**Natural Language Processing for Determining the Sentiment of Stock Tickers**

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**Abstract**

1. **Introduction**

It is no secret that the public takes a tremendous interest in the stock market. Many have attempted to study market trends and use this knowledge into making fruitful investments. This paper attempts to determine and justify a curated sentiment of a stock ticker and leverage this analysis to advise a user on whether or not to buy, sell, or hold a given stock. It aims to detail the process behind generating a sentient polarity for a given string of text, and how cumulating such data points can give us an accurate sentiment analysis. This papers also details the process of aggregating such sentiments and weighing them relative to their sources. Our analysis was done on data scraped from condensed online discussion platforms, daily journalist headlines, and qualified financial stock analysts.

**II. Background**

Unsupervised social media platforms have allowed users to express themselves free of accountability and repercussions. A tremendous amount of false information has begun to flood various platforms like Facebook, Instagram, Twitter, and other mainstream social media sites. The advent of bot accounts has only exacerbated the situation into skewing the mind of an average user regarding a particular topic. Misinformation can spread quickly through bot accounts resharing and retweeting information without verifying the facts (Ferrara et al., 2016). In this context, misinformation is the factually incorrect information that is spread via social media (ASU article). While bot accounts play a role in the spread of misinformation, the basic aspect of social media allowing anyone to publish what they please are pitfalls users must be aware of. The controversy surrounding the 2016 Presidential Election is a prime example of how misinformation distributed via social media can affect the way people view the current political landscape. Spam, rumors, and “fake news” are all forms of misinformation that can alter decision-making.

With the advent of social media, the stock market has become ever more accessible to the public, but with this accessibility comes a risk of baseless opinions with an amplified voice. In 2017, the Security and Exchange Commission (SEC) announced an investigation into entities that published fraudulent articles promoting certain stocks over others. Public companies had hired writers to publish articles without disclosing that the articles had been sponsored (SEC Press Release, 2017). Fraudulent articles like these have the power to drastically alter how the general public view stocks and what stocks to invest in. However, there are other factors to consider as well. Online forums, as mentioned previously, have the power to create echo chambers. The same opinions can be parroted to double-down on one way of thinking. Investment forums like Yahoo! Finance conversations and Reddit’s r/WallStreetBets can perpetuate positivity bias, where members may be unnecessarily bearish or bullish on a given stock. Studies have shown that this can lead to excessive trading during times when that may be fiscally inadvisable (Tang et al., 2017).

1. **References**

The Rise of Social Bots: <https://arxiv.org/pdf/1407.5225.pdf>

$FAKE: Evidence of …: <https://www.aaai.org/ocs/index.php/ICWSM/ICWSM18/paper/viewFile/17871/17055>

A large scale study to understand…:https://www.computer.org/csdl/pds/api/csdl/proceedings/download-article/12OmNzzP5HP/pdf

ASU Article: <https://www.public.asu.edu/~huanliu/papers/Misinformation_LiangWu2019.pdf>

“SEC.gov” SEC: Payments for Bullish Articles on Stocks Must , 10 Apr. 2017, www.sec.gov/news/press-release/2017-79. Accessed 29 Jan. 2021.