

Quantitative Analysis of Financial Sentiment Impact on Stock Market Dynamics

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Objectives

We aim to explore the relationship between sentiment expressed in financial news articles and stock market performance. By combining sentiment analysis of Bloomberg articles and financial market data from Yahoo Finance, we hope to uncover patterns that could provide insights into market behavior.

Methodology

1. Ingestion Phase

- Bloomberg Articles (2006–2013)*: Extracted from archived text files, organized into date-based folders. Parsed text is loaded into a raw data zone for preprocessing as a CSV.
- Yahoo Finance Market Data*: Retrieved using the Yahoo Finance API if the app is connected to the Internet. Data is downloaded in JSON format and stored in a raw data zone.



2. Wrangling Phase

- Sentiment Analysis*: Sentiment scores are calculated using NLP tools (Vader) = measure the polarity (positive, neutral, or negative) of each central sentence of the article. The more we talk about the company, the heavier the weight of sentiment.
- Data Filtering*: Focus exclusively on articles from 2010 to 2013, as these years have the highest volume of data. Remove articles that do not mention the target companies to ensure analysis is focused.
- Data Formatting*: Convert the cleaned dataset into a standardized JSON format, ensuring all relevant information.

3. Production Phase

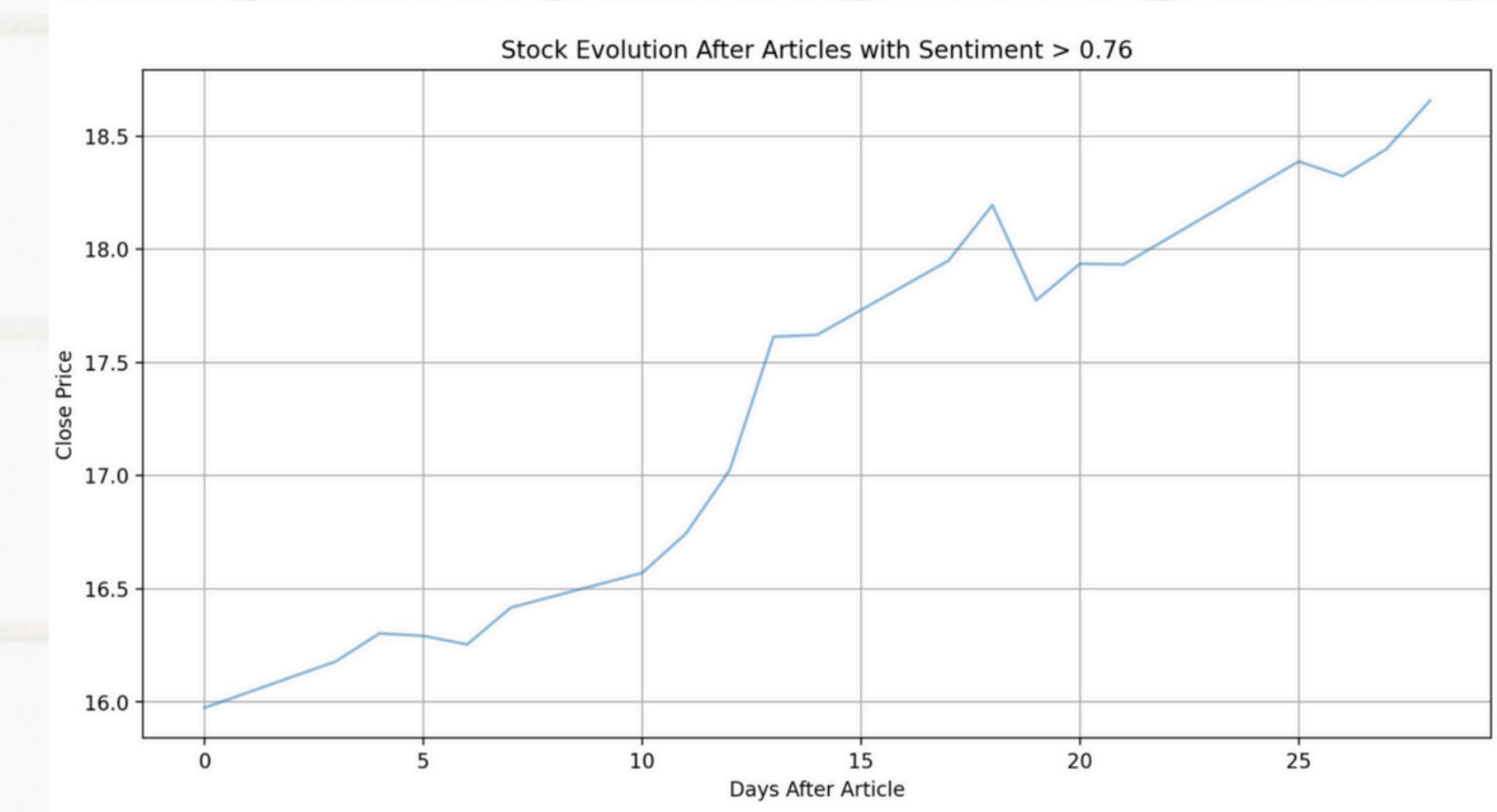
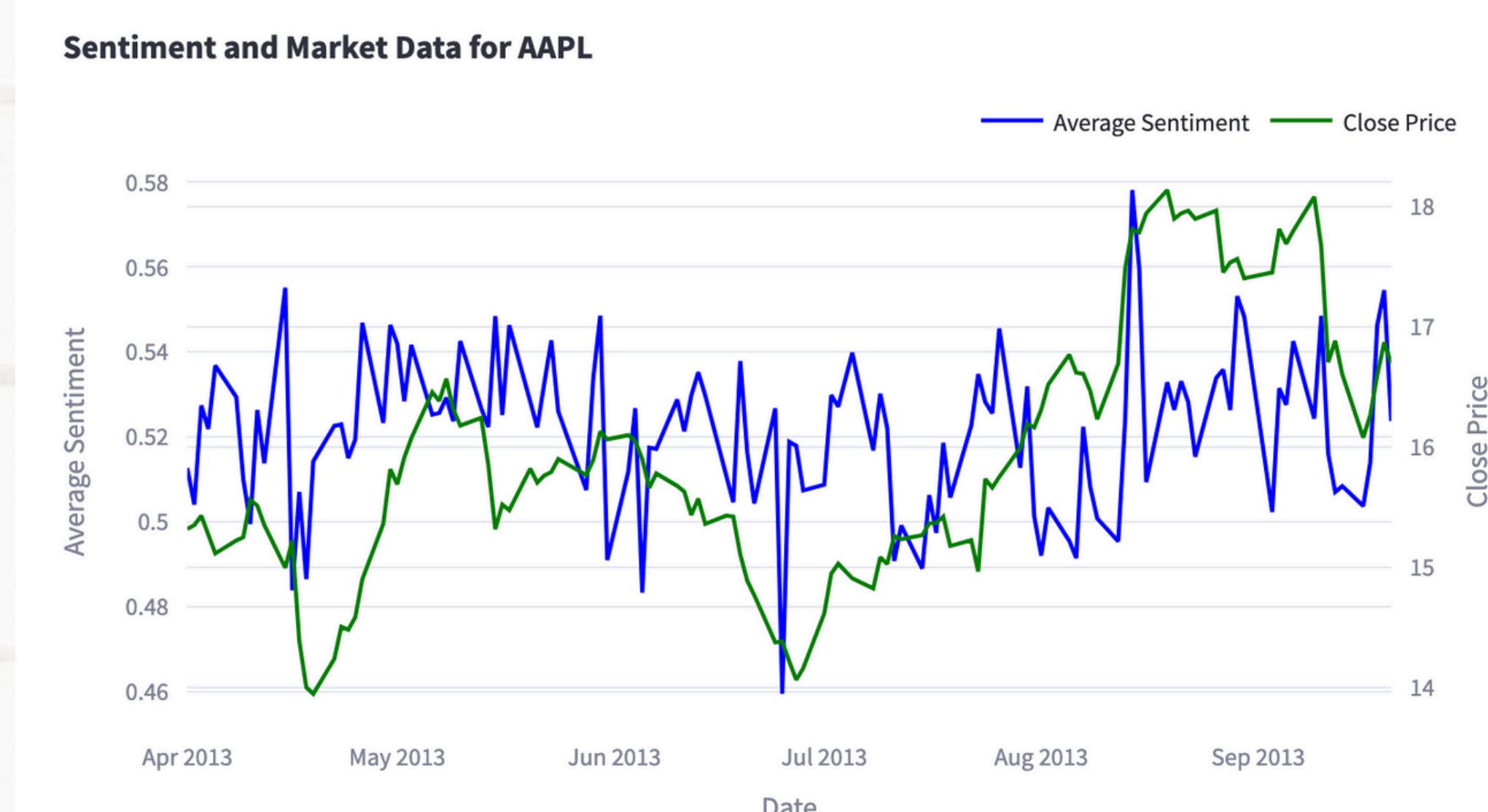
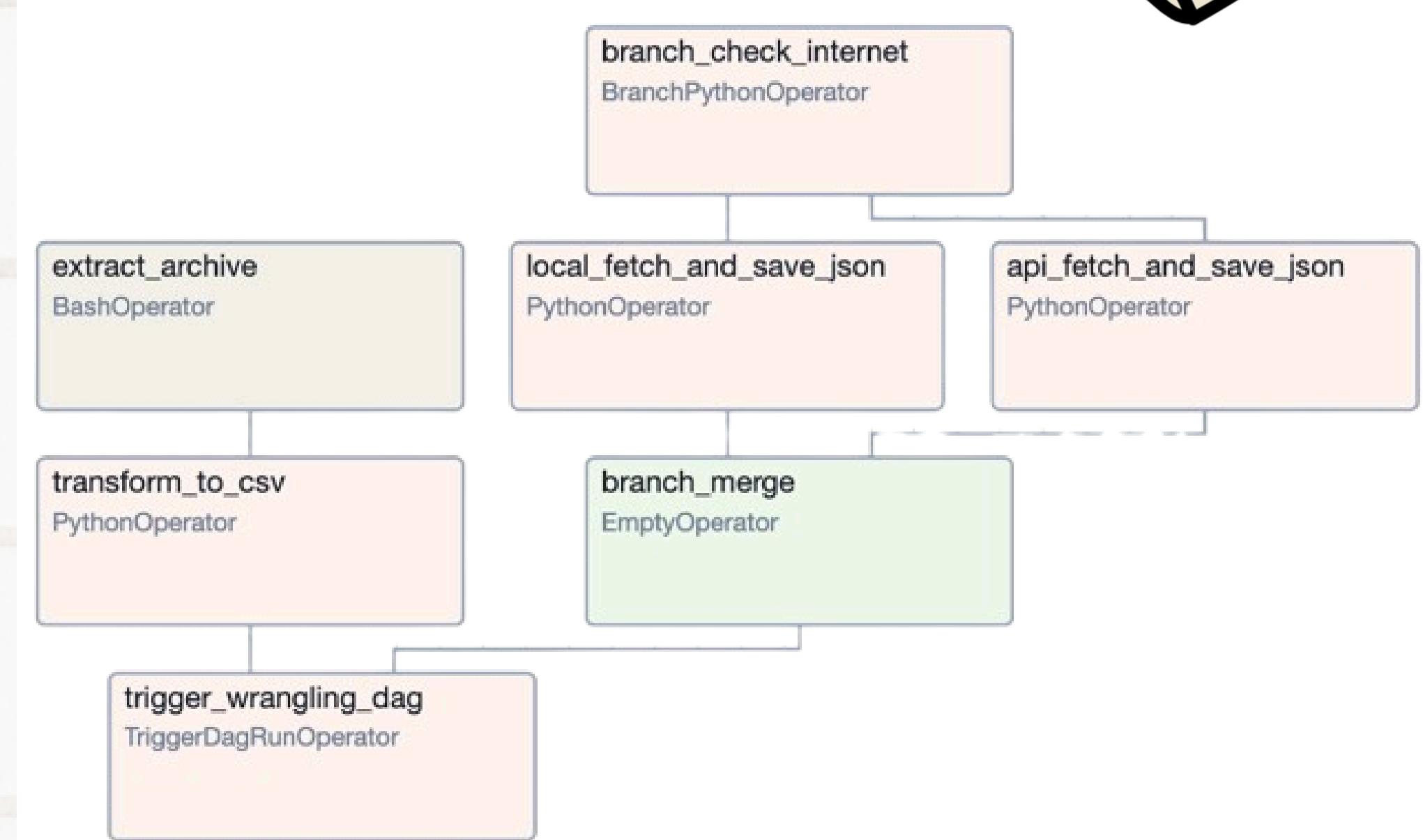
- Financial Data on Redis*: Fast, real-time access to stock data using timestamps as key values for efficient querying.
- Article Data on MongoDB*: Flexible storage, enabling quick filtering by company, sentiment, or date. And allows us to keep JSON format.
- Cross-Referenced Analysis*: Combine Redis and MongoDB data to analyze trends between sentiment and stock performance.
- Visualization on Streamlit*: Dashboard displaying sentiment and stock timelines, filtered insights by company or period.

Results

- Scattered correlation**: Correlations are sometimes observed with articles predicting stock prices, as in the graph above. However, these correlations were isolated cases, and the overall sentiment curve resembled a zigzag pattern, with no significant trends, unlike stocks.
- Strongly negative or positive sentiment**: Articles presenting extremely positive sentiment have preceded growth in stock prices (and vice versa with strongly negative articles).

Questions

- Is there a correlation between sentiment scores and stock prices?
- How do sentiment and market trends respond to global events (e.g., iPhone launch)?



References

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