**Final Project – Findings Section**

Daily Portfolio Summary Dashboard:

*Streamlining Crypto Asset Research with Web Scraping and Sentiment Analysis*

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# Findings

## Limitations

There is no one strategy that can provide investors with a full proof strategy to get the perfect entries and exits to the market. No one tool alone will provide investors all the required info to know when the best time is to buy or sell. Every tool has its limitations, and sentiment analysis is no exception. Sentiment analysis should be considered an extra tool in an investors kit to add to their own investment strategy, not as a holistic indication of how they should interpret the markets. Here I will provide my findings on what limitations the tool I created has and explore how users can best use the tool to maximize its potential. Interestingly, even with the growing popularity of sentiment analysis, and despite many exchanges offering some sort of sentiment analysis to their users, I have not seen these limitations, which would be shared with most sentiment analysis tools, explained thoroughly on these sites. This could give users of our tool a competitive advantage.

### Over Positivity in social media

Some crypto currencies, particularly ETH, are subject to a flood of social media posts that are overly positive, which may distort the true sentiment of the markets. Ethereum and cryptos like it are particularly challenging because projects that are not affiliated with Ethereum can be based on its technology, and therefore will likely include hashtags like #ETH or #Ethereum, which contributes to the sentiment analysis of Ethereum, even though the post may not even be directly about Ethereum. Many of these new projects have twitter ‘armies’, which are supporters of the new projects that are incentivized with airdrops (gifts of free crypto currencies) simply for tweeting positively about the new project. This results in many positive tweets about Ethereum and likely Bitcoin even though the post has nothing to do directly with either of these crypto currencies. I will include some images below that demonstrate this in action:

Example1A:

Graphical user interface, text, application, chat or text message

Description automatically generated

\*Source: Tweet. @Aisar Crypto. June 10, 2022. url: https://twitter.com/AisarCrypto/status/1535104471956656131

Example1B:

Chart, pie chart

Description automatically generated

As illustrated above, there is a clear mismatch in the twitter sentiment analysis and the news sentiment analysis, both extracted June 10th at 11:52am. This is caused by examples such as the one listed above, which shows the tweet promoting a crypto with the ticker $CFX. Even though the post is unrelated to Ethereum or Bitcoin, the user still includes both cryptos as hashtags. This is extremely common and unfortunately makes up most crypto related posts on Twitter. This is a flaw with sentiment analysis that I had not considered – users including hashtags of unrelated or barely related topics simply to gain more exposure. There is an argument, however, that these posts reflect new adoption and expansion of the technology and therefore could still be considered still positive news.

### Unequal weight of certain events

Sentiment analysis simply compares the number of inputs that include positive words versus negative words. I have not found a way to adjust the analysis to include how negative or positive a certain news event is and/or the amount of impact it has. I could not find any other sentiment analysis tools that take these limitations into account either. The idea of amount of likes or retweets to account for amount of influence doesn’t work because of examples like Example1A above, where users are externally motivated to like or retweet a certain tweet for rewards. I will show below an example of a news headline, according to BBC, that resulted in a 10% decrease in the price of Bitcoin (Cellan-Jones, R., para.2, 2021) and the resulting sentiment scores of the day.

Example2A:

Graphical user interface, text, application, email

Description automatically generated

*\*Source: News Article. BBC News, Cellan-Jones, 2021. url: https://www.bbc.com/news/business-57096305*

Example2B

Graphical user interface, text, application

Description automatically generated

\*Source: Tweet. Elon Musk. May 13, 2021. url: https://twitter.com/elonmusk/status/1392602041025843203?s=20&t=eVbD5NukJ3LBHDQhwXjOnw

Example2C

Chart, pie chart

Description automatically generated

Example2D

Chart, pie chart

Description automatically generated

When comparing Examples 2A/B and Example2C, we can see that, though the positive sentiment for the day is generally less than the usual amount of around 30-35%, it is not necessarily indicative of a 10% price move. Unfortunately, I am unable to retrieve the sentiment for news articles by the specific time, only the date, but we can see that the day prior (shown in Example 2D), sentiment was significantly more positive. It’s reasonable to assume that a user checking sentiment around the time of, just before, or just after the time of the tweet would see a generally positive market, since most tweets/news articles were positive during the time with only one extremely negative event causing the downturn.

Lastly, the limitations with the twitter API are that, unless one is willing to sample every single tweet on a given subject, it is not guaranteed that the analysis would even includer those tweets that are the most impactful.

## Historical Sentiment Analysis to Price Action Comparison

Now that all the necessary caveats of the analysis have been late out, we can finally look at how the analysis can be successfully used by investors as a part of their analysis. Let’s look at a quote from JK Investment Group that explains how a contrarian approach should be taken to sentiment analysis to identify market opportunities:

“Sentiment analysis can be most effective as a contrarian indicator when price movements have become overly bullish or bearish. After all, retail traders tend to be reactive trend followers who base their buying and selling decisions on the market’s general direction or a particular company’s activities. Therefore, one could make successful sentiment-based trades by going against the grain of strong sentiment bias. By following this strategy, investors can unearth attractive oversold positions. If investors’ sentiment toward the markets overall or individual stocks are pessimistic based on specific news developments, their uneven emotions can drive increased panic selling. As bearish sentiment strengthens, ensuing selloffs can reveal buying opportunities since compounding selling would create inherent value.”

– Kukla, G. (2022, paras. 3&4)

Essentially, the market tends to overreact, based on the emotions of traders, to highly positive or negative news, causing extreme swings in price. Highly speculative assets like cryptocurrency are especially vulnerable to these kinds of price swings. This creates opportunities for investors to look at the market holistically and try to determine if movements in price are over or under reactions to certain news events. Let’s take a closer look at the broader market’s reaction to Elon Musk’s Tweet about Tesla not accepting Bitcoin (Example 2B above) by looking at the bitcoin price in the following months after Elon’s Tweet (Example3A), sentiment analysis comparing the day and week of the tweet (Example 3B), and other news examples in the same week as the tweet. The goal is to examine the price change and determine if the extreme downturn in price is justified given other news headlines and broader market sentiment.

Example 3A

Chart

Description automatically generated

Example3B

Chart, pie chart

Description automatically generated Chart, pie chart

Description automatically generated

Example3C

Text, letter

Description automatically generated

As we can see, the extreme price correction (circled in example 3A) is a result of one outlier – Elon’s Tweet, in a generally positive marketplace. Looking at Example 3B, the daily sentiment is not positive, but the sentiment over the entire week is balanced. Furthermore, Example 3C shows many positive news events along side the negative headline “Elon Musk says Tesla will no longer accept Bitcoin over energy concerns” throughout the same time frame, even though the price continues to fall significantly. The over reaction of the market caused an opportunity for aware investors to buy Bitcoin at nearly half the price as the prior month and see the price regain its strength, even hitting new all-time highs over the next few months. Investors properly using the analysis would be wary of these new highs, however, and be checking to ensure the positive price action is in line with the sentiment of the market (it wasn’t).

## Summary

Users should understand the source of the sentiment that the tool is using and the limitations of that tool. This is the same as any other tool or indicator that an investor would use. All have their limitations and understanding how to use and balance those out with other tools is an essential aspect of a successful investment strategy. Sentiment analysis does not take into consideration market events that have significantly more weight than others, such as Elon Musk tweeting about Tesla not accepting Bitcoin for payments until climate concerns are dealt with. To use sentiment analysis properly, users should take a contrarian approach by gauging whether market sentiment and reaction to certain news events properly represents price movement. Any misalignment between price direction and market sentiment can indicate that the market is over bought or oversold and be a sign that an investor should buy or sell at this point.

# References

Cellan-Jones, R. (2021). ‘Tesla will no longer accept Bitcoin over climate concerns, says Musk’, BBC News. Taken From: https://www.bbc.com/news/business-57096305

Kukla, G. (2022). ‘The Role of Sentiment Analysis in Decision-Making’. JK Investment Group. Taken From: https://www.jkinvestmentgroup.com/blog/the-role-of-sentiment-analysis-in-investment-decision-making-1