A Deep Learning Framework for Momentum-Based Trading on New York Stocks Combining Technical and Sentiment Factors

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We aim to integrate historical technical factors, news sentiment, and momentum trading into a unified investment framework. A relevant study [1] has applied a similar approach in the Chinese market, but it was limited to only three years of historical data. In contrast, we seek to extend this methodology to the U.S. market, specifically focusing on New York-listed stocks, and leverage a more extensive dataset spanning 2020 to 2026.

1 Methods

The target market for this study is the New York Stock Exchange, and the dataset spans from 2020 to 2026. Our investment framework combines fundamental analysis, news sentiment analysis, and momentum-based trading, leveraging deep learning models for stock price prediction.

1. Fundamental Screening
   We begin by identifying undervalued stocks using key financial indicators, including P/E, P/B, P/S, ROE, and profit margin, following the methodology outlined in [1]. This step serves as a preliminary filter to focus on stocks with strong fundamental value.

2. News Sentiment Analysis
   For the selected stocks, we collect and summarize news articles. Sentiment scores are then computed to quantify the market sentiment associated with each stock. These scores will serve as input features for our predictive models.

3. Predictive Modeling
   Historical stock data (OHLCV, moving averages, etc.) are combined with sentiment scores and fed into deep learning models such as LSTM or Transformer networks. These models are trained to estimate future stock prices based on both market trends and sentiment signals.

4. Trading Strategy
   Once the predictive models are trained, we select the top 50 stocks with the highest price estimation accuracy on the validation set. For these stocks, momentum is calculated as the slope of the 20-day closing price series, obtained by fitting a linear regression to the last 20 closing prices for each day. We then select the top 60% of stocks with the steepest positive slope for potential trades in the momentum rotation strategy.

   The deep learning model is used to generate buy/sell signals:

   - Buy: If the model predicts a price increase.
   - Sell: If the model predicts a price decrease for stocks already in the portfolio.

   Additionally, profit-taking and stop-loss strategies are implemented:

   - Stocks are sold if returns exceed 22%.
   - Stocks are sold if prices decline by 8%.

   The specific numbers may vary depending on the trading period, trading frequency, and model performance.

References

[1] Wang Li, Chaozhu Hu, and Youxi Luo. A deep learning approach with extensive sentiment analysis for quantitative investment. *Electronics*, 12(18):3960, 2023.