CIS600 Applied Natural Language Processing

Spring 2024 Term Project Proposal

"Financial News Sentiment Analysis"

Team Members
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Project Idea and Features

The project centers around the development of a sophisticated sentiment analysis system tailored for financial news content. Utilizing cutting-edge NLP techniques, the system aims to classify sentiments expressed in news articles as positive, negative, or neutral. This classification provides critical insights into market trends, enabling informed decision-making for investors and financial analysts.

Key Features:

Real-Time Analysis: Ability to process and analyze financial news in real-time, ensuring timely insights.
Advanced NLP Models: Incorporation of state-of-the-art NLP models for deeper textual analysis.
User Interface: Development of an intuitive user interface for easy access to sentiment analysis results.

Significance

Analyzing finance news is a valuable idea for several reasons:

Timeliness: Finance news directly impacts markets, economies, and individual investments. Analyzing news as it happens provides timely insights that investors can use to make informed decisions.

Market Trends: Finance news often reflects broader market trends, including shifts in investor sentiment, economic indicators, and geopolitical events. By analyzing these trends, investors can better understand market dynamics and adjust their strategies accordingly.

Investment Opportunities: Finance news analysis can uncover potential investment opportunities, whether it's identifying undervalued stocks, emerging sectors, or market trends that may lead to profitable trades.

Risk Management: Understanding finance news helps investors manage risk by staying informed about factors that could impact their investments negatively. This could include factors like regulatory changes, economic downturns, or company-specific issues.

Educational Value: Finance news analysis provides educational value by explaining complex financial concepts, market dynamics, and economic principles in real-world contexts. This can help investors deepen their understanding of finance and improve their decision-making skills.

Competitive Advantage: Access to timely and insightful finance news analysis can provide investors with a competitive advantage over those who rely solely on mainstream news sources or lack access to in-depth analysis.

Overall, finance news analysis serves as a crucial tool for investors, offering insights, opportunities, and risk management strategies essential for navigating the dynamic world of finance.

Work Plan

The work plan outlines the project's key technical tasks, their timelines, and the team members responsible for each task.

Data Collection and Pre-processing:
- Perform data pre-processing steps such as removing HTML tags, accented characters, stopwords, tokenization, and normalisation.
- Balance the dataset by upsampling the minority class.

03/28/2024 - 03/31/2024

Assigned to: Atharvaa and Nagesh

Feature Selection and Extraction:
- Tokenize text data and convert it into numerical vectors using CountVectorizer.
- Extract features from the text data.
- Select appropriate features for modelling.

04/01/2024 - 04/04/2024

Assigned to: Bhumika and Aswin

Data Analysis and Visualization:
- Visualise the distribution of sentiment classes.
- Explore relationships between features and sentiment.
- Conduct exploratory data analysis to gain insights into the dataset.

04/05/2024 - 04/09/2024

Assigned to: Kratik and Nagesh

Modelling:
- Build and train machine learning models (Naive Bayes, Random Forest) using selected features.
- Implement deep learning models (CNN 1D, RNN, LSTM) using tokenized sequences.
- Tune hyperparameters and optimise models for better performance.

04/10/2024 - 04/16/2024

Assigned to: Bhumika, Atharvaa, and Aswin

Testing and Summarization:
- Evaluate models on the test set.
- Calculate performance metrics such as accuracy, precision, recall, and F1-score.
- Summarise the results and compare the performance of different models.
- Prepare a final report documenting the project workflow, findings, and recommendations.

04/17/2024 - 04/21/2024
Assigned to: Kratik and Nagesh

Conclusion

The Financial News Sentiment Analysis project aims to harness the power of NLP to provide valuable insights into market sentiments, aiding stakeholders in making informed decisions. Through meticulous planning and execution, the team is committed to delivering a solution that stands at the forefront of financial analytics technology.