# Landing Page for Stock Forecasting Feature: Model Evaluation

This feature allows users to choose the stock that price they want to forecast with user's customisations of the forecast model

## Stock Forecasting

**Stock Symbol:**
AAPL **1**

**Start Date:**
2023-03-24 **2**

**Forecast Period (months):**
2 **3**

**Train Proportion:**
0.5 | 0.8 | 0.95 **4**
0.5 0.55 0.6 0.65 0.7 0.75 0.8 0.85 0.9 0.95

**Select Forecasting Models:**
- ☑ ARIMA
- ☑ Prophet **5**
- ☑ XGBoost
- ☑ ETS
- ☑ Random Forest

**Fourier Terms (Prophet):** **6**
1

## XGBoost Parameters

**Number of Trees:**
300 **7**

**Max Depth:**
10 **8**

## Random Forest Parameters

**Number of Trees:**
500 **9**

**Minimum Node Size:**
50 **10**

Run Forecast

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**11**

Model Evaluation | Forecast Plot

Show 5 ⌄ entries                                                     Search: [        ]

| .model_id | .model_desc | .type | mae | mape | mase | smape | rmse | rsq |
|---|---|---|---|---|---|---|---|---|
| 1 | ARIMA(0,1,1)(0,0,1)[5] | Test | 9.830923060076527 | 4.125713777814775 | 3.700332598521933 | 4.18873455568121 | 11.97648977494052 | 0.001213597249908361 |
| 4 | ETS(M,N,N) | Test | 9.849693416799248 | 4.131458421250527 | 3.707397709543811 | 4.196847976035227 | 12.02531870160352 | |
| 2 | PROPHET W/ REGRESSORS | Test | 28.4868388644609 | 12.30521715123836 | 10.72236837119399 | 11.44741166218633 | 31.16428699313501 | 0.09134558773667464 |
| 3 | XGBOOST | Test | 32.03315704345706 | 13.5863291830931 | 12.05719285128388 | 15.08997571864406 | 38.7496760980487 | 0.06965135309273336 |
| 5 | RANGER | Test | 41.59573151268641 | 17.56899546756786 | 15.65651977288096 | 19.3911425964686 | 43.21140479894471 | 0.1180092090711222 |

Showing 1 to 5 of 5 entries                                          Previous | 1 | Next

**12**

MAPE by Model | MAE by Model | RMSE by Model

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## Stock Forecasting

**Stock Symbol:**

AAPL

**Start Date:**

2023-03-24

**Forecast Period (months):**

2

**Train Proportion:**

0.5 — 0.8 — 0.95

0.5  0.55  0.6  0.65  0.7  0.75  0.8  0.85  0.9  0.95

**Select Forecasting Models:**

☑ ARIMA
☑ Prophet
☑ XGBoost
☑ ETS
☑ Random Forest

**Fourier Terms (Prophet):**

1

### XGBoost Parameters

**Number of Trees:**

300

**Max Depth:**
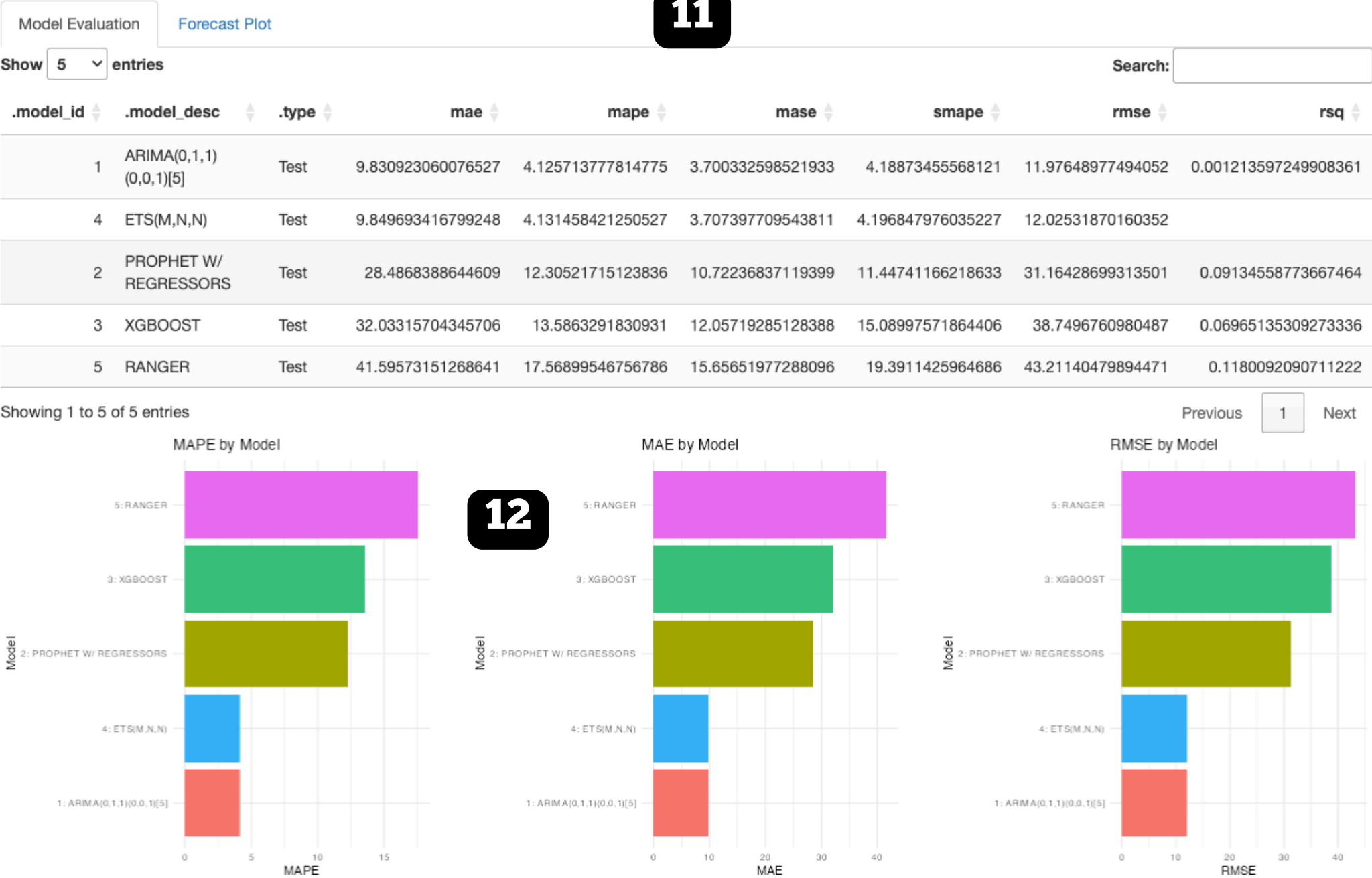
10

### Random Forest Parameters

**Number of Trees:**

500

**Minimum Node Size:**

50

Run Forecast

Model Evaluation    Forecast Plot **13**

**Forecast Plot**



**Legend**
- ACTUAL
- 1_ARIMA(0,1,1)(0,0,1)[5]
- 2_PROPHET W/ REGRESSO
- 3_XGBOOST
- 4_ETS(M,N,N)
- 5_RANGER

After the user is done with model evaluation:

13: Users can click on the Forecast Plot tab to navigate to this page

14: A Line Plot with the forecasted values would be shown

This chart is interactive:
- Users can hover on the plot grids to view exact values of the plot
- Users can click on the legend to choose which models they want to visualisize on the plots
- Users can use in built interactive features as they hover above the legend (eg. Zoom in/ Zoom Out)

# Landing Page of Technical Analysis

This feature allows for technical analysis with a variety of technical indicators to choose and customize from

**Enter Stock Symbol:**

AAPL

**1**

**Select Date Range:**

2024-01-01 to 2025-03-29

**2**

**Select Technical Indicators:**

☑ SMA
☑ EMA
☑ RSI
☑ Bollinger Bands
☑ MACD

**3**

**SMA Period:**

5 — 64 — 200

5 25 45 65 85 105 125 145 165 185 200

**4**

**EMA Period:**

5 — 43 — 200

5 25 45 65 85 105 125 145 165 185 200

**Bollinger Bands Std Dev:**

1 — 1.8 — 3

1 1.2 1.4 1.6 1.8 2 2.2 2.4 2.6 2.8 3

**Bollinger Bands Period:**

5 — 16 — 50

5 10 15 20 25 30 35 40 45 50

**RSI Overbought Threshold:**

50 — 66 — 90

50 54 58 62 66 70 74 78 82 86 90

**RSI Oversold Threshold:**

10 — 26 — 50

10 14 18 22 26 30 34 38 42 46 50

## Price Chart with Indicators

### Stock Price and Indicators for AAPL



Legend: FALSE, TRUE, SMA, EMA

**5**

## MACD & RSI Chart

### MACD and RSI Indicators



colour: MACD, Signal Line, RSI

**6**
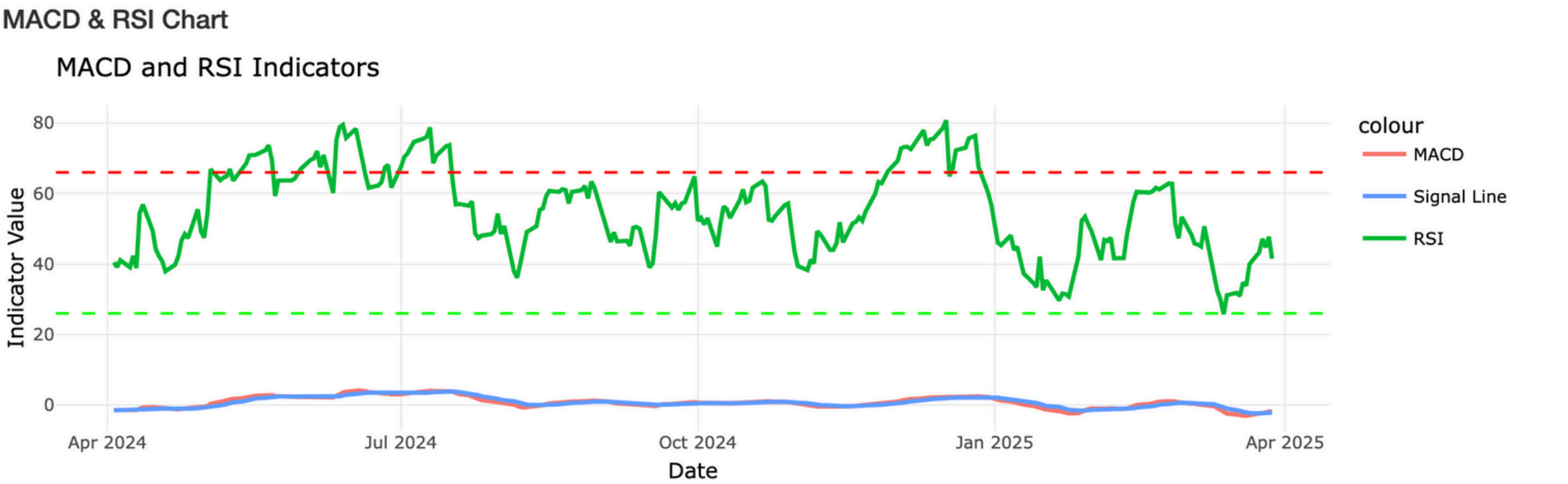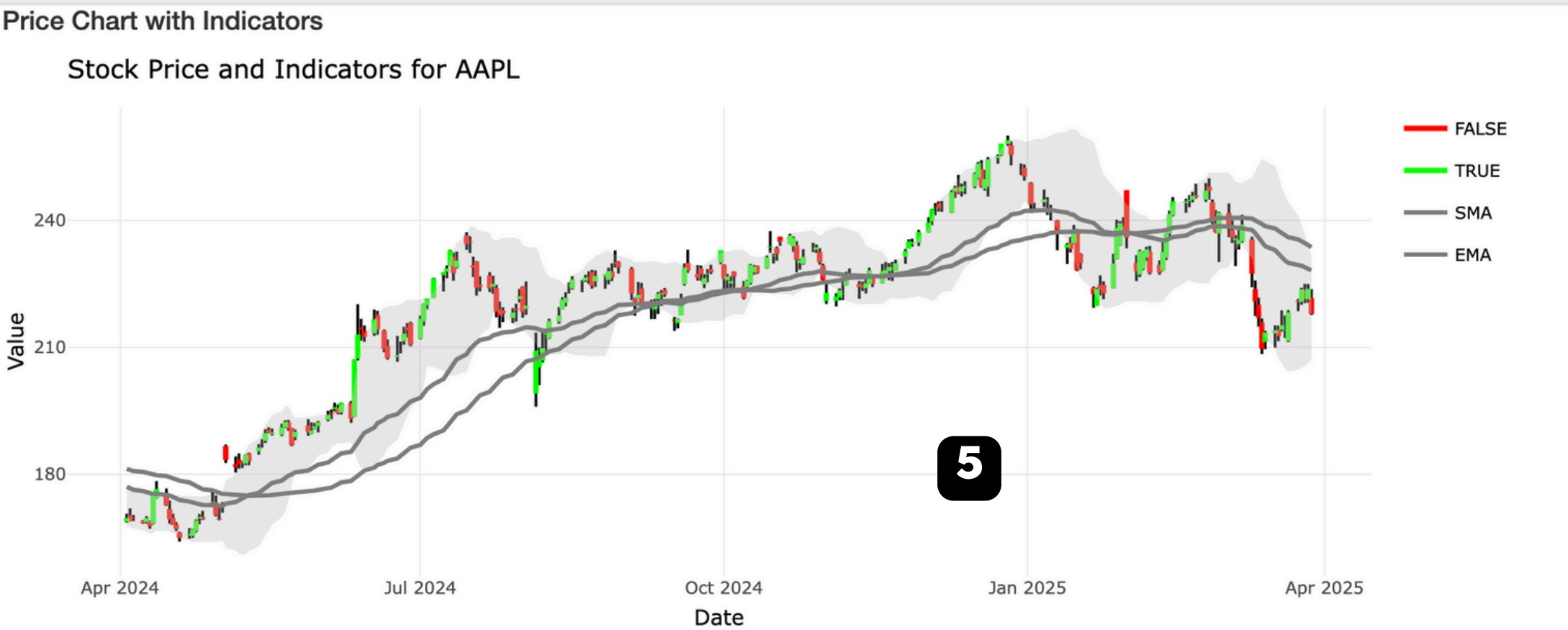
1: Users can choose the stock symbol they want to analyse

2: Users can select the date range they want

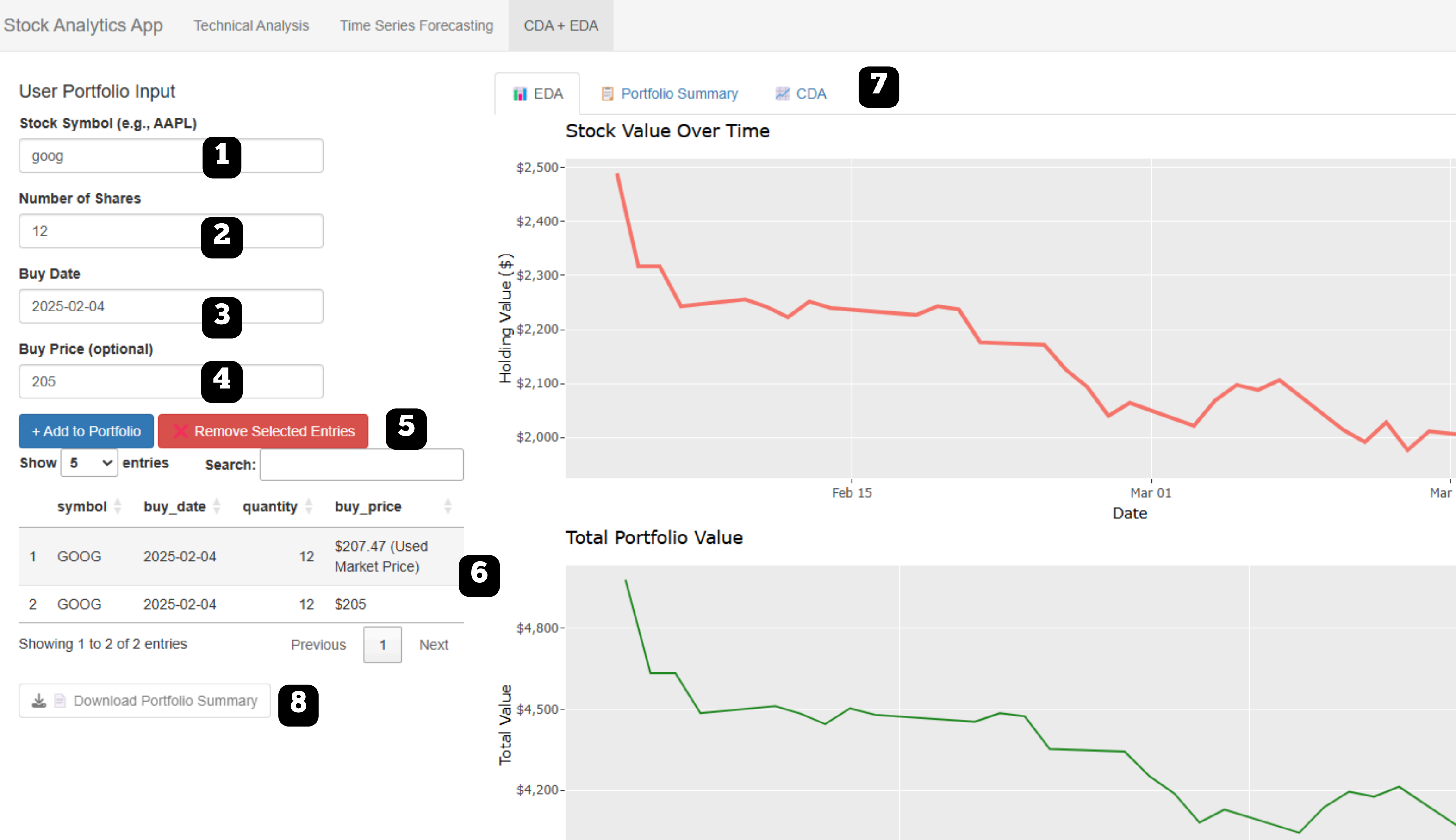3: Users can select the technical indicators that they want to include in their charts

4: Users can customise for their technical indicators

5: After clicking Analyse, users will be able to see a candlestick pattern chart with the Moving Averages and Bolinger Bands (whichever selected)

6: Users will also be able to view the MACD and RSI indicators (whichever are selected

# Landing Page for EDA

This feature allows users to choose the stock that price they want to forecast with user's customisations of the forecast model

**Stock Analytics App**  Technical Analysis  Time Series Forecasting  CDA + EDA

## User Portfolio Input

**Stock Symbol (e.g., AAPL)**

goog **[1]**

**Number of Shares**

12 **[2]**

**Buy Date**

2025-02-04 **[3]**

**Buy Price (optional)**

205 **[4]**

[ + Add to Portfolio ]  [ ✕ Remove Selected Entries ] **[5]**

Show [ 5 ▼ ] entries    Search: [ ]

| | symbol | buy_date | quantity | buy_price |
|---|---|---|---|---|
| 1 | GOOG | 2025-02-04 | 12 | $207.47 (Used Market Price) |
| 2 | GOOG | 2025-02-04 | 12 | $205 |

**[6]**

Showing 1 to 2 of 2 entries    Previous [ 1 ] Next

[ ⬇ 📄 Download Portfolio Summary ] **[8]**

📊 EDA    📄 Portfolio Summary    📈 CDA   **[7]**

### Stock Value Over Time

Holding Value ($) / Date

$2,500
$2,400
$2,300
$2,200
$2,100
$2,000

Feb 15 — Mar 01 — Mar

### Total Portfolio Value

Total Value

$4,800
$4,500
$4,200

**1:** Specify the stock ticker symbol that you want to add to your portfolio (e.g AAPL, TSLA)

**2:** Define the number of shares you hold

**3:** Select your buy date

**4:** Define your buy price. (Optional) You may leave it blank. If you do, median price of that day will be used.

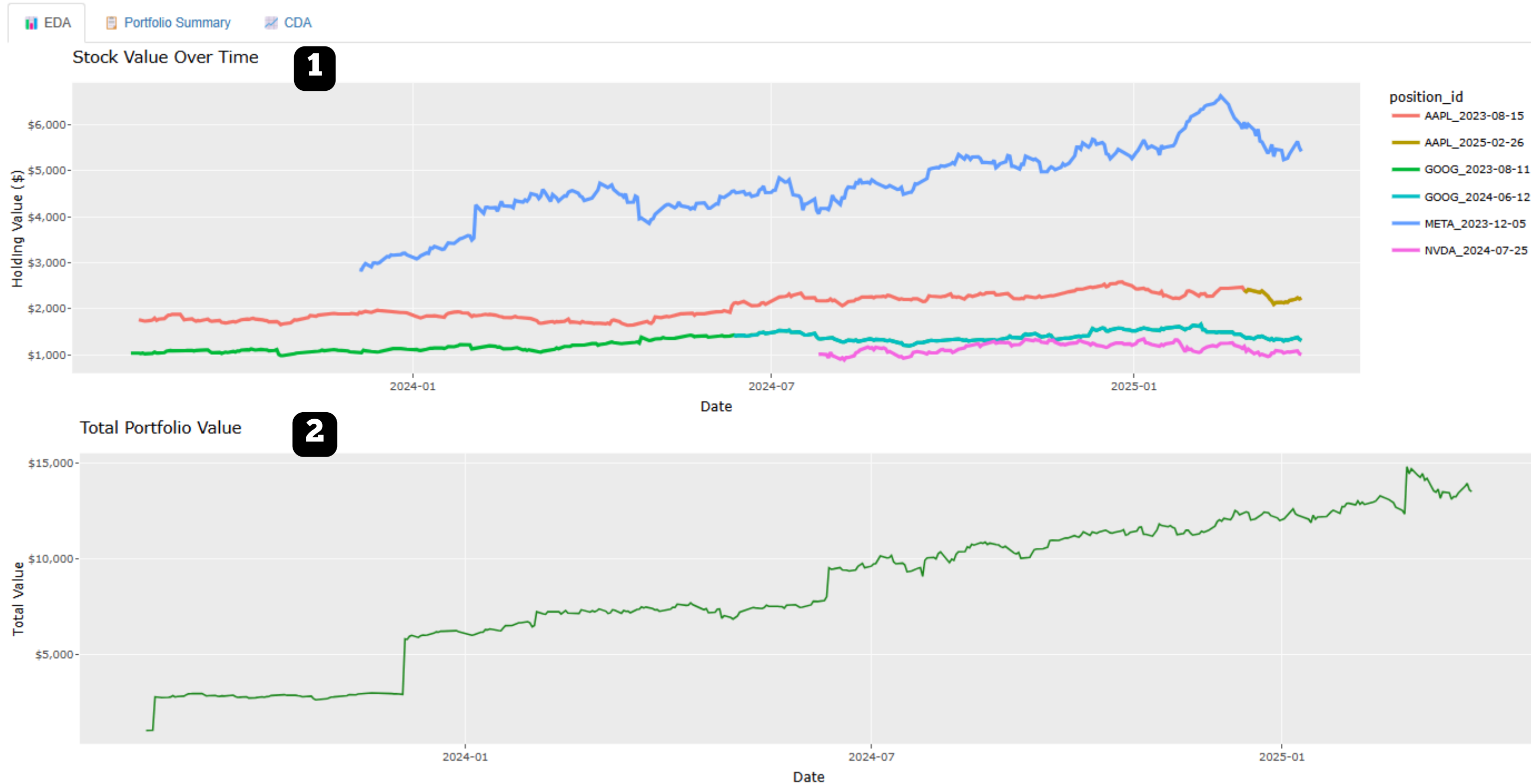**5:** Button to add stock to Portfolio. Select the stock in Point 6 and click remove to remove.

**6:** Shows number of stocks currently added

**7:** Toggle tab for user to move between EDA, Portfolio Summary and CDA.

**8:** User is able to download excel version of Portfolio Summary.

# EDA

These charts provides exploratory data analysis of stocks in user's portfolio.
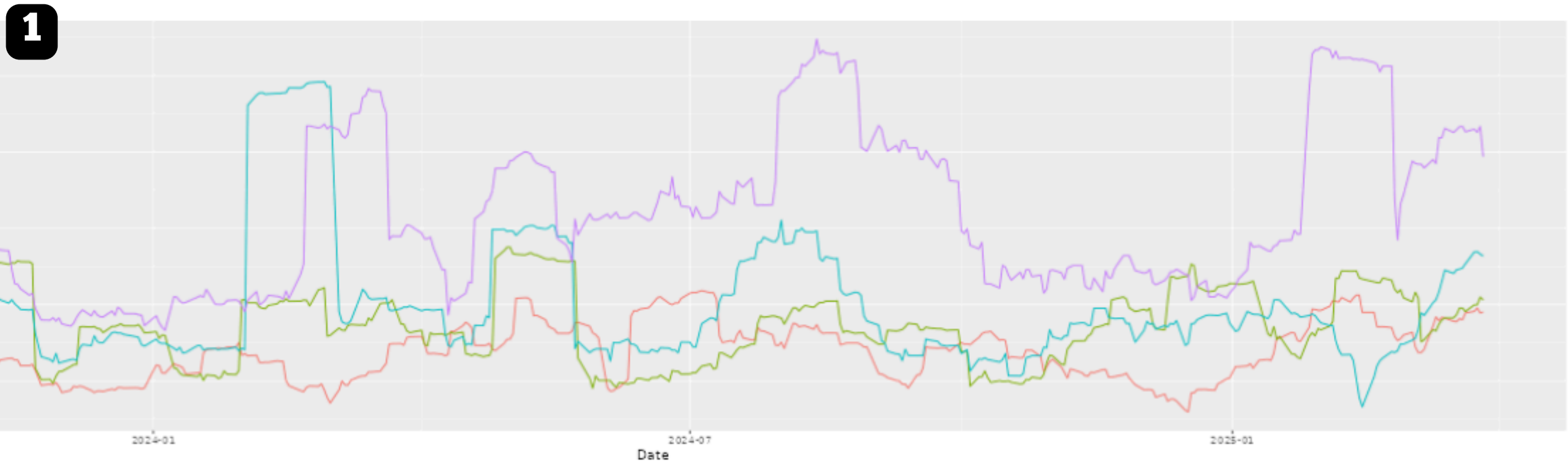


1: From this chart, user will be able to determine the trend of each stock in their portfolio. The different colours represents the different buy-in dates.

2: This chart shows the total portfolio value over time. It provides the user performance insights of their stocks.

These charts provides exploratory data analysis of stocks in user's portfolio.



20-Day Rolling Volatility (SD)

**1**



**2**

1: 20-Day rolling volatility chart is a powerful tool to evaluate risk and market behaviour over time.

Higher volatility, above 5%, has the biggest spikes. Frequent large price swings indicates possible speculative behaviour, earnings surprises or broader market sentiment. Higher volatility implies higher risk and reward potential.

Low and stable volatility are typically in the 1-3% range. These stocks are less risky in terms of price fluctuations.

2: This chart shows the Daily return correlation matrix. It reveals how similarly or differently the stocks move on a daily basis in terms of their returns.

# Continuation for EDA

These charts provides exploratory data analysis of stocks in user's portfolio.
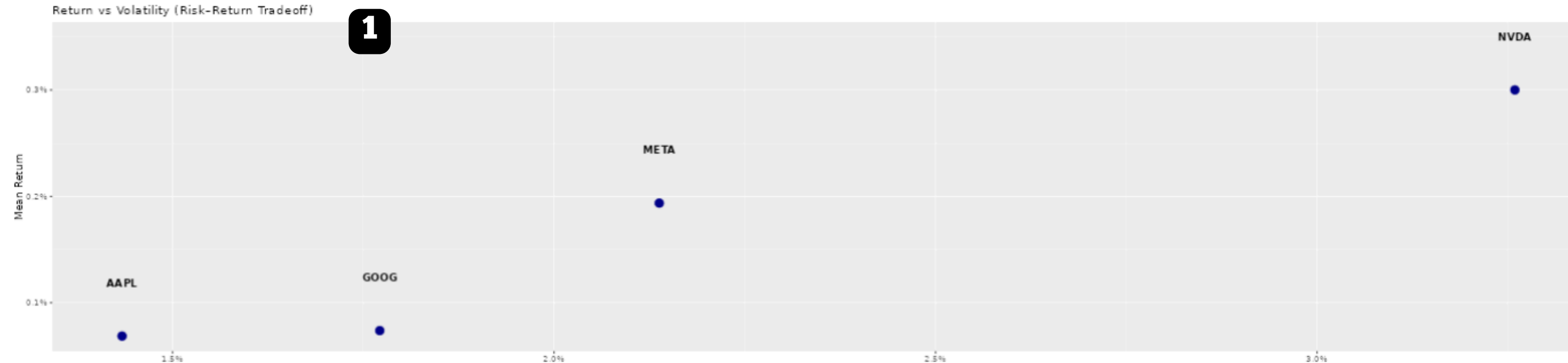
1: This is a Return vs Volatility scatter plot, a classic visualization of the risk-return tradeoff. It helps investors quickly assess which stocks offer better return for the level of risk they carry.

2: This chart shows the monthly trading volume for each stock from buy in date. User will be able to observe seasonal trends.
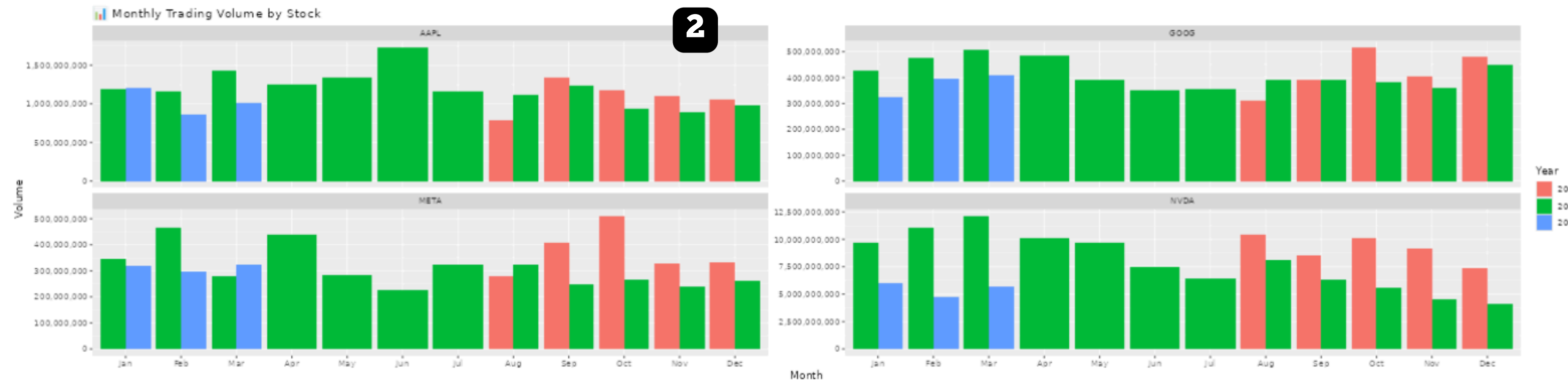
# Portfolio Summary

These summary provides value and percentage returns. Easy to understand profit/loss for current stock holdings.

📊 EDA | 📄 Portfolio Summary | 📈 CDA

**1**

📋 Portfolio Summary with $ and % Return

| Stock | Buy Date | Quantity | Buy Price ($) | Price Source | Day Low ($) | Day High ($) | Buy Price Status | Invested Amount ($) | Current Price ($) | Current Value ($) | Unrealized Return ($) | Return (%) |
|-------|----------|----------|---------------|--------------|-------------|--------------|------------------|---------------------|-------------------|-------------------|-----------------------|------------|
| META | 2025-02-26 | 10 | $673.10 | Median Price on 2025-02-26 | $658.00 | $683.01 | ✔ OK | $6,731.01 | $602.58 | $6,025.80 | -$705.21 | -10.5% |
| GOOG | 2024-11-12 | 15 | $182.90 | Median Price on 2024-11-12 | $180.99 | $184.02 | ✔ OK | $2,743.56 | $164.08 | $2,461.20 | -$282.36 | -10.3% |
| AAPL | 2024-08-13 | 12 | $221.00 | User Input | $219.01 | $221.89 | ✔ OK | $2,652.00 | $223.85 | $2,686.20 | $34.20 | 1.3% |
| AAPL | 2025-01-17 | 15 | $229.73 | Median Price on 2025-01-17 | $228.48 | $232.29 | ✔ OK | $3,445.91 | $223.85 | $3,357.75 | -$88.16 | -2.6% |
| GME | 2025-01-17 | 15 | $27.51 | Median Price on 2025-01-17 | $27.02 | $28.79 | ✔ OK | $412.65 | $22.09 | $331.35 | -$81.30 | -19.7% |
| NIO | 2024-08-05 | 15 | $3.89 | Median Price on 2024-08-05 | $3.66 | $3.97 | ✔ OK | $58.35 | $3.98 | $59.70 | $1.35 | 2.3% |
| MRNA | 2023-08-08 | 25 | $99.74 | Median Price on 2023-08-08 | $98.86 | $101.82 | ✔ OK | $2,493.50 | $32.12 | $803.00 | -$1,690.50 | -67.8% |

**2**     **3**     **4**   **5**

1: Shows the buy in price added by the user.

2: Shows the day low and day high price for the buy in date. This allows user to gauge if they have paid a fair price.

3. Invested amount calculated by price x quantity.

4. Unrealized Returns ($) calculated by current value - invested amount

5. Return (%) calculated by percentage profit/loss.

# CDA

These summary provides value and percentage returns. Easy to understand profit/loss for current stock holdings.

**EDA** | **Portfolio Summary** | **CDA**

**Select Stock 1:** 1

GOOG ▼

**Select Stock 2:**

META ▼

**Wilcoxon Test: Daily Return Comparison** 2

$W_{Mann-Whitney} = 82801.00$, $p = 0.71$, $\hat{r}_{biserial}^{rank} = -0.01$, $CI_{95\%}$ [-0.09, 0.06], $n_{obs} = 820$

daily_return

Median = 3.18e-03   Median = 1.67e-03

GOOG (n = 410)   META (n = 410)

symbol

📈 **Daily Return Correlation: GOOG vs META** 3
Pearson Correlation = 0.453

META Daily Return

GOOG Daily Return

1: User selects stocks for comparison.

2: Wilcoxon Test: Daily Return Comparison compare daily return distributions of two stocks.
- Each violin plot displays the shape and spread of daily return values for one stock.
- Dots represent individual daily return observations.
- p-value: If this is below 0.05, the difference in returns is considered statistically significant.

3: This scatter plot visualizes the relationship between daily returns of the two stocks.
Pearson Correlation Coefficient:
- +1: Perfect positive correlation
- 0: No correlation
- -1: Perfect negative correlation
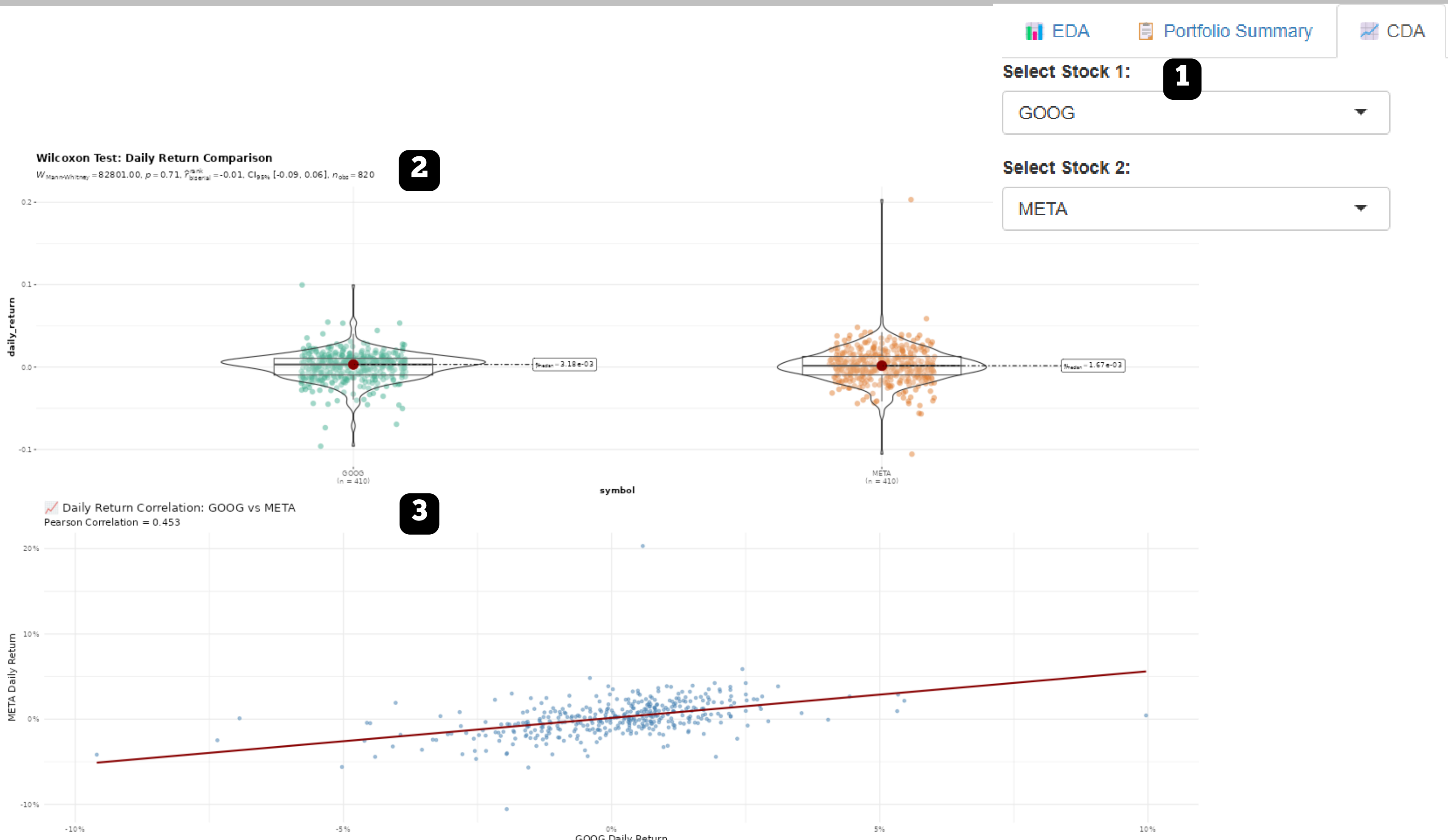
These summary provides value and percentage returns. Easy to understand profit/loss for current stock holdings.



**Rolling Correlation (30 Days)**
GOOG vs META

**1**

**Residuals vs Fitted - GOOG**

**2**
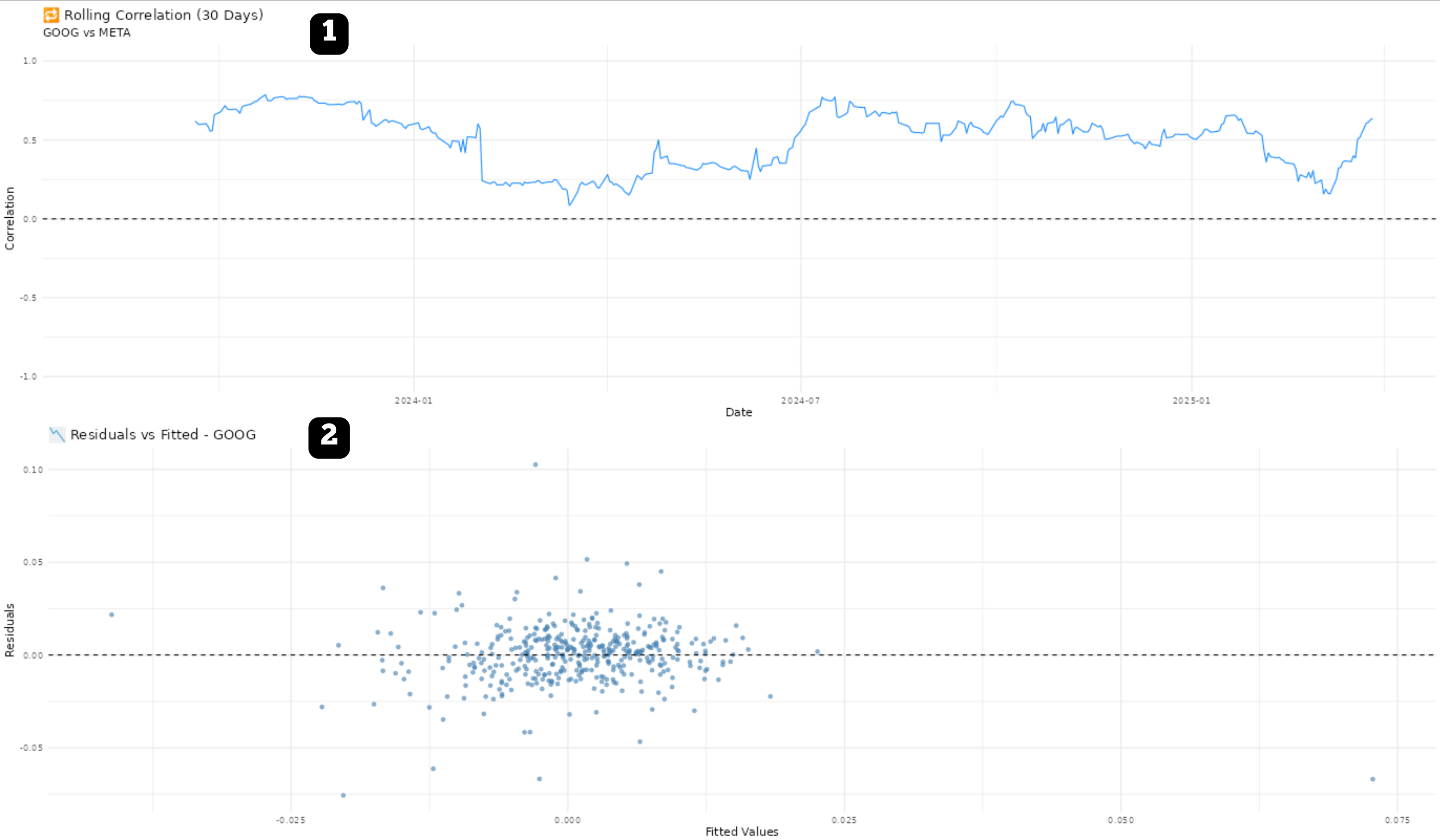
1: This line chart shows the rolling 30-day Pearson correlation between the daily returns of the two selected stocks The blue line indicates how closely the two stocks' returns moved together over each 30-day window.
- Helps assess dynamic co-movement

2: This diagnostic scatter plot evaluates the quality of a linear regression model used to explain GOOG's returns based on an independent variable (e.g., META's returns).

- Helps users assess how well META's returns explain GOOG's movements. A good residual pattern supports using this relationship for predictive modeling, beta estimation, or risk exposure analysis.
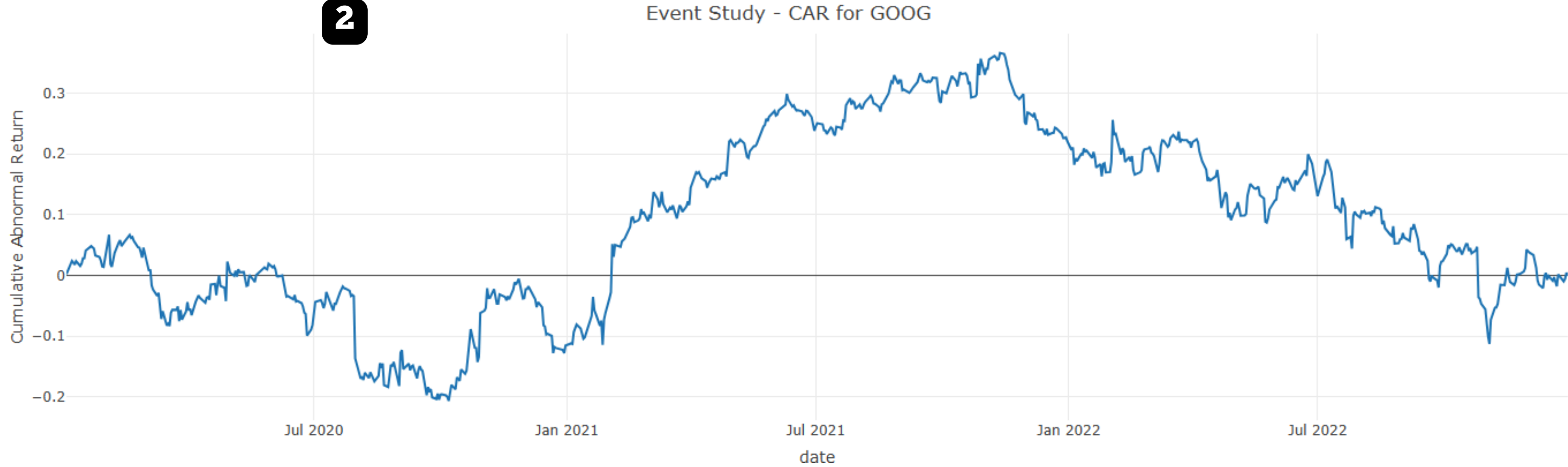
These summary provides value and percentage returns. Easy to understand profit/loss for current stock holdings.



Density Plot of Daily Returns by Stock **1**
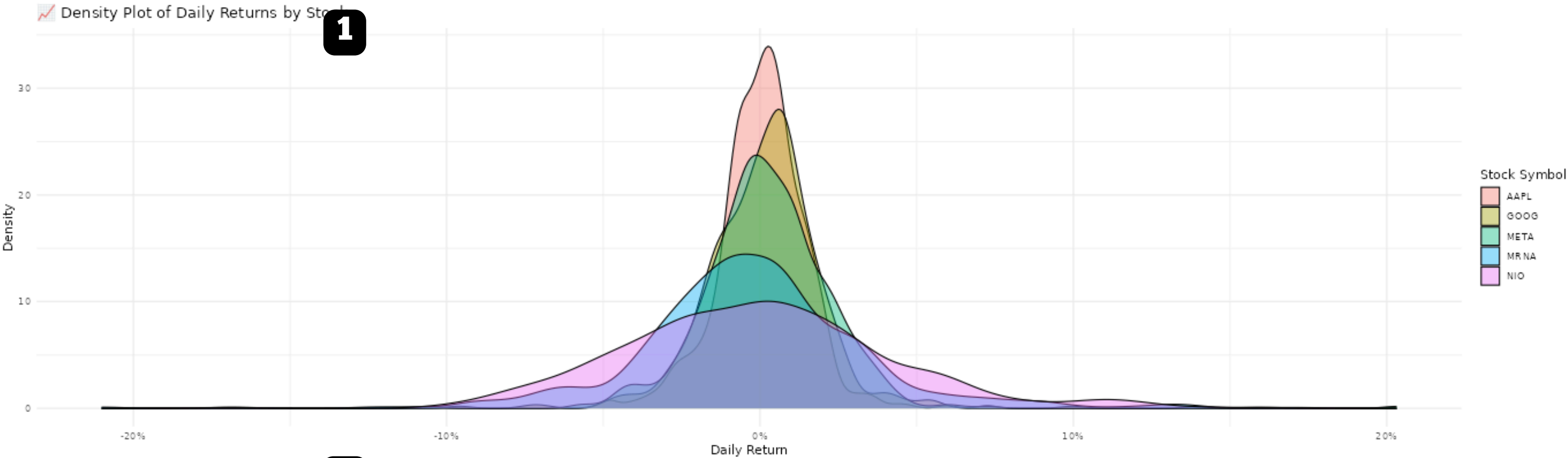
Event Study - CAR for GOOG **2**

1: This chart visualizes the distribution of daily returns for multiple stocks.
The height of each curve indicates how frequently return values occur.
Wider curves suggest more volatile returns, while narrower, taller curves indicate stability.
- Allows users to visually compare return volatility across stocks and aids in selecting stocks that align with their risk tolerance or portfolio diversification strategy.

2: This time series plot shows the Cumulative Abnormal Returns (CAR) for GOOG over a multi-year period.
The line tracks how GOOG's returns differed from expected/benchmark returns over time.
X-axis: Date range (from early 2020 to end of 2022)