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Advancing sustainable investing: A deep learning model for multi-source stock prediction

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Abstract

The burgeoning role of the stock market within the national economy elevates the importance of precise stock price analysis and prediction, a field that has garnered substantial interest in academic research. Stock price fluctuations, influenced by a multitude of factors including company fundamentals, market sentiment, capital flows, industry news, and macroeconomic policies, present a highly dynamic and complex challenge for predictive modeling. Addressing this challenge, our study introduces an innovative method that capitalizes on the synthesis of news text and stock price data for forecasting market movements. We employ Glove embeddings to capture semantic nuances from news text and integrate them with quantitative stock data through a sophisticated attention mechanism. This multi-faceted approach is operationalized within a predictive model underpinned by Long Short-Term Memory (LSTM) networks and an Attention framework, geared towards deciphering the intricate, non-linear patterns characteristic of stock market time series data. Our empirical evaluation, conducted on a comprehensive dataset, reveals that our model significantly outperforms traditional methods, marking a notable advancement in prediction accuracy. The results underscore the efficacy of combining textual and numerical data through deep learning techniques, providing a robust tool for investors and analysts to navigate the volatile terrain of stock markets with enhanced foresight.

Keywords

deep learning, multi-source stock prediction, sustainable investing

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Advancing Sustainable Investing: A Deep Learning Model for Multi-Source Stock Prediction

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Abstract

The burgeoning role of the stock market within the national economy elevates the importance of precise stock price analysis and prediction, a field that has garnered substantial interest in academic research. Stock price fluctuations, influenced by a multitude of factors including company fundamentals, market sentiment, capital flows, industry news, and macroeconomic policies, present a highly dynamic and complex challenge for predictive modeling. Addressing this challenge, our study introduces an innovative method that capitalizes on the synthesis of news text and stock price data for forecasting market movements. We employ Glove embeddings to capture semantic nuances from news text and integrate them with quantitative stock data through a sophisticated attention mechanism. This multi-faceted approach is operationalized within a predictive model underpinned by Long Short-Term Memory (LSTM) networks and an Attention framework, geared towards deciphering the intricate, non-linear patterns characteristic of stock market time series data. Our empirical evaluation, conducted on a comprehensive dataset, reveals that our model significantly outperforms traditional methods, marking a notable advancement in prediction accuracy. The results underscore the efficacy of combining textual and numerical data through deep learning techniques, providing a robust tool for investors and analysts to navigate the volatile terrain of stock markets with enhanced foresight.

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