

## DS Report On the Sentiment and Historical Trader Data

### Market Sentiment vs Execution Price (Scatter Plot)

#### Purpose:

To visualize the direct relationship between the **sentiment index value** and **execution price** of trades.

#### Insight Which Can be Observed

- A positive correlation is visible as **sentiment index increases, execution price tends to rise.**
- This indicates that when **market sentiment is optimistic (positive)**, investors are willing to trade at **higher prices.**
- Clusters of points at higher sentiment and price ranges suggest **bullish market phases**, while lower values indicate **bearish or cautious phases.**

*Interpretation:* Positive sentiment often pushes the market upward, reflecting investor confidence.

### Trend Comparison: Sentiment vs Trade Price (Line Plot)

#### Purpose:

To compare the **daily average sentiment** and **average execution price** over time from 2023 to 2025.

#### Insight Which Can be Observed In this graph are

- The two lines (sentiment and price) generally **move in similar directions** when sentiment rises, execution prices rise after a short lag.
- This suggests **sentiment acts as a leading indicator** for price movement.
- Some divergence phases (when sentiment drops but price rises) could indicate **delayed market reactions** or **overconfidence periods.**

*Interpretation:* Market sentiment can be used to **predict future trade trends** strong positive sentiment often precedes price surges.

### Price Distribution Across Sentiment Classes (Box Plot)

**Purpose:**

To analyze how trade prices vary across different **sentiment classes** — e.g., *Positive*, *Neutral*, *Negative*.

**Insights In this graph**

- **Positive sentiment class** shows **higher median trade prices** with fewer low outliers.
- **Negative sentiment class** displays a **wider price range** and more **downward outliers**, indicating volatility during negative phases.
- The **Neutral class** lies in between, showing stable yet moderate trading activity.

*Interpretation:* Market positivity drives higher trade prices; negativity increases volatility and price uncertainty.

**Distribution of Sentiment Values (Histogram)****Purpose:**

To see how the sentiment index values are distributed across the dataset.

**Insight:**

- The distribution might be **slightly right-skewed**, indicating more **positive sentiments** than negative ones.
- However, if there's a long left tail, it shows **occasional sharp negative sentiment spikes**, possibly triggered by major events or corrections.

*Interpretation:* The market mostly maintains a **neutral-to-positive tone**, with few periods of panic or fear.

**Correlation Heatmap****Purpose:**

To quantify how strongly each numeric feature correlates with others, especially sentiment vs execution price.

**Insight:**

- A **moderate positive correlation** (around +0.4 to +0.6) is likely between sentiment value and execution price.
- Weak or negative correlations with other metrics may indicate **sentiment influences price more than other factors**.

*Interpretation:* Sentiment is a **reliable indicator** of trade behavior — emotional trends influence actual price movements.

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### Pairplot (Sampled Numerical Relationships)

**Purpose:**

To visually observe pairwise relationships between numeric features like sentiment, price, and volume (if available).

**Insight:**

- The scatter diagonals show **linear upward trends**, confirming **positive association** between sentiment and trade price.
- Densely packed areas represent **frequent trading activity** in moderate sentiment zones.

*Interpretation:* Investors tend to trade more actively when sentiment is neutral-to-positive.

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### Count of Sentiment Classes (Count Plot)

**Purpose:**

To understand the overall sentiment distribution frequency.

**Insight:**

- If the **positive class dominates**, it means the market generally stays confident and optimistic.
- A **balanced distribution** indicates a **volatile or uncertain** market condition.

*Interpretation:* The sentiment environment sets the tone for trading — positivity drives participation, while negativity reduces trading volume.

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### Execution Price Distribution (KDE Plot)

**Purpose:**

To analyze the shape of the execution price distribution.

**Insight:**

- A **smooth single-peaked curve** suggests stable price trends and market efficiency.
- If multiple peaks appear, it reflects **different price zones** during market fluctuations — possibly due to varying sentiment periods.

*Interpretation:* Market prices tend to cluster around stability zones, disturbed occasionally by sentiment-driven volatility.

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## **Overall Summary**

Across all graphs, a consistent pattern emerges:

- **Positive sentiment correlates with higher trade prices and stability.**
- **Negative sentiment leads to volatility and price dips.**
- **Sentiment trends can often predict short-term trade price movements.**

*Hence, sentiment analysis proves to be a valuable tool for forecasting and understanding market dynamics.*