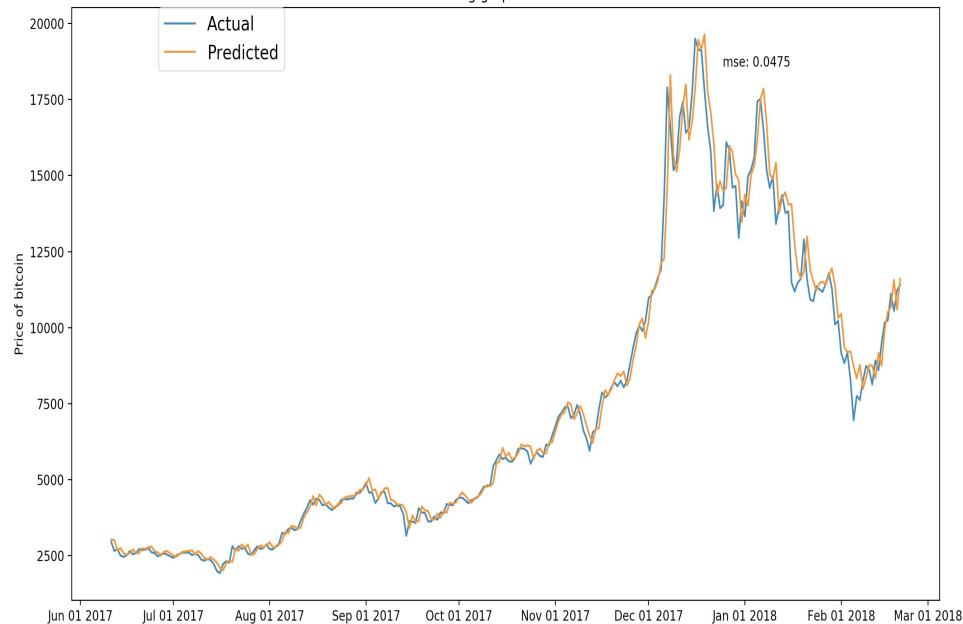

Training graph of bitcoin

Prediction -- testing (Jun 2017- Mar 2018)

Testing graph of ethereum

Testing graph of bitcoin

Thank you for Listening