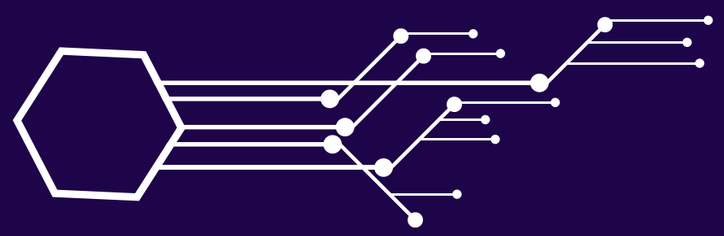
Future of Trading at JP Morgan

Introduction of Sentiment Analysis for better investments

Understanding the titan of asset management

Company Background

JPMorgan Chase & Co., is at the forefront of integrating artificial intelligence with its trading activities through its "Next-Generation Markets Execution" project using LOXM, an AI system designed to optimize equity trade executions by analyzing current market conditions and sentiments.



Falling short at analysis

The LOXM Problem

A practical challenge emerged when LOXM attempted to analyze sentiments from social media rumors about a tech merger, struggling to filter meaningful insights from speculative noise. This incident highlights the critical need for LOXM to evolve its capabilities to accurately discern and quantify sentiment amidst the flood of digital information.

Laura Noonan - Financial Times

“LOXM’s job is to execute client orders with maximum speed at the best price, by using lessons it has learnt from billions of past trades — both real and simulated”

Our Solution

Simple Methodology

Our strategy involves meticulously training and testing each algorithm with the comprehensive Financial PhraseBank and FiQA datasets, with the objective of discerning which model most adeptly deciphers the subtleties of financial lexicon.

We are set to optimize LOXM's sentiment analysis by appraising three distinct machine learning models:

- The Naive Bayes Classifier
- Support Vector Machine (SVM)
- Random Forest Classifier.

Words to look for

Preprocessing the Data

We utilize a Word Cloud to visualize the most frequent and significant words in our corpus. A Word Cloud is a visual representation where the size of each word indicates its frequency or importance in the dataset.

Categorizing data

Support Vector Machine

The core idea behind SVM is to determine the optimal hyperplane which maximizes the margin between different classes of data points.

	Precision	Recall	F1 - Score	Support
Negative	0.42	0.13	0.2	175
Neutral	0.7	0.92	0.79	622
Positive	0.78	0.62	0.69	372
Accuracy			0.71	1169
Macro Avg	0.63	0.56	0.56	1169
Weighted Avg	0.68	0.71	0.67	1169

Text classification by probability

Naive Bayes Classifier

Based on Bayes' theorem, the Naive Bayes classifier assumes independence between predictors and calculates the probability of each class based on the presence of features in the given data.

	Precision	Recall	F1 - Score	Support
Negative	0.86	0.03	0.06	192
Neutral	0.66	0.98	0.79	643
Positive	0.7	0.44	0.54	334
Accuracy			0.67	1169
Macro Avg	0.74	0.48	0.46	1169
Weighted Avg	0.7	0.67	0.6	1169

Leveraging for Enhanced Sentiment Classification

Random Forest Classifier

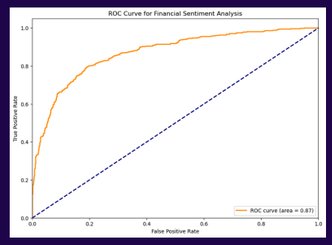
It operates by constructing a multitude of decision trees at training time and outputting the class that is the mode of the classes (classification) of the individual trees.

	Precision	Recall	F1 - Score	Support
Negative	0.15	0.08	0.1	192
Neutral	0.67	0.83	0.74	643
Positive	0.73	0.6	0.66	334
Accuracy			0.64	1169
Macro Avg	0.52	0.5	0.5	1169
Weighted Avg	0.6	0.64	0.61	1169

Proof is in the pudding

ROC Curve and Model Performance

Our model's ROC curve (in orange) shows a good balance between sensitivity and specificity. The AUC score of 0.87 indicates that the model has a high probability of distinguishing between the 'positive' and 'negative' sentiment classes.



Smarter Trading

for your assistance