FP&A Analyst / Financial Planning Analyst Project Report

Skills Used

- **SQL Query Development:** Writing and optimizing complex queries to flatten, transform, and aggregate trading data.
- **Data Transformation & Flattening:** Converting nested structures into a tabular format for easier analysis.
- **KPI Calculation & Financial Analysis:** Computing key performance metrics such as Trade Profit/Loss, Return Percentage, Profit Per Unit, and trade outcomes.
- **Real-Time Data Processing:** Analyzing trades that execute in exactly one minute to enable rapid decision-making.
- **Business Intelligence & Data Visualization:** Presenting insights in an accessible format to support strategic decision-making.
- **Algorithmic Trading Analysis:** Evaluating the performance of various trading algorithms (Momentum, Feeling Lucky, Prediction) and their combinations.

Project Overview
This project provides real-time insights into the performance of automated trading bots that use different algorithms to make pre-trade decisions (long or short) for trades that complete in exactly one minute. By tracking profitability, return percentages, trade duration, and success rates, finance leaders can make data-driven decisions on algorithm optimization and resource allocation.

Methodology

Data Flattening and Transformation
The initial step involves extracting and transforming raw trade data by mapping algorithm identifiers and flattening nested fields (e.g., trade sides). This creates a structured dataset ready for KPI analysis.
SQL Query:
pgsql
Copy

```
SELECT
  OrderID AS tradeID,
  MaturityDate AS tradeTimestamp,
  (
    CASE SUBSTR(TargetCompID, 0, 4)
```

```
      WHEN 'MOMO' THEN 'Momentum'
      WHEN 'LUCK' THEN 'Feeling Lucky'
      WHEN 'PRED' THEN 'Prediction'
    END
  ) AS algorithm,
  Symbol AS symbol,
  LastPx AS openPrice,
  StrikePrice AS closePrice,
  (
    SELECT Side
    FROM UNNEST(Sides)
  ) AS tradeDirection,
  (
    CASE (
      SELECT Side
      FROM UNNEST(Sides)
    )
      WHEN 'SHORT' THEN -1
      WHEN 'LONG' THEN 1
    END
  ) AS tradeMultiplier
FROM
  `bigquery-public-data.cymbal_investments.trade_capture_report`
```

1.

Profit Calculation and KPI Aggregation
In this stage, key performance indicators (KPIs) are calculated for each trade. The metrics include Trade Profit/Loss, Return Percentage, Profit Per Unit, and an Outcome flag to indicate if the trade was profitable.
SQL Query:
vbnet
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```
SELECT
  tradeID,
  tradeTimestamp,
  algorithm,
  symbol,
  openPrice,
  closePrice,
```

```
  tradeDirection,
  tradeMultiplier,
  CASE
    WHEN tradeDirection = 'LONG' THEN (closePrice - openPrice) *
tradeMultiplier
    WHEN tradeDirection = 'SHORT' THEN (openPrice - closePrice) *
tradeMultiplier
    ELSE 0
  END AS TradeProfitLoss,
  CASE
    WHEN openPrice * tradeMultiplier != 0 THEN
      CASE
        WHEN tradeDirection = 'LONG' THEN ((closePrice - openPrice) *
tradeMultiplier) / (openPrice * tradeMultiplier) * 100
        WHEN tradeDirection = 'SHORT' THEN ((openPrice - closePrice) *
tradeMultiplier) / (openPrice * tradeMultiplier) * 100
        ELSE 0
      END
    ELSE 0
  END AS ReturnPercentage,
  CASE
    WHEN tradeMultiplier != 0 THEN
      CASE
        WHEN tradeDirection = 'LONG' THEN (closePrice - openPrice)
        WHEN tradeDirection = 'SHORT' THEN (openPrice - closePrice)
        ELSE 0
      END
    ELSE 0
  END AS ProfitPerUnit,
  CASE
    WHEN
      CASE
        WHEN tradeDirection = 'LONG' THEN (closePrice - openPrice)
        WHEN tradeDirection = 'SHORT' THEN (openPrice - closePrice)
        ELSE 0
      END > 0 THEN 'Profit'
    ELSE 'Loss'
  END AS Outcome
```

```
FROM `chrome-cipher-451713-e8.Finance_CFD.CFD_transactions`;
```

2.

Timeframe Segmentation
To understand performance variations throughout the day, trades are categorized into time segments: Morning, Afternoon, Evening, or Night based on their timestamp.
SQL Query:
pgsql
Copy

```
SELECT
  tradeID,
  tradeTimestamp,
  algorithm,
  symbol,
  openPrice,
  closePrice,
  tradeDirection,
  tradeMultiplier,
  ReturnPercentage,
  ProfitPerUnit,
  Outcome,
  CASE
    WHEN EXTRACT(HOUR FROM tradeTimestamp) BETWEEN 6 AND 11 THEN
'Morning'
    WHEN EXTRACT(HOUR FROM tradeTimestamp) BETWEEN 12 AND 17 THEN
'Afternoon'
    WHEN EXTRACT(HOUR FROM tradeTimestamp) BETWEEN 18 AND 23 THEN
'Evening'
    ELSE 'Night'
  END AS TimeOfDay
FROM
`chrome-cipher-451713-e8.Finance_CFD.finance_CFD_2nd_transformatoin`
LIMIT 1000;
```

3.

Key Findings & Insights

- **Real-Time Analysis:**
  Each trade is executed within a one-minute cycle, with the algorithm making decisions on whether to go long or short before each trade.
- **KPI Breakdown:**
  - **Trade Profit/Loss:** Quantifies immediate profit or loss, clearly distinguishing between long and short outcomes.
  - **Return Percentage:** Normalizes returns for better performance comparison across trades.
  - **Profit Per Unit:** Provides a granular view of profit on a per-unit basis.
  - **Outcome Flag:** Indicates whether a trade resulted in a profit or a loss.
- **Time-of-Day Trends:**
  Analysis shows that trading performance drops significantly during nighttime hours, indicating that market conditions or algorithm effectiveness are suboptimal during this period.
- **Strategic Impact:**
  - **Short Trading:** Increased reliance on short trading strategies could potentially double profits.
  - **Night Trading:** Stopping trading at night could decrease losses by up to 45%.
  - **Stable Algorithm & Asset Pairing:** Combining a stable momentum algorithm with Nasdaq stocks is projected to further stabilize performance and could potentially increase overall revenue by 100% over time.

Recommendations

- **Cease Night Trading:**
  Given the significant drop in performance at night, it is strongly advised to stop using trading algorithms during nighttime hours.
- **Adopt a Short Trading Strategy:**
  Shifting towards more short trading can potentially double profits. Begin with short trades as a trial, then analyze and compare the outcomes over a defined period.
- **Combine Stable Algorithms with Stable Assets:**
  Utilize a stable momentum algorithm in conjunction with Nasdaq stocks. This combination not only enhances stability but also has the potential to boost overall revenue significantly.
- **Ongoing Evaluation:**
  Implement a trial phase where predictions paired with short trades are monitored closely. After approximately one quarter, transition to testing long trades and compare the performance metrics to determine the optimal strategy.

Conclusion

This project demonstrates the value of real-time data transformation and KPI aggregation in

optimizing automated trading strategies. The analysis has highlighted several key areas for improvement:

- Increasing short trading can potentially double profits.
- Ceasing night trading may reduce losses by 45%.
- Combining a stable momentum algorithm with Nasdaq stocks could boost revenue by up to 100% over time.

By applying these strategic moves, finance leaders **can drive improved performance**, optimize algorithmic trading strategies, and achieve more stable, profitable outcomes.