Constructing A Profitable Portfolio? Mind the Sentiment!

by Ngoc Vo

1. Introduction

News sentiment plays a crucial role in the predictability of stock market. Recently, researchers have consistently searched for different news types and their impacts on stock prediction. Furthermore, existing machine learning literature with regards to stock movement prediction has mostly concentrated on one single market, whose results may mask the true degree of conclusion to other markets. This research aims to fill these gaps by examining the predictive value of news sentiment in three countries- the US, Australia, and Vietnam from developed and developing economies.

2. Objectives

- Exploring the predictive values of daily pollical news on prediction models, which have not been studied in prior work
- Showing how news sentiment combined with a machine learning technique can provide a successful stock portfolio
- Conducting a cross-border study to investigate the consistency of the proposed methods over a period of time and across countries
- Bridging the divide in financial market forecasting for machine learners and financial economists

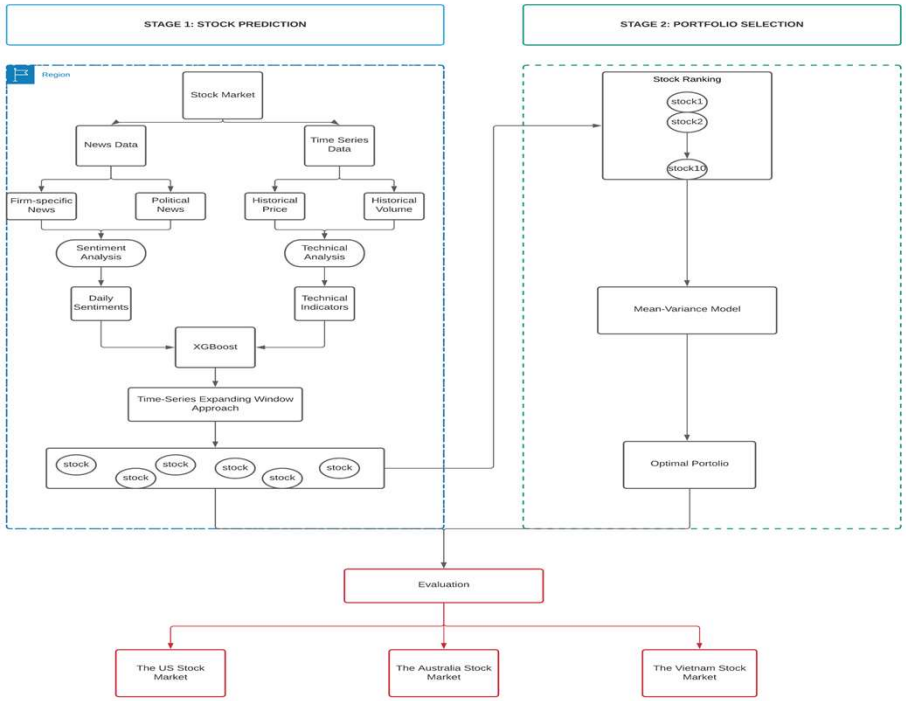
3. Methodology

Data:
Data collected from listed companies in three market indices representing the stock exchange of the US (S&P100), Australia (ASX100), and Vietnam (VNI30). Total companies are 230.

Dataset: stock price data and news data from 2010 to 2021. To prevent look-ahead bias and data leakage, a time window slicing cross-validation strategy is adopted: the training and tests sets are moved across the timeline of a dataset. The hold-out period 2016-2021 is used for the out-of-sample test as it contains market dynamics such as bull/bear markets cycles, 2020 stock market crash, and the Black Swan event- COVID19 pandemic

Experiment includes two stages:
(1) Stock Prediction:
Predictions based on price time series, technical indicators and news sentiments. The choice of state-of-the-art algorithms are Extreme Gradient Boosting (XGB), Long-short-term-memory (LSTM), and Ensemble Models (RF, DT, XGB).

(2) Portfolio Selection:
The prediction results from first stage are employed for portfolio selection using a mean-variance optimisation.



4. Results

- Average F1-score of approximately 80% for all countries confirmed predictive value of news sentiment.
- The sentiment portfolios outperformed market benchmarks in all countries from 2016 to 2021
- News sentiment has larger impact on prediction models from developing country when compared to developed countries

News Sentiment Detection

Countries	Average F1		
	Prediction Model (baseline)	Sentiment-Prediction Models	Changes
United States	79.0%	80.2%	1.6%
Australia	80.5%	81.9%	1.8%
Vietnam	75.4%	79.1%	4.9%

5. Implications

✓ For traders: unlocking sentiment potentials: adding sentiment to prediction models will significantly improve model performance.
✓ For asset managers, portfolio with sentiments guarantee abnormal returns overtime
✓ For scholars, political news is first introduced and proven to improve predictive performance of ML models.

6. References