Predicting Fluctuations in Bitcoin with Twitter Data

CS-579 Online Social Network Analysis
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Problem Overview

- Algorithmic based trading of cryptocurrencies for monetary gains
- Reflecting the effect of sentiment shared by the people on the bitcoin’s price variation
- Help to analyze the right time to buy or sell the bitcoin based on any global events
    - War Crisis
    - Restriction in Trading
    - Market Breakdown

Abstract

- To understand and obtain Bitcoin data from particular exchange (Kraken) using Quandl API
- To fetch tweets having *Bitcoin* term in tweets using Twitter Scraper
- To do sentiment analysis based on TextBlob package
- To do data manipulation for model development
- To fit bitcoin price fluctuation w.r.t sentiment polarity score
- Evaluate the model developed from historical data with real time data

Introduction

- Price movement of cryptocurrencies remains a mystery.
- Cryptocurrencies values depends on various factors such as supply/demand, Legal/Government issues and people's sentiments.
- Sentiments in tweets are a good indications of the movements of closing price on a stock market.
- Training Data - Historic tweets(top 20 tweets per day) starting from 1- June 2017 to 31 Dec-2017 and compared against Bitcoin's value for same time period.
- Test Data - Historic tweets(top 20 tweets per day) starting from 1- Jan 2018 to 28 Feb 2018 and compared against Bitcoin's value for same time period.

Approach

Verifying the predicted fluctuation

Text Blob to get average polarity (-1 to 1) per day

Model to Fit tweet polarity in align with Standardized bitcoin fluctuation

Twitter tweets and Quandl BitCoin train data from 1 June 2017 to 31 Dec 2017

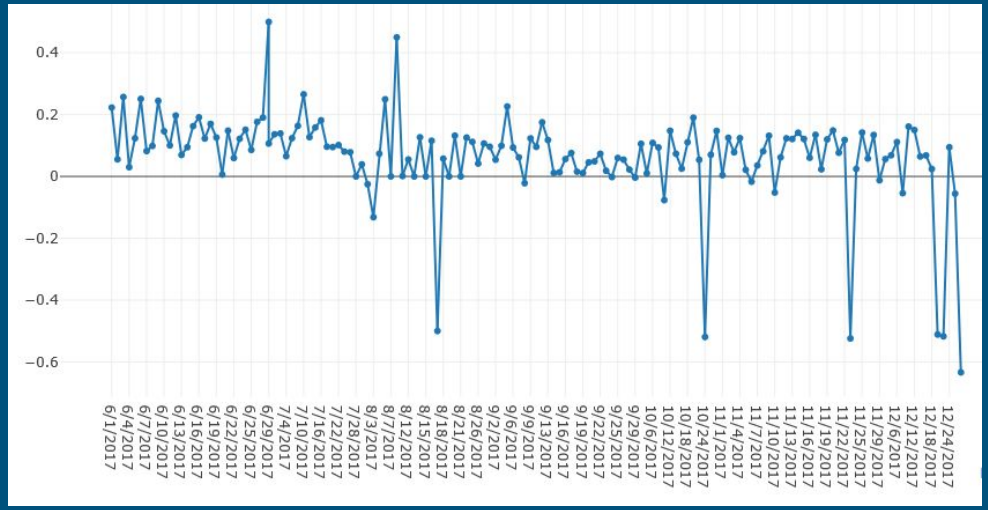
Twitter tweets test data from Jan 2018 to 28 Feb 2018

Standardizing data between -1 to 1

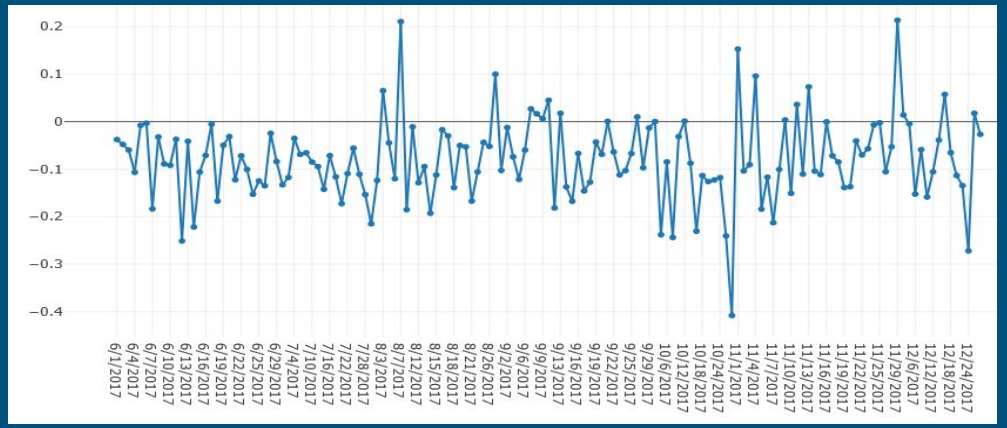
Selected 200 and -200 as threshold for positive, negative and neutral classification

Graph of Train Data

Twitter Scores

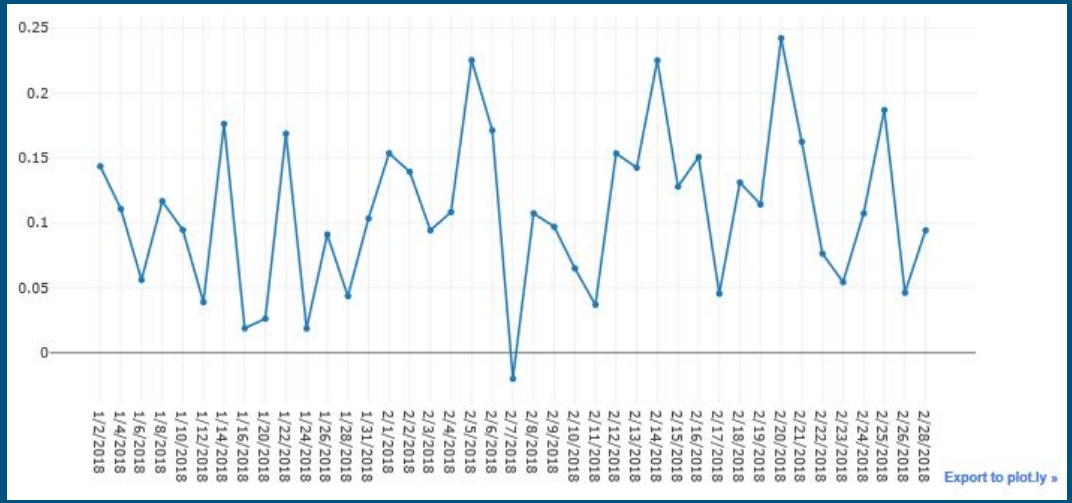


Bitcoin Fluctuations

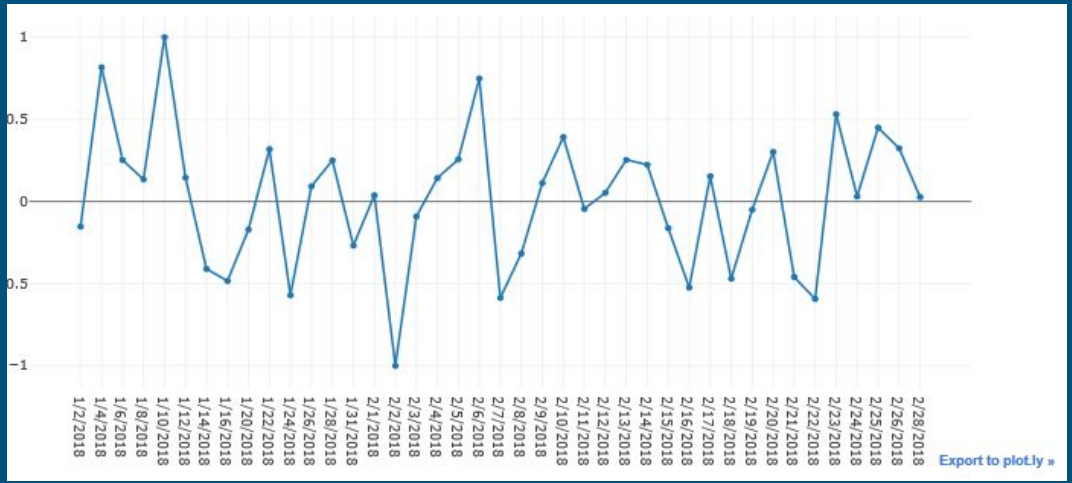


Graph of Test Data

Twitter Scores



Bitcoin Fluctuations



Confusion Matrix of Training Data

Label		Actual		
		Positive	**Neutral**	**Negative**
Predicted	**Positive**	3	12	1
	Neutral	31	82	8
	Negative	2	6	2

Accuracy = 59.184 (Total Truly Classified / Total Values)
Error = 40.81 (Total Misclassified / Total Values)

Confusion Matrix of Testing Data

Label		Actual		
		Positive	**Neutral**	**Negative**
Predicted	**Positive**	7	7	0
	Neutral	2	8	0
	Negative	6	10	1

Accuracy = 39.01 (Total Truly Classified / Total Values)
Error = 60.99 (Total Misclassified / Total Values)

Conclusion

- We are getting less accuracy due to less data of testing data for twitter and model finds hard to classify fluctuation in Bitcoin value
- Besides there is high fluctuations in January and February month’s bitcoin value due to regulatory bodies inferefering on various bitcoin exchanges to govern the proper trading
- Also the global market scenario and various geopolitical factors highly affect the bitcoin value.

Future Ideas

- We can implement logistic regression to properly classify tweet sentiments into different features.
- Also we can achieve high accuracy by getting twitter data of Bitcoin exchange provider’s twitter account like Kraken account
- We can apply sentiment analysis with some keywords and check whether it has strong predictive power for Bitcoin. Our manual cut off point evaluation point can be automated using Machine learning which helps in identifying hidden signals.

Reference List

- Algorithmic Trading of Cryptocurrency Based on Twitter Sentiment Analysis - Stuart Colianni, Stephanie Rosales, and Michael Signorotti
- Rapid Prototyping of a Text Mining Application for Cryptocurrency Market Intelligence - Marek Laskowski, Henry M. Kim
- Predicting Fluctuations in Cryptocurrency Transactions Based on User Comments and Replies - Young Bin Kim, Jun Gi Kim, Wook Kim, Jae Ho Im, Tae Hyeong Kim, Shin Jin Kang, Chang Hun Kim
- The Impact of Social Media on Bitcoin Performance – Feng Mai, Quing Bai, Zhe Shan
- Nowcasting the Bitoin Market with Twitter Signals- Jarmain Kaminski