

Stock Predictions with Sentiment Analysis

Motivation: Predicting the market movements is one of the prime targets in the field of finance. This can be used in order to understand risks and for management of investment portfolios or valuing different types of assets. Nonetheless, the stock market presents various trends and has hidden data, understand and correlating it to real world, helps understand the movements. Therefore, Financial News and their underlying sentiments are an important factor for the decision process of economic actors involved in investments processes of a company.

Problem: Correlate and predict market movements of APPL stock using financial news using time series analysis. Therefore, understanding if they have an effect on the price.

Research Question: To what extent is possible to predict market movements using a multimodal fusion model?

Public Dataset

Data: Kaggle

Timeframe: 23/07/2012 - 27/01/2020

Methodology

The stock dataset includes values from 2012 until 2020 of the APPL stock. The data will be split into a Training and Testing set to evaluate the methodology.

- Finding the daily sentiments using FinBERT
- Extract the features of Sentiments
- Plot the time series
- Verify for multicollinearity and stationarity
- Analyse the results (correlation)

Evaluation

On a training data the LSTM model with one lagged value performed at around 95% accuracy. However, on the unseen data it performed only at 81%. This is still an impressive result at predicting data but still shows high uncertainty in the market. Following, there was performed a Person's correlation test and identified that the Financial News do in fact aid at predicting market movements (positive sentiment - upwards trajectory and negative and neutral sentiments - downwards trajectory)

Assumptions

- Effects of the news are instant and valid on the same trading day
- All the news that mention the said stock do have an effect on the price
- All the Sentiments applied on the news are valid