Predicting Stock Volatility using Sentiment Analysis of Daily News Articles

Abstract:
Financial markets are complex ecosystems influenced by a myriad of factors. This project aims to harness the power of sentiment analysis from daily news articles to predict the stock volatility of publicly traded companies. By leveraging natural language processing techniques and established time-series models, we intend to create a robust framework for forecasting daily stock volatility.

Objectives:

Data Collection:

- Extract daily news articles related to publicly traded companies from reputable sources.
- Implement web scraping tools to gather sentiment scores based on article content.

Sentiment Analysis:

- Utilize state-of-the-art sentiment analysis tools such as VADER to quantify the sentiment of each article.
- Aggregate daily sentiment scores for each company to create a comprehensive sentiment time series.

Feature Engineering:

- Integrate sentiment scores as features along with other relevant financial indicators (e.g stock open/close price and traded volumes).
- Explore the correlation between sentiment scores and subsequent stock volatility.

Modeling:

- Apply linear regression models to understand the relationship between sentiment scores and stock volatility.
- Implement ARIMA models to capture time-dependent patterns in volatility and forecast future volatility.

Validation and Optimization:

- Employ cross-validation techniques to validate the accuracy of the models.
- Fine-tune model parameters to optimize predictive performance.

Expected Outcomes:

- Develop a predictive model capable of forecasting daily stock volatility based on sentiment scores.

- Gain insights into the impact of news sentiment on short-term stock price movements.
- Create a user-friendly interface for daily volatility predictions.

Significance:

This project offers a novel approach to stock market forecasting by integrating sentiment analysis into traditional quantitative models. Understanding the role of news sentiment in stock volatility provides valuable insights for investors, traders, and financial analysts.

Future Work:

- Explore the use of machine learning algorithms to enhance prediction accuracy.
- Investigate the influence of macroeconomic indicators on the relationship between sentiment and stock volatility.

Conclusion:

The proposed project merges cutting-edge sentiment analysis techniques with established time-series models to predict stock volatility. By exploring the intricate interplay between news sentiment and market dynamics, this project aims to contribute to the evolving landscape of financial forecasting, providing stakeholders with a more nuanced understanding of daily stock behavior.