📊 Data Analytics Project Report

Project Title: ***Technical and Strategic Stock Analysis of Infosys Ltd (April 2021 – March 2025)***

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ERP No: 66031205

Semester: 6th Semester

Course: Data Analytics

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Date: 18 May 2025

📘 Introduction

This project presents a comprehensive data-driven analysis of **Infosys Ltd (INFY.NS)** stock performance over the period **April 1, 2021 to March 31, 2025** using various **exploratory data analysis (EDA)** techniques, **technical indicators**, and a **trading strategy** based on **momentum and mean reversion principles**. The project is implemented using **Python**, **Jupyter Notebook, Google Sheets for dashboard**, and visualized via a **Streamlit dashboard**.

🔧 Steps Followed

The project followed a structured pipeline, beginning with data extraction and ending in dashboard deployment:

📥 1. Data Extraction (Yahoo Finance)

- Fetched daily stock data of **Infosys Ltd (INFY.NS)** using the `yfinance` API.
- **Timeframe**: April 1, 2021 – March 31, 2025.

📊 2. Exploratory Data Analysis (EDA)

Performed a comprehensive EDA to understand the structure, quality, and behavior of the data:

1. Basic Structure & Data Preview
2. Data Types & General Information
3. Statistical Summary (mean, std, min, max)
4. Missing & Duplicate Data Check
5. Value Counts & Distribution Plots
6. Correlation Matrix & Advanced Data Inspection

📉 3. Price Extremes Analysis

Identified key price metrics over the timeframe:

- Lowest High
- Highest High
- Lowest Opening
- Highest Closing

📈 4. Trend Visualization

- Plotted the Closing Price Trend to observe price movement over time.

🧮 5. Technical Indicators Computation

Added key technical indicators for further analysis:

1. **Simple Moving Average (SMA)**
2. **Relative Strength Index (RSI)**
3. **Moving Average Convergence Divergence (MACD)**

🧠 6. Technical Analysis

Used indicators and statistical tools to gain deeper insights:

1. **Daily Return Calculation**
2. **Cumulative Return Calculation**
3. **Volatility Analysis**
4. **Bollinger Bands**
5. **Dual-Axis Plot for Volume vs Price**
6. **Support & Resistance Zone Detection**
7. **Trading Signal Strategy using RSI + MACD Crossover**

📊 7. Strategy Evaluation

Compared strategy-based performance against market performance:

1. **Strategy vs Market Returns**
2. **Performance Evaluation Metrics** (e.g., win rate, Sharpe ratio)

🌐 8. Dashboard Development (Streamlit)

- Developed a fully interactive **Streamlit dashboard**.
- Included **sidebar user inputs** for dynamic strategy visualization and data filtering.

📊 9. Spreadsheet-Based Dashboard (Google Sheets)

- Built an alternative dashboard using **Google Sheets**, replicating the core visual and analytical components.
- Used charts like **Line**, **Area**, and **Shape Marker Charts** to display:
    - Closing Price
    - Support & Resistance Levels
    - Bollinger Bands
    - Strategy Indicators

📈 Strategy Performance

This section compares the **custom trading strategy** against the **Infosys stock's natural market performance** over the period **April 1, 2021 – March 31, 2025**. The evaluation is based on key financial metrics relevant to assessing risk-adjusted returns and robustness of the strategy.

🔍 **Interpretation**:

- The **strategy underperformed** compared to the market, yielding a negative return.
- A **Sharpe Ratio below zero** indicates poor risk-adjusted returns from the strategy.
- **High drawdown** in the strategy implies that it experienced deep losses during certain periods, making it riskier than holding the stock outright.
- Despite the lower performance, a **45.59% win rate** suggests that nearly half the trades were successful — indicating some structure in the signal, though possibly needing refinement or filters.

Metric	Strategy	Stock (Market)
Total Return	-24.05%	24.39%
Win Rate	45.59%	—
Sharpe Ratio	-0.18	0.35
Max Drawdown	-46.46%	-35.56%

🌐 Tools and Technologies Used

- **Language**: Python
- **Libraries**: `pandas`, `numpy`, `matplotlib`, `seaborn`, `yfinance`, `scipy`
- **Platforms**: Jupyter Notebook, Google Sheets, Streamlit
- **Deployment**: Streamlit Cloud

💻 Live Dashboard & Sheet

- **Streamlit App**: Click to View
- **Project Repository:** INFY.NS-analysis on GitHub
- **Google Sheet** : View Sheet

📌 Conclusion

This project highlights the integration of **data analytics** and **financial modeling** to simulate and visualize trading strategies. It provides valuable insights into stock behavior and lays the foundation for future work in **quantitative finance** and **algorithmic trading**.