Proposal

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Predicting Bitcoin Price based on Sentiment Analysis on News and Social Media

In recent years, Bitcoin has gained enormous popularity. After receiving many media coverages in 2017, the price went up drastically from 1,000 to 20,000 CAD, from which it has since gone down. In fact, this sudden increase in price is not surprising, since behavioral economics states that there are correlations between the public sentiment and the financial market. Fortunately, with the advent of social media, the information about public feelings has become abundant, where Twitter has received a lot of attention from researchers. The aim of this project is thus to test the hypothesis that, in addition to past historical prices, the public sentiment also influences the stock market. We will focus particularly on the case of the Bitcoin prices. The plan of the project is as follows. Tweets will be pre-processed and represented using word2vec model rather than N-gram model, as word2vec allows for sustainability in word meaning across different contexts. We will then gather public sentiment from these tweets. We will train different classifiers and choose the best sentiment analysis model to apply to tweets that are related to Bitcoin or cryptocurrencies. Once sentiment analysis on Bitcoin tweets has been assessed, we are then going to extract its past historical price movements. The idea is that the future movement of a stock price should mainly be able to reflect its past tendencies, but that the public opinion will also influence its future paths. Therefore, we will then train a final machine learning model (SVM, neural networks, etc, and compare results) that will classify the Bitcoin price movement as being "up" or "down" at a each time frame (minutes, hourse, or days) based on both its past historical movements and on its public opinion in that time frame.

Public Sentiment

- word2vec representation for tweets

- to determine the sentiment of a tweet, list out positive and negative keywords and see if the tweet contains those keywords.

- LDA for finding topics in news articles

- If the main topic of a news article is cryptocurrency/Bitcoin, include it into our corpus

- for each news artcle, determine the sentiment by using the positive and negative keywords approach

Predicting Bitcoin Price Movement

1. Choose a time frame (minutes, hours, days, etc)

2. For each time frame, determine the public sentiment.

3. To do this, take all the tweets and articles within that time frame, and the public sentiment will be the majority of sentiments.

4. See if the Bitcoin price increased or decreased within that time frame

5. Use (time, sentiment, price movement) as input for different models (SVM, neural networks, etc) to predict the rise and fall of the price.

6. Compare outcomes of the different models