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BITCOIN & TWITTER (X)

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Introduction

Key Facts

- Launch: 2009 by Satoshi Nakamoto
- What is Bitcoin?: Decentralized digital currency using blockchain to store and verify transactions
- Independence: Operates without governments or regulatory bodies
- Market leader and most valuable cryptocurrency

Influences on Price

- Affected by politicians, governments, and public figures
- Example: Price rose ~10% after Donald Trump became the 47th U.S. President



Research Question

Is there a correlation between Twitter (X) posts and Bitcoin price fluctuations?

Hypothesis

Null Hypothesis: There is no correlation between Twitter (X) posts and changes in Bitcoin prices.

Alternative Hypothesis: Twitter (X) posts are correlated with changes in Bitcoin prices.

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Bitcoin dataset

Timestamp	Open	High	Low	Close	Volume
1325412060.0	4.58	4.59	4.57	4.59	8.9
1325412120.0	4.59	4.59	4.56	4.57	10.4
1325412180.0	4.57	4.58	4.57	4.58	7.3
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Twitter (X) dataset

ID	User	Fullscreen	URL	Timestamp	Likes	Replies	Retweets	Text
1	DetroitCrypto	J. Scardina	None	2019-05-27 11:49:14+00	3	0	1	Current Crypto Prices! BTC: \$8721.99...
2	CCNMarkets	CCN.com	None	2019-05-27 08:13:06+00	167	5	68	Bitcoin Price Hits \$8,939 in New 2019...
3	malfouh	Emad Almalfouh	None	2019-05-27 11:49:17+00	19	1	6	I lost all money because of BTC! :(
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Data Processing

Pre-Processing

- Unnecessary columns
- Daily data
- Time frame (2012-01-01 to 2019-11-23)
- Only English tweets

Impressions

- Likes, replies and retweets
- Normalized

Sentiment analysis

- VADER sentiment analysis
- Magnitude

Normalized impressions

- Direct comparison is biased
- Averages:
 - Likes: 8 (2.32...)
 - Replies: 1 (0.29...)
 - Retweets: 3 (0.88...)
- Is a like more valuable than a reply?
- Normalization:
 - Divide by average
- Total Impressions = Likes / Avg Likes +
Replies / Avg Replies +
Retweets / Avg Retweets

Sentiment magnitude

- VADER
- Sentiment:
 - Negative (-1)
 - Neutral (0)
 - Positive (+1)
- Is the sentiment of a low-engagement tweet as valuable as one with high engagement?
- Magnitude:
 - Multiply by impressions
- Sentiment Magnitude = Sentimen Score · Normalized Impressions

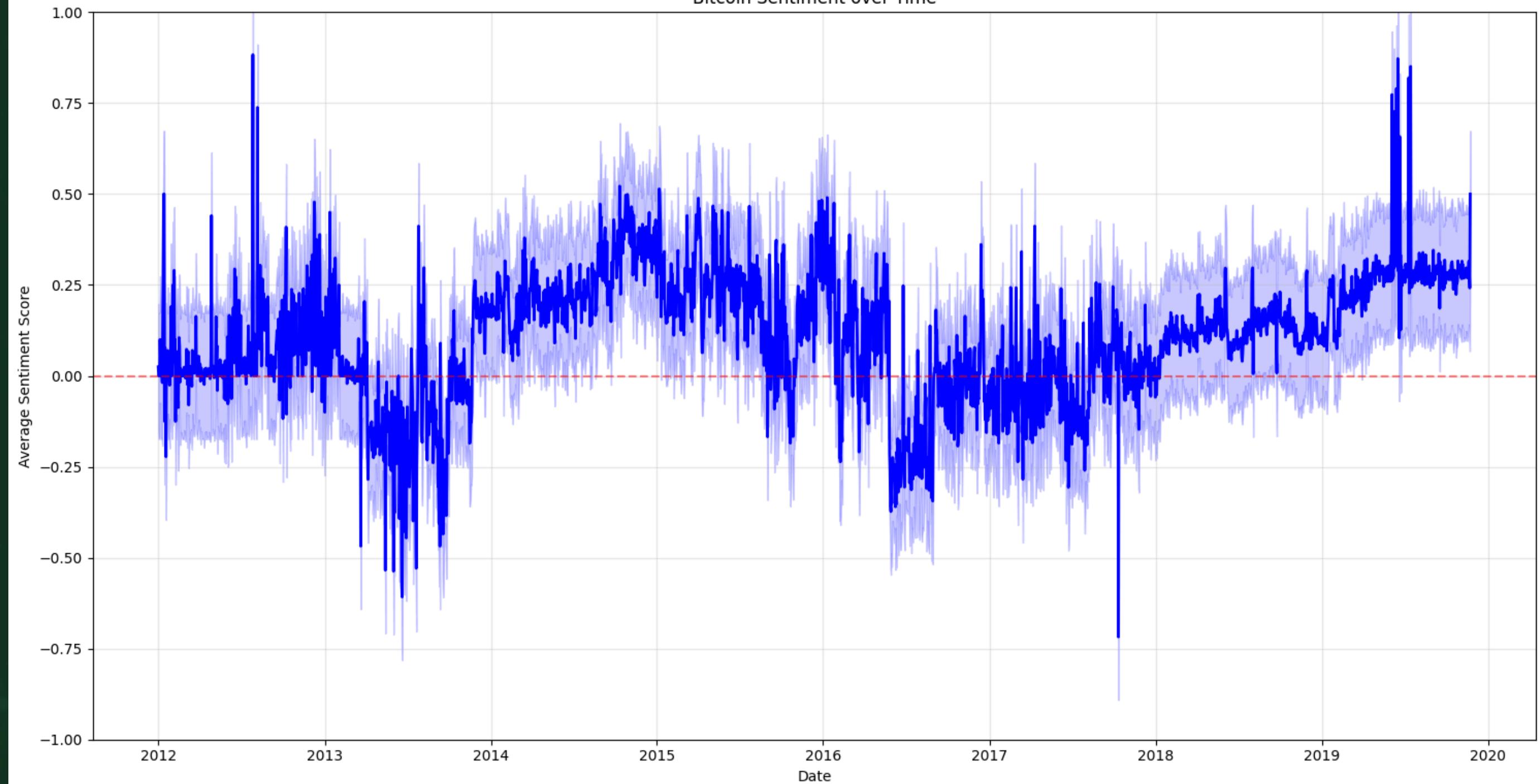
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WordCloud

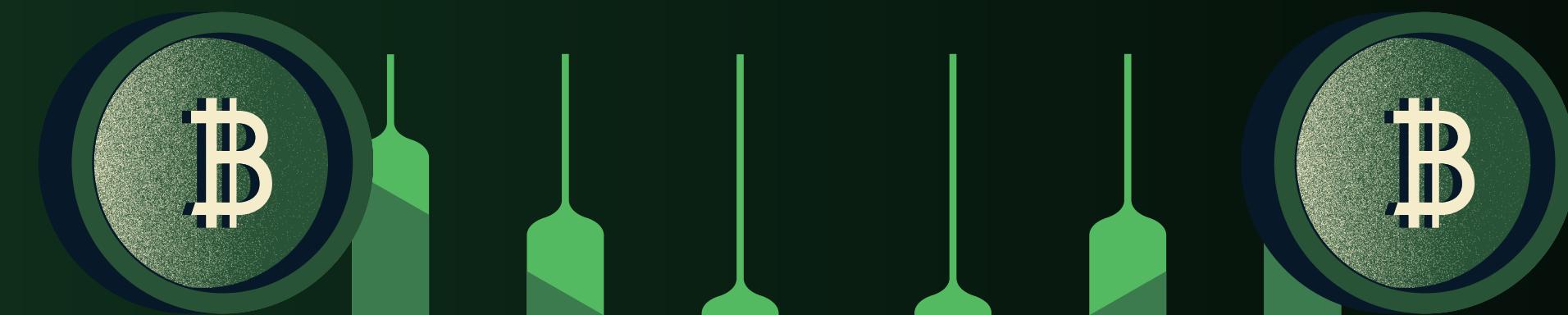
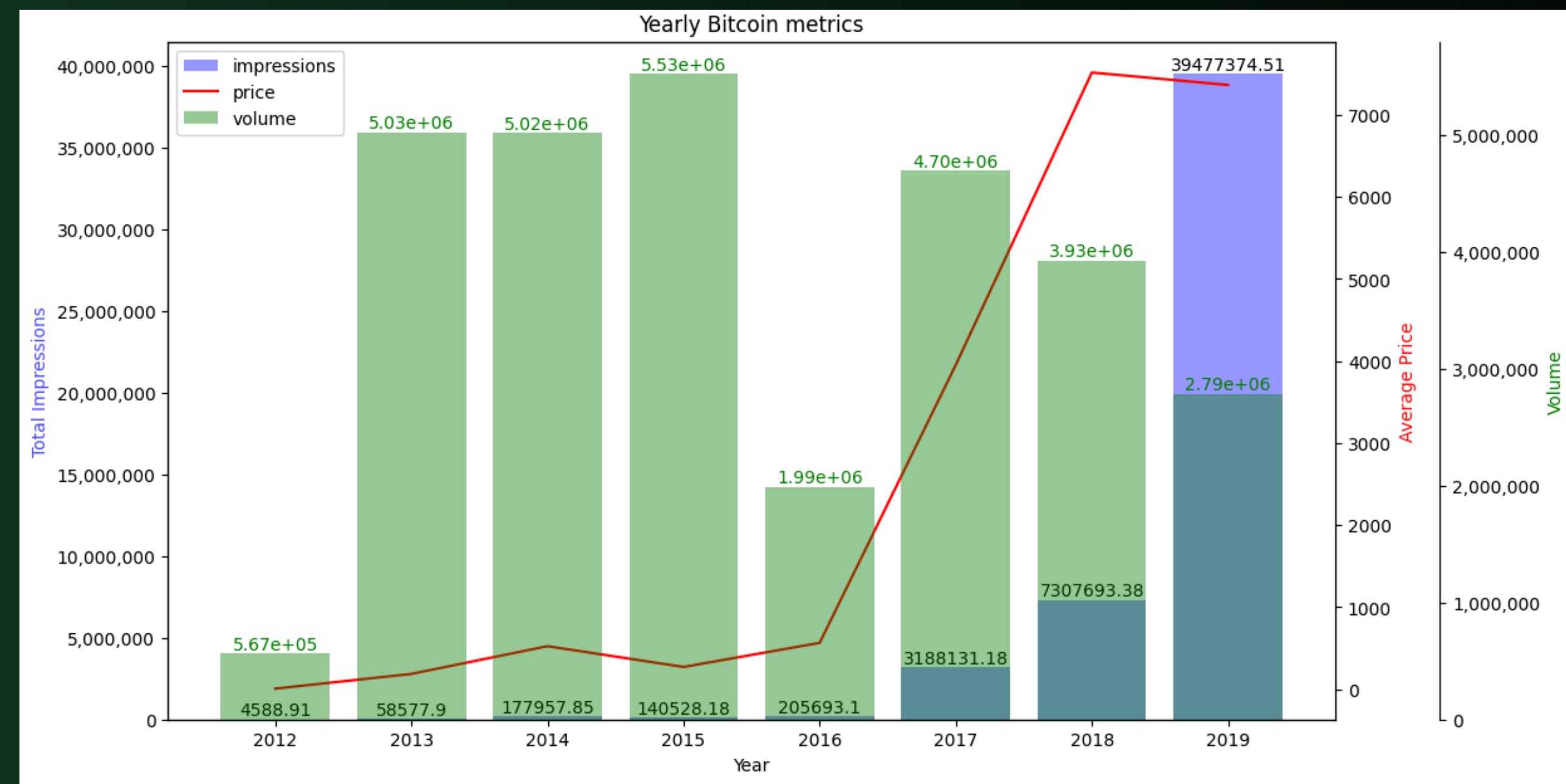


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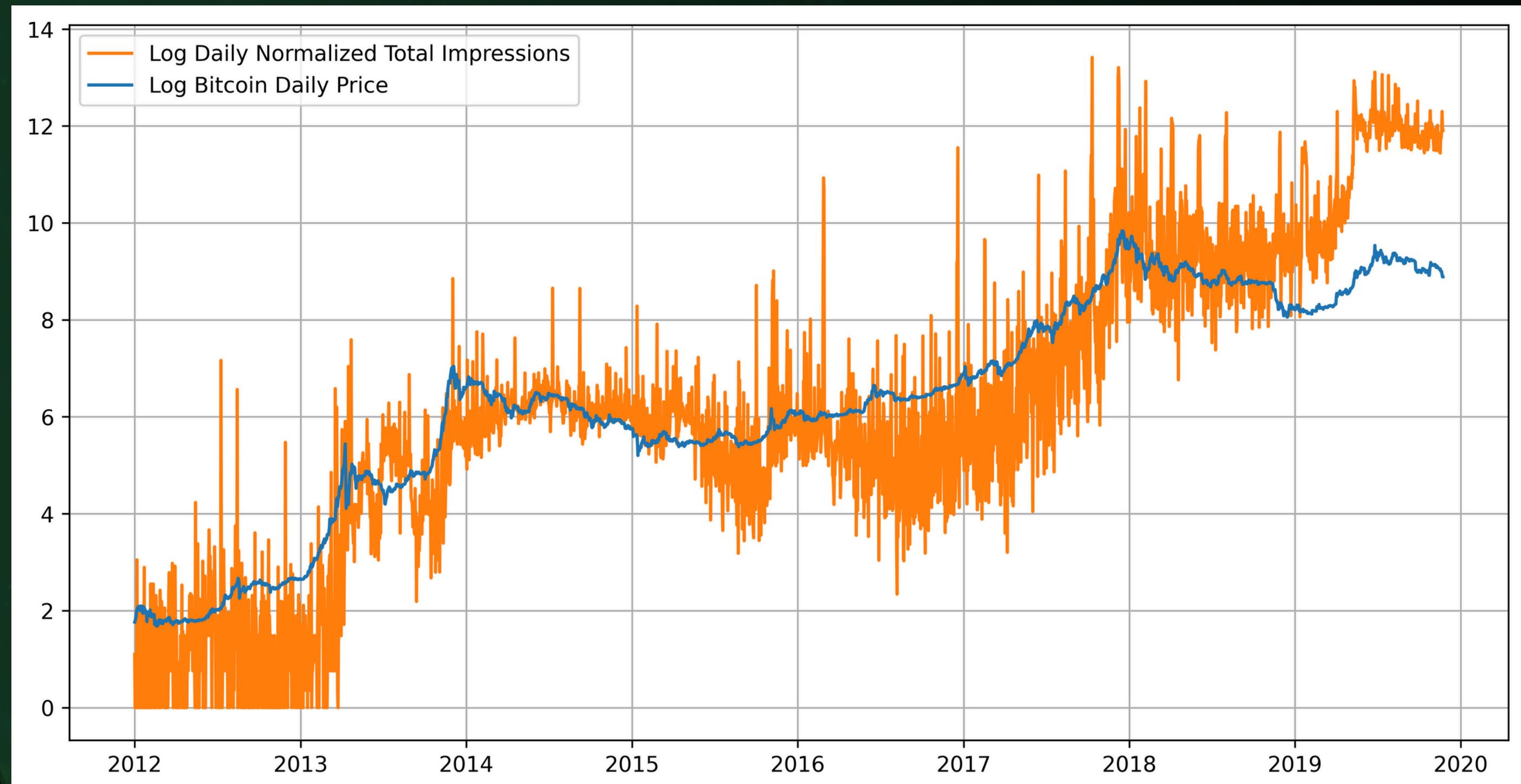
Bitcoin Sentiment over Time



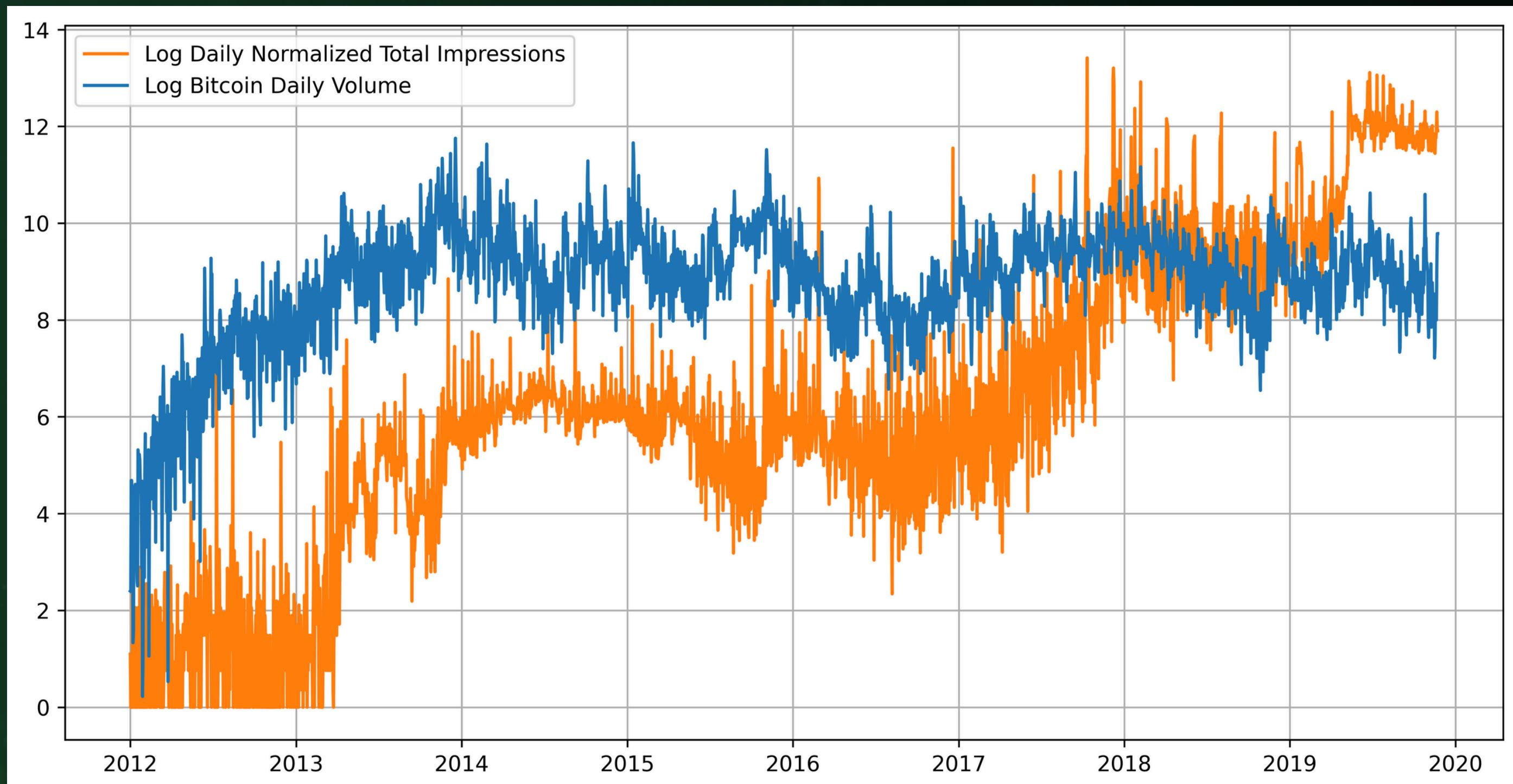
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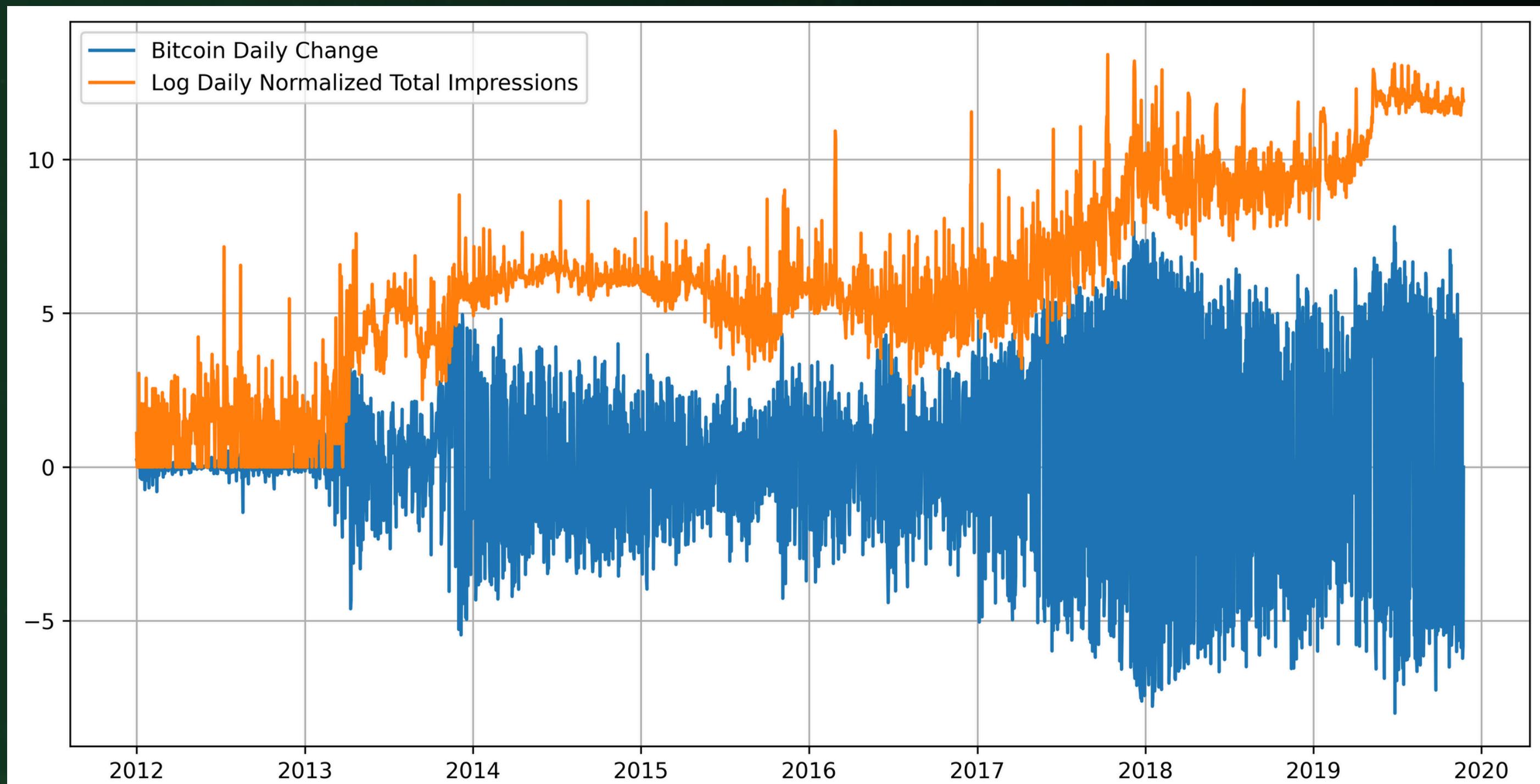
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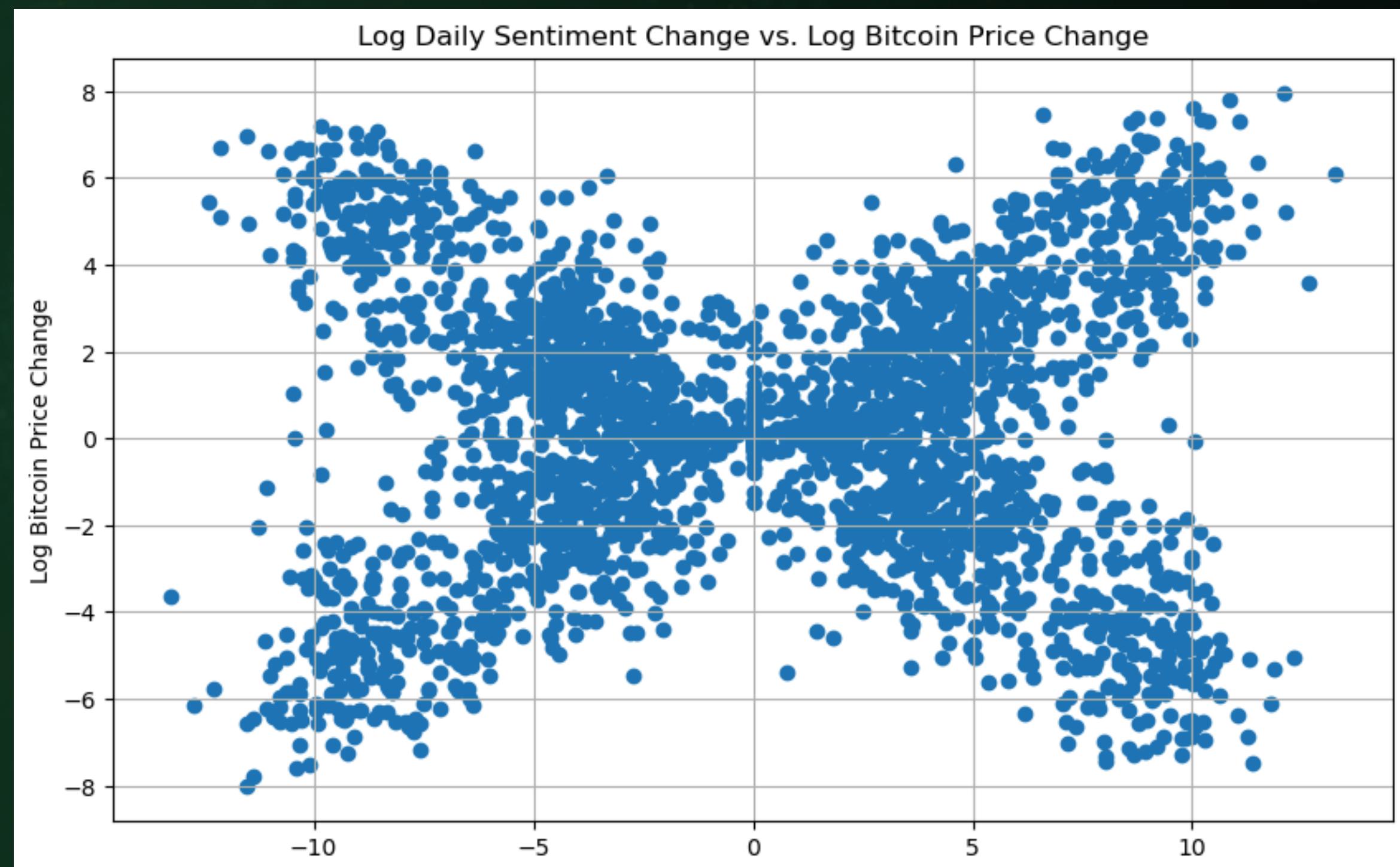


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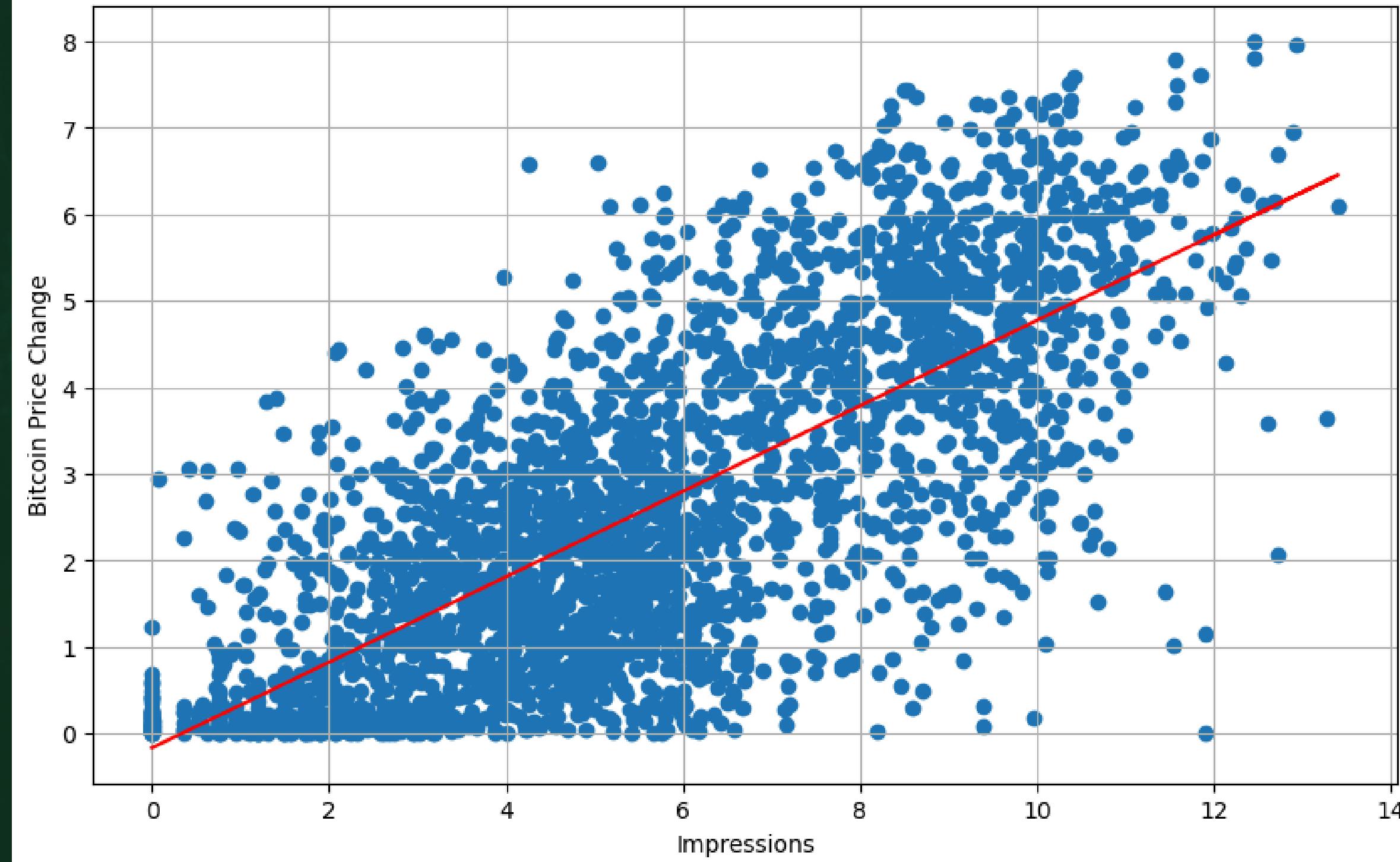
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Log Daily Sentiment Change vs. Log Bitcoin Price Change

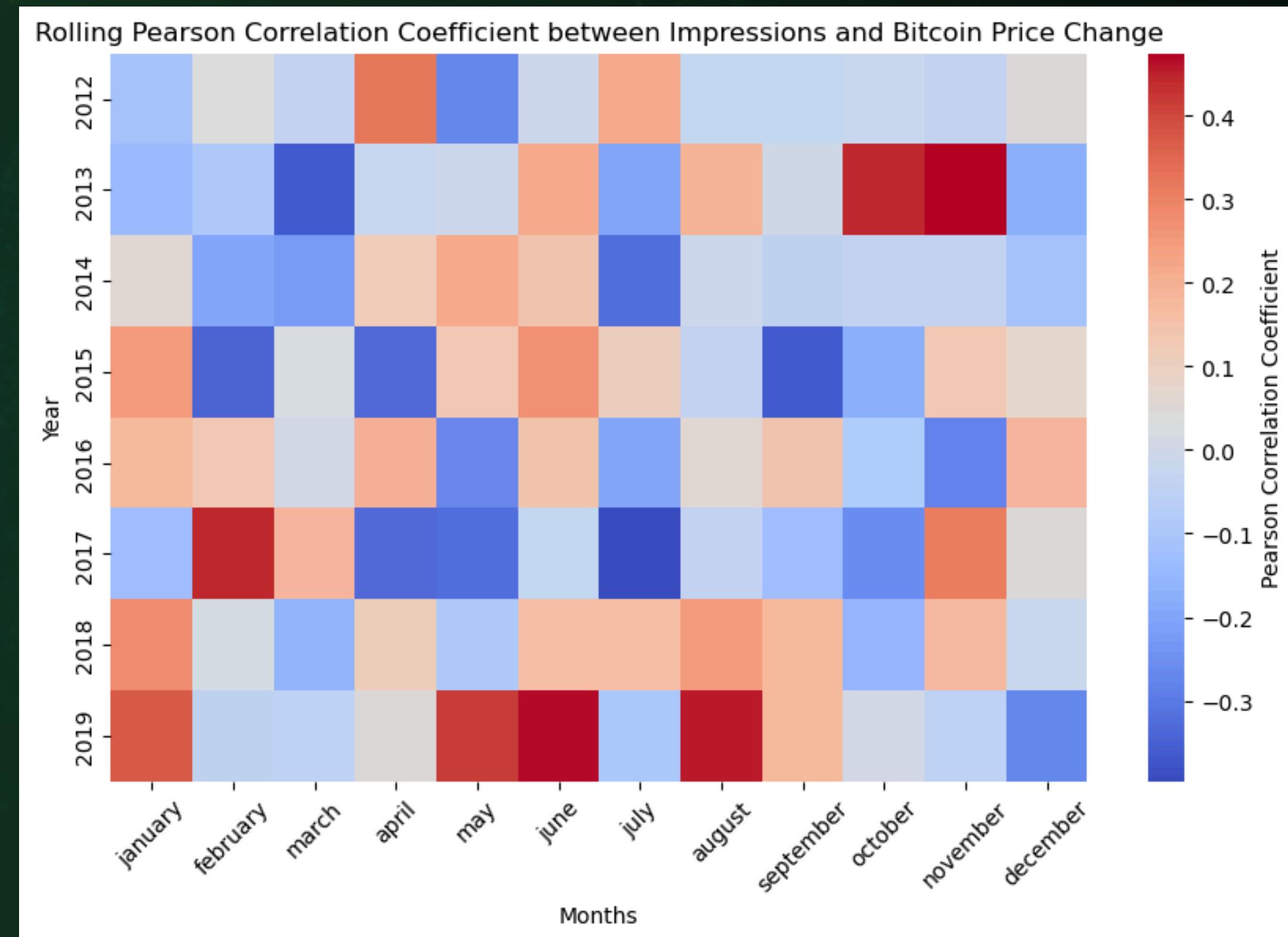


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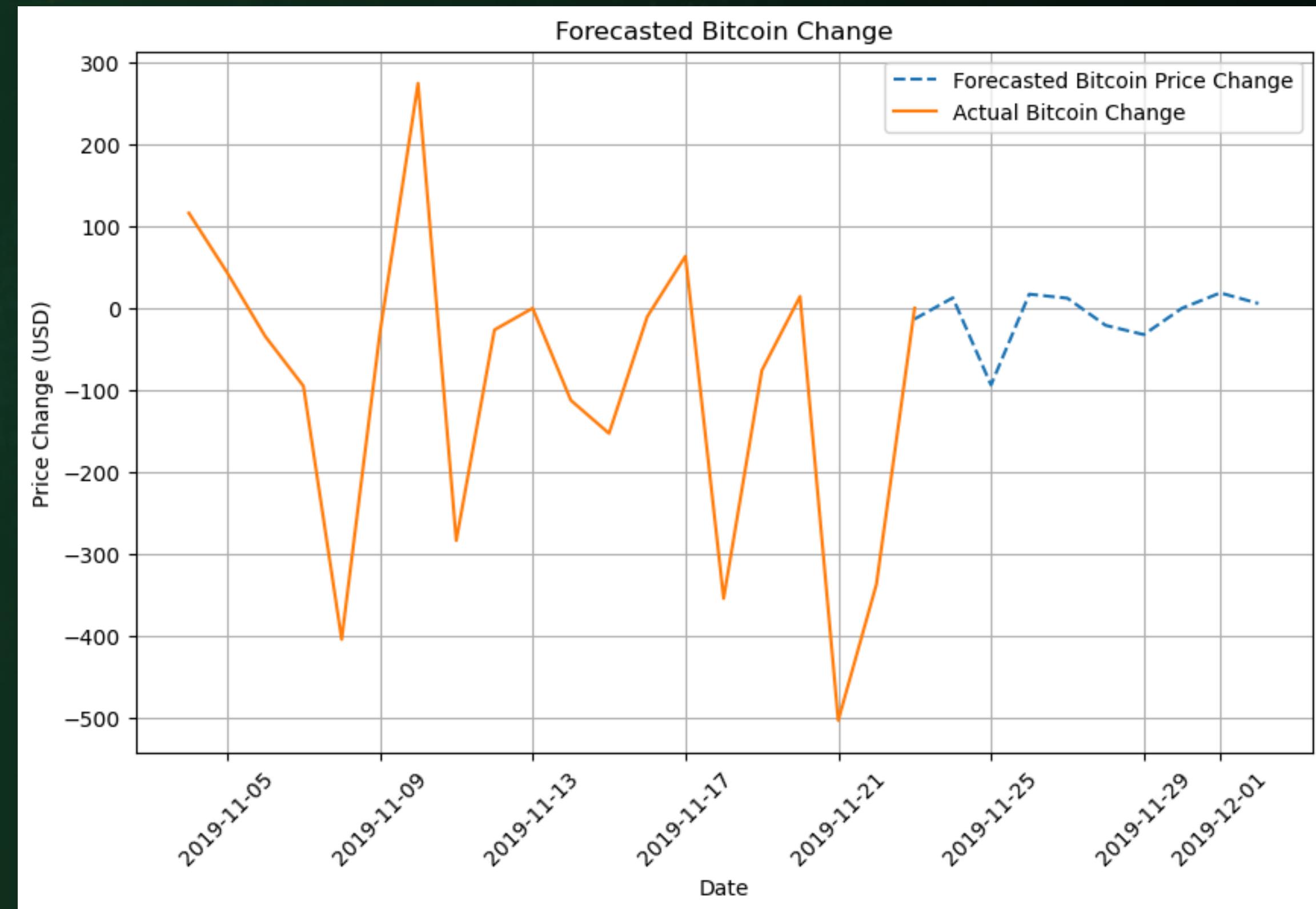
Absolute Log Impressions vs. Absolute Log Bitcoin Price Change, Pearson R = 0.75



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Statistical tests

Pearson correlation coefficient

- Variance and covariance
- No linear correlation
- $0.0 +/ - 0.03$

Spearman rank correlation

- Rank differences
- No monotonic relationship
- $0.0 +/ - 0.02$

Kendall Tau correlation

- Concordant and discordant pairs
- No monotonic relationship
- $0.0 +/ - 0.04$

Conclusion

- Statistical tests show no correlation or at least not worth mentioning (+/- 0.04).
- Thus, we cannot reject the Null Hypothesis.
- Evidence shows that there is no correlation or that we have not enough evidence to say that there is a correlation.
- Impressions/sentiment change shows price change
- Only English tweets
- Missing timestamps of likes, replies and retweets
- Different platforms (e.g. Facebook, online forums)

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Thank you for your attention

Any questions?