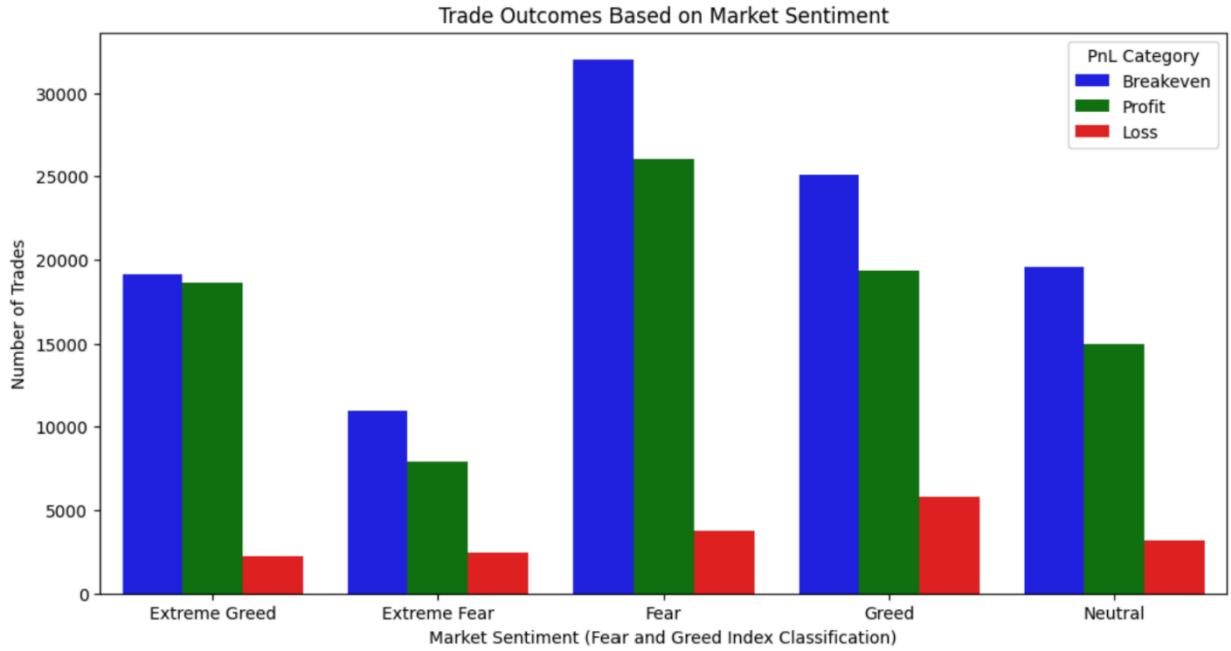
Sentiment-Driven-Trading-Analysis

Graphs for analysis of both the datasets.

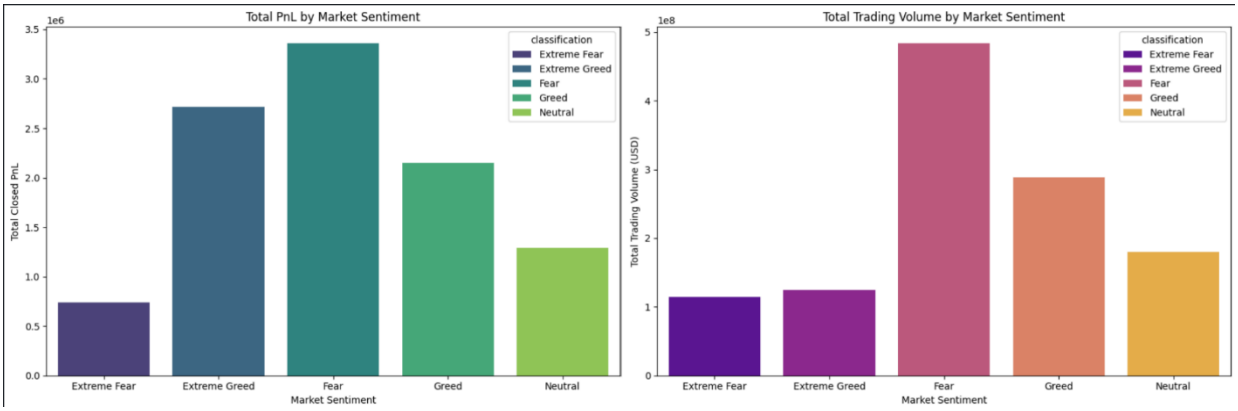


It illustrates the number of trades categorized by their profit and loss (PnL) outcome (Breakeven, Profit, Loss) across different market sentiments. The market sentiments are classified using the "Fear and Greed Index Classification" and are labeled as "Extreme Greed," "Extreme Fear," "Fear," "Greed," and "Neutral."
"Fear" sentiment shows the most activity, with the highest numbers of both breakeven and profitable trades.

Losses are consistently lower than breakeven and profit trades across all sentiments.

"Greed" sentiment has the highest number of losing trades, despite generally having a high volume of overall trades.

Breakeven trades are a significant portion of outcomes, often rivaling or exceeding profit trades in volume.



The image contains two bar charts showing financial outcomes based on market sentiment.

Left Chart (Total PnL):

"Fear" sentiment generated the highest total profit/loss (PnL) (around $3.4 million), followed by "Extreme Greed" ($2.7 million).

"Extreme Fear" had the lowest PnL (around $0.75 million).

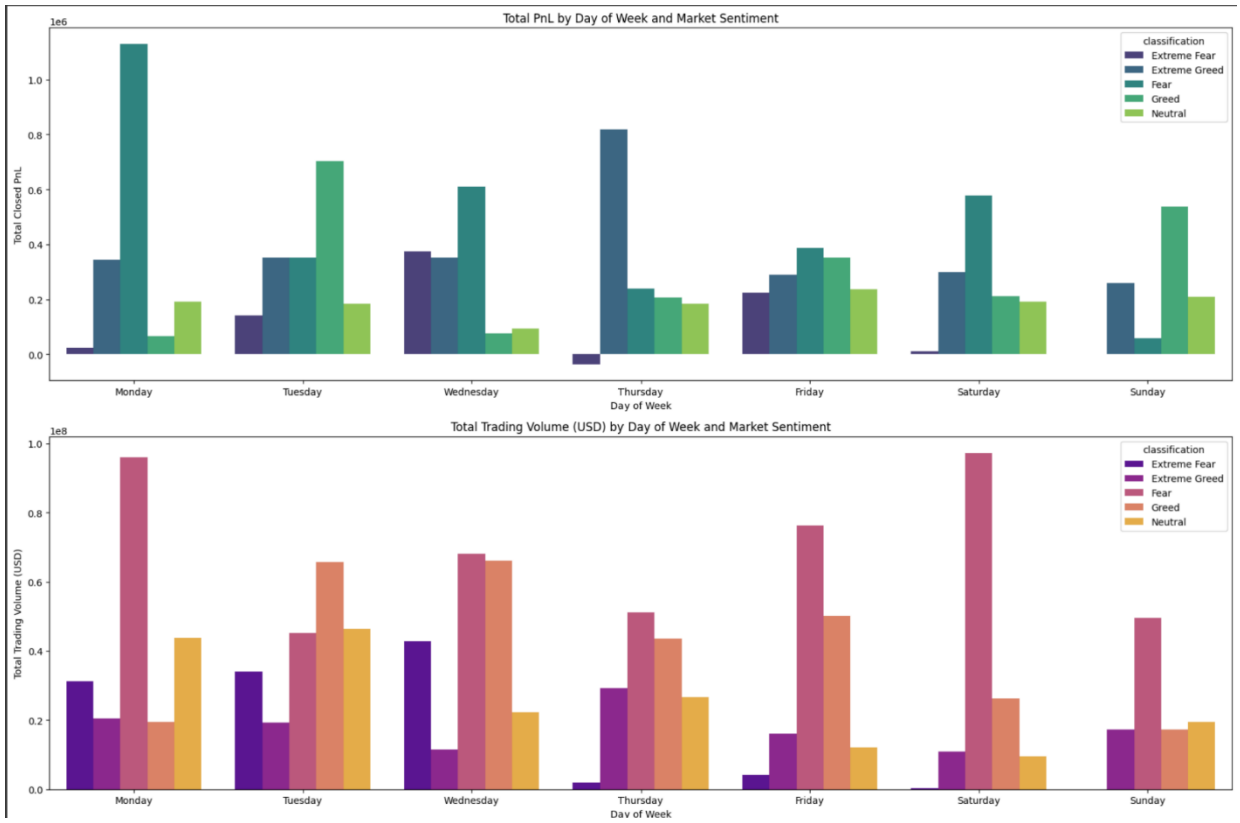
Right Chart (Total Trading Volume):

"Fear" sentiment also had the highest total trading volume (almost $4.9 billion), significantly more than any other sentiment.

"Greed" sentiment was second in volume (around $2.9 billion).

"Extreme Fear" and "Extreme Greed" had the lowest trading volumes.

Overall takeaway: "Fear" sentiment periods were the most active and profitable, while "Extreme Fear" periods were the least active and least profitable. "Extreme Greed" showed good profitability despite lower volume compared to "Greed."



The image shows two bar charts analyzing trading activity by "Day of Week" and "Market Sentiment."

Top Chart: "Total PnL by Day of Week and Market Sentiment"

This chart shows the total profit/loss (PnL) for each day of the week, broken down by market sentiment (Extreme Fear, Extreme Greed, Fear, Greed, Neutral).

Key points:

Monday and Tuesday (Fear sentiment): Show the highest PnL.

Thursday: Generally shows lower PnL, with some negative PnL for "Extreme Fear."

Overall: "Fear" and "Extreme Greed" sentiments tend to have higher PnL across most days.

Bottom Chart: "Total Trading Volume (USD) by Day of Week and Market Sentiment"

This chart shows the total trading volume in USD for each day of the week, also broken down by market sentiment.

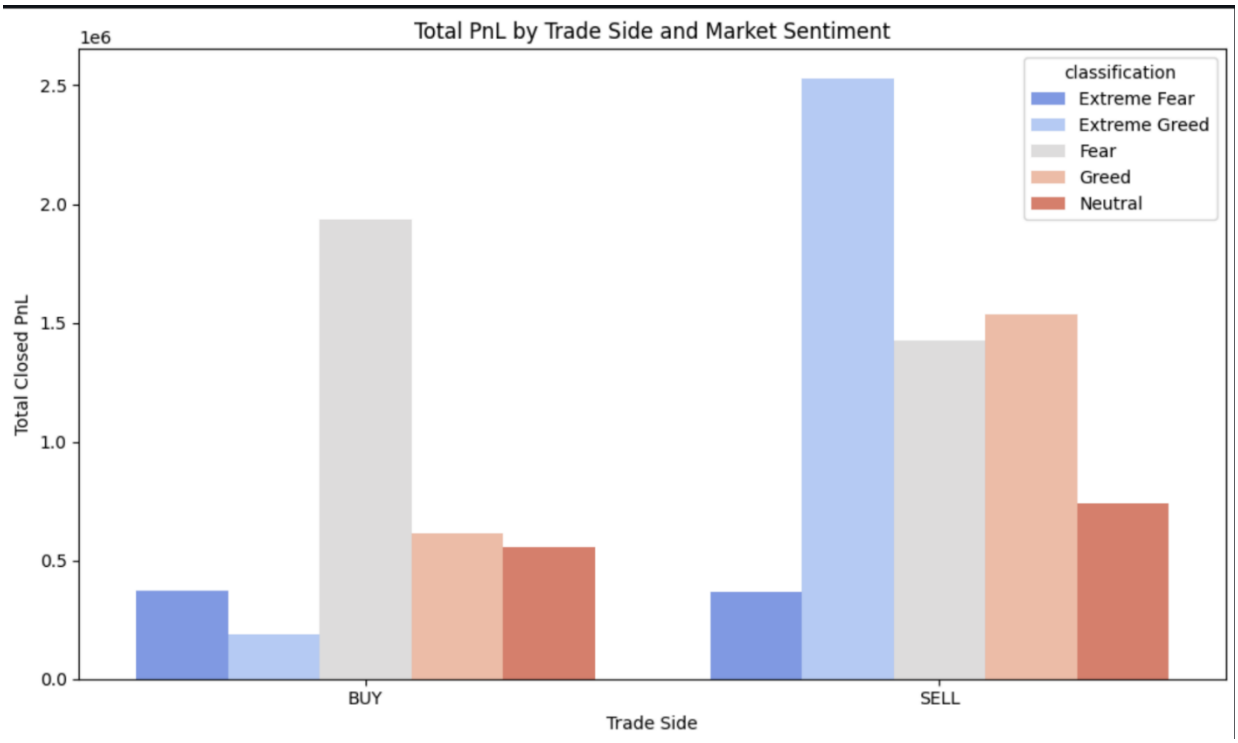
Key points:

Monday, Saturday, and Wednesday (Fear/Greed sentiments): Show the highest trading volumes.

Trading volume generally high for "Fear" and "Greed" sentiments throughout the week.

Sunday: Shows comparatively lower overall volume.

In essence: The charts highlight how market sentiment influences PnL and trading volume differently across the days of the week, with "Fear" and "Greed" sentiments often associated with higher activity and "Fear" frequently leading to higher PnL.



This bar chart titled "Total PnL by Trade Side and Market Sentiment" shows the total profit and loss (PnL) from trades, categorized by whether the trade was a "BUY" or a "SELL" and by the prevailing market sentiment (Extreme Fear, Extreme Greed, Fear, Greed, Neutral).

BUY Side:

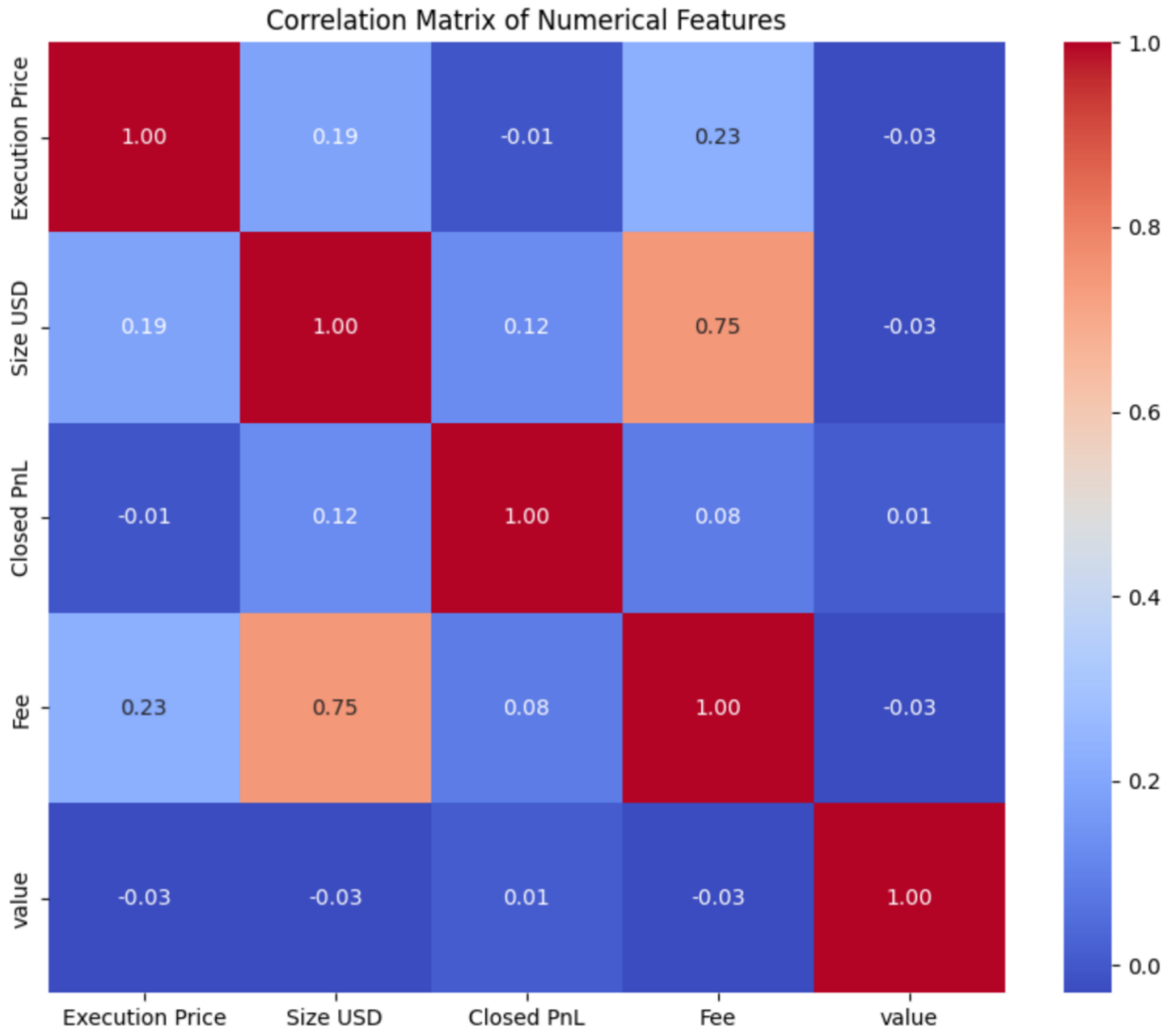
"Fear" sentiment (light gray bar) resulted in the highest PnL for BUY trades, close to $2 million.

Other sentiments on the BUY side generated significantly less PnL.

SELL Side:

"Extreme Greed" sentiment (light blue bar) generated the highest PnL for SELL trades, reaching approximately $2.5 million.

"Fear" (light gray bar) and "Greed" (light orange bar) also show substantial PnL for SELL trades.



Numbers Range: Values range from -1 to 1.

1 (Red): Perfect positive correlation (variables move in the same direction).

-1 (Dark Blue): Perfect negative correlation (variables move in opposite directions).

0 (White/Light Blue): No linear correlation.

Key Observations:

Execution Price has a weak positive correlation with Size USD (0.19) and Fee (0.23).

Size USD has a strong positive correlation with Fee (0.75). This means larger trade sizes tend to incur higher fees.

Closed PnL shows very weak correlations with all other features (close to 0), indicating that these specific features (Execution Price, Size USD, Fee, value) don't strongly predict the Closed PnL in a linear fashion.

Value has very weak (close to 0 or slightly negative) correlations with all other features.

In essence, the matrix tells us how much and in what direction one feature tends to change when another feature changes. The strongest relationship observed is between "Size USD" and "Fee."

Built a Machine Learning Model to predict the outcome of a trade based on a combination of trade details and market sentiment. This demonstrates that there are predictable patterns in the data that can be learned and potentially used to inform trading strategies. For instance, we could use this model to identify the characteristics of trades that are most likely to be profitable.

Model Accuracy:-

Accuracy: 0.9283211817062779

Classification Report:

	precision	recall	f1-score	support
Breakeven	0.92	0.94	0.93	21363
Loss	0.92	0.85	0.88	3508
Profit	0.94	0.92	0.93	17373
accuracy			0.93	42244
macro avg	0.93	0.91	0.92	42244
weighted avg	0.93	0.93	0.93	42244

Predictive Modeling

To predict trade outcomes, a RandomForestClassifier was trained on key features such as Execution Price, Size (USD), Fear & Greed Index, Hour of Day, and Day of Week. This model, which combines multiple decision trees for higher accuracy, achieved a **92.83% accuracy** on unseen data. Its strong performance confirms that these factors are significant predictors of whether a trade will result in a **Profit**, **Loss**, or **Breakeven**, making it a valuable tool for data-driven strategy development.
