STARC

In the recent investment banking slump, Morgan Stanley saw income decrease by 11% in their quarter report on July 18, 2023, yet the stock price surged because of the "green shoots" wording in their media release (Desmos, 2023). This common practice of manipulating sentiment without changing the information helps companies shape investor perception and potentially impact stock prices, even in times of financial struggle.

STARC is an advanced text manipulation model designed to assist companies in influencing investor sentiment through automated sentiment modification. Leveraging advanced natural language processing, STARC enables users to convey desired sentiments through text by adjusting the sentiment score – while retaining the original information.

Real-Time Sentiment Scoring (FinBERT-tone model)

Our implementation uses the FinBERT-tone model, a **fine-tuned** version of Google's FinBERT on **10,000 manually annotated** (positive, negative, neutral) sentences from analyst reports. This helps the model achieve superior performance on financial tone/sentiment analysis tasks than other NLP models (Huang, 2022). The base model was pre-trained on **4.9B tokens** from corporate (10-K & 10-Q) reports, earnings calls, and financial analyst reports

Our team reverse-engineered the model to classify sentence sentiments on a **6-scale output** instead of the base 3-scale. This helps add greater nuance to text generation (Figure 1).

Key Features:

1. **Evaluating the sentiment** of financial text using our 6-scale model and setting desired sentiment score (Figure 2).
2. **Rewrite or generate new text** to communicate the desired sentiment using a proprietary version of GPT-4, fine-tuned on sentiment scores by our 6-scale FinBERT-tone model.
3. **Modified text retains the original text's information**, context, and coherence using advanced semantic similarity, topic modeling, and prompt engineering.
4. **Providing real-time feedback** on the sentiment score changes as users modify the text to refine text until it reaches the desired score.

5. **When evaluated by external sentiment analysis tools,** used for predicting stock price changes, STARC-produced text consistently yields the desired sentiment score.

Potential Use Cases:

1. **Investor Communications:** Companies can influence investor sentiment through letters to shareholders, earnings reports, and other communication materials, which, in turn, can impact stock prices.
2. **Reputation Management:** Managing brand reputation by modifying the sentiment of public statements and social media posts allows companies to shape and maintain a positive public image.
3. **Financial Analysis:** By evaluating sentiment scores from financial reports or news, analysts and researchers can assess the influence of sentiment on market behavior.
4. **Content Optimization:** Brand marketers and content creators can tailor marketing ads and web content for enhanced audience engagement and desired market actions.

Target Audience

Our target audience ranges from big corporations to smaller startups. STARC is beneficial to any company generating communications that may be analyzed by investors or analysts using sentiment analysis tools, which shapes their confidence in the company.

Gap Analysis/Competitive Landscape

Currently, no specific company offers a product identical to STARC – which combines sentiment analysis and modification for targeted influence on investor sentiment.

1. **Sentiment Analysis:** While several companies (Lexalytics, Aylien, MonkeyLearn) provide NLP sentiment analysis for text, they do not offer sentiment modification.
2. **Market Research Firms:** Market research firms provide insights into sentiment trends but focus on industry research rather than offering company-facing products.
3. **Text Generation Models:** Companies like OpenAI and OpenText offer generic text generation models that lack sentiment manipulation or a quantified sentiment score.

Appendix

Figure 1:

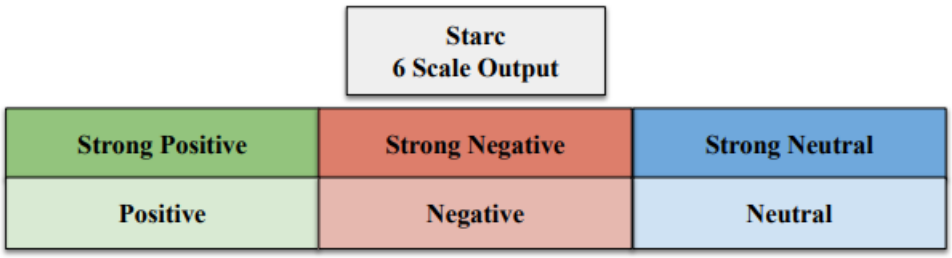

Figure 1: *shows the 6-scale output of our financial sentiment analysis model.*

Figure 2:

```
Please enter a sentence for scoring, ('x' to exit):
While the broader economy suffered last quarter, we maintained healthy cash flows

Sentence: While the broader economy suffered last quarter, we maintained healthy cash flows
Label: Strong Positive

Breakdown:
Positive sentiment probability:  0.9999997615814209
Neutral sentiment probability:  6.387256235029781e-08
Negative sentiment probability:  7.691184578106913e-08
```

Figure 2: *shows STARC's real-time sentiment scoring with sentiment magnitude.*

Bibliography

Araci, D. (2019, August 27). Finbert: Financial sentiment analysis with pre-trained language models. arXiv.org. https://doi.org/10.48550/arXiv.1908.10063

Desmos, T. (2023, July 18). Morgan Stanley used magic words-'green shoots'. The Wall Street Journal. https://www.wsj.com/livecoverage/stock-market-today-dow-jones-07-18-2023/card/morgan-stanley-used-the-magic-words-green-shoots--QibAXv8Ps4Aqa5ptg6KY

Huang, Allen H., Hui Wang, and Yi Yang. "FinBERT: A Large Language Model for Extracting Information from Financial Text." Contemporary Accounting Research (2022).

Shi, Y., Zheng, Y., Guo, K., & Ren, X. (2020). Stock movement prediction with sentiment analysis based on deep learning networks. *Concurrency and Computation: Practice and Experience*, *33*(6). https://doi.org/10.1002/cpe.6076