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TECHNICAL REPORT - TREND FOLLOWING STRATEGY

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INTRODUCTION

TREND FOLLOWING STRATEGY

Trend following strategy according to which one should buy an asset when its price trend goes up, and sell when its trend goes down, expecting that price trend continues. in this strategy trader tends to move in a particular direction over time . if there is a turn contrary to the trend, they exit and wait until the turn establishes itself as a trend in the opposite direction. In case their rules signal an exit, the traders exit but re-enter when the trend re-establishes

MOTIVES

- **Price**: One of the first rule is the price concern. Traders uses indicators to asses the trend of the price. The current price and only the price tells you what the market is doing.
- **Money Management**: Another decisive factor of the trend following is not the timing of the trade or the indicator, but rather the decision of how much to trade over the course of the trend
- **Risk Control:** Cut losses is the rule. This means that during periods of higher market volatility, the trading size is reduced. During losing periods, positions are reduced and trade size is cut back
- **Rules:** Trend following should be systematic. Price and time are pivotal at all times.

ABOUT STRATEGY:

This strategy is efficient in catching up the momentum using the combination of EMA crossover MACD signals, and ADX filtering. This strategy follows the approach of trend following and is applied on Infosys(INFY.NS) using indicators to asses the mid term trends the key indicators used in this strategy are

- ***EMA(Exponential Moving Average):*** *Used to identify short- and long-term trends with 25-period and 50-period EMAs.*
- ***MACD (Moving Average Convergence Divergence):*** *Used to detect momentum shifts with 25/50 MACD and 12-period signal line.*
- ***ADX (Average Directional Index):*** *Filters for market strength, with trades triggered only when ADX > 15.*

Entry Conditions:

A trade signal is triggered when:

- *MACD line crosses above its Signal line (bullish crossover), and*
- *Either the ADX indicates a strong trend (>15) or the price is within 4% of the long EMA (i.e., close to the mean, indicating potential momentum ignition).*

Exit Strategy:

- *Stop Loss (SL): 3% below the entry price*
- *Take Profit (TP): Approximately 4.89% above the entry price*

These targets aim to balance reward and risk while allowing room for normal price fluctuations.

The strategy enters long positions when a MACD crossover occurs, and either a strong trend is detected or the price is close to the 50-period EMA. Stop-loss is set at 3% below entry, and take-profit is set at ~4.89% above.

BACKTESTING FRAMEWORK:

Tools Used:

- **Back testing Library**: backtesting.py — a strategy driven by Python back testing framework.
- **Code:** For technical indicator (EMA, MACD, ADX) and trade logic.
- **Visualization Tools:** matplotlib for charting equity curves, indicator trends, and return comparisons.

Stock Data:

- **Stock: Infosys Limited** (INFY.NS), a leading Indian IT stock.
- **Index:** Nifty 50 Index (^NSEI), representing the broader Indian equity market.
- **Data Provider:** Yahoo Finance via the yfinance Python package for historical daily data (OHLCV).

Assumptions:

- **Initial Capital:** 100,000 (INR)
- **Commission:** Fixed transaction cost of 0.01% per trade.

INTERPRETATION OF RESULTS:

The strategy was back tested on Infosys stock data from January 2021 to December 2024.

Key Performance Metrics:

- Sharpe Ratio: 1.97
- Sordino Ratio: 4.74
- Max Drawdown: -5.75%
- Win Rate: 93.75%
- CAGR (Annual Return): 12.14%

Profit Factor Metrics:

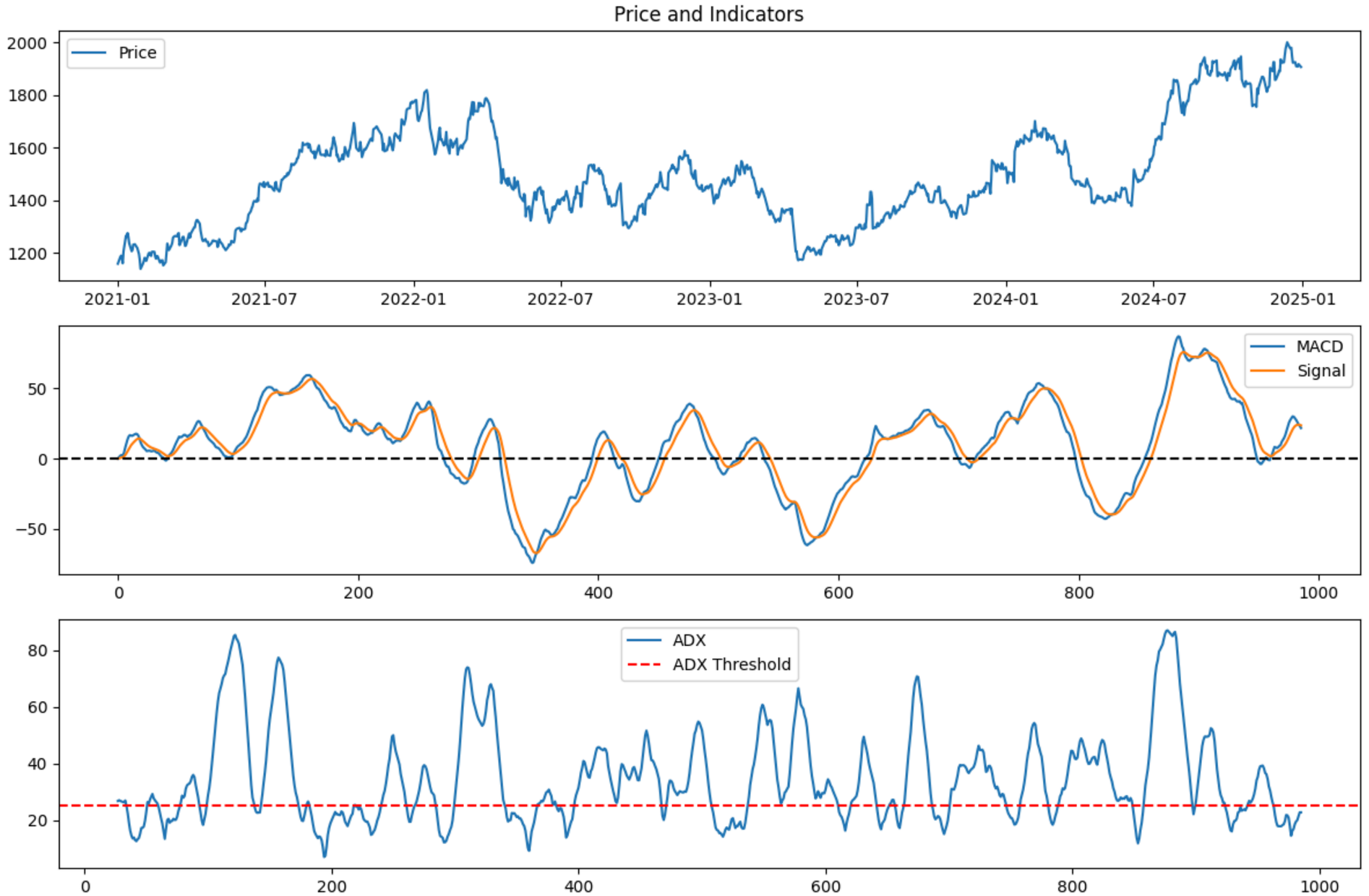
- Profit Factor: 17.08
- Average Profit per winning trade: 6694.69
- Average Loss per losing trade: -5880.63
- Max Profit: 8828.93
- Max Loss: -5880.63

Comparative Returns:

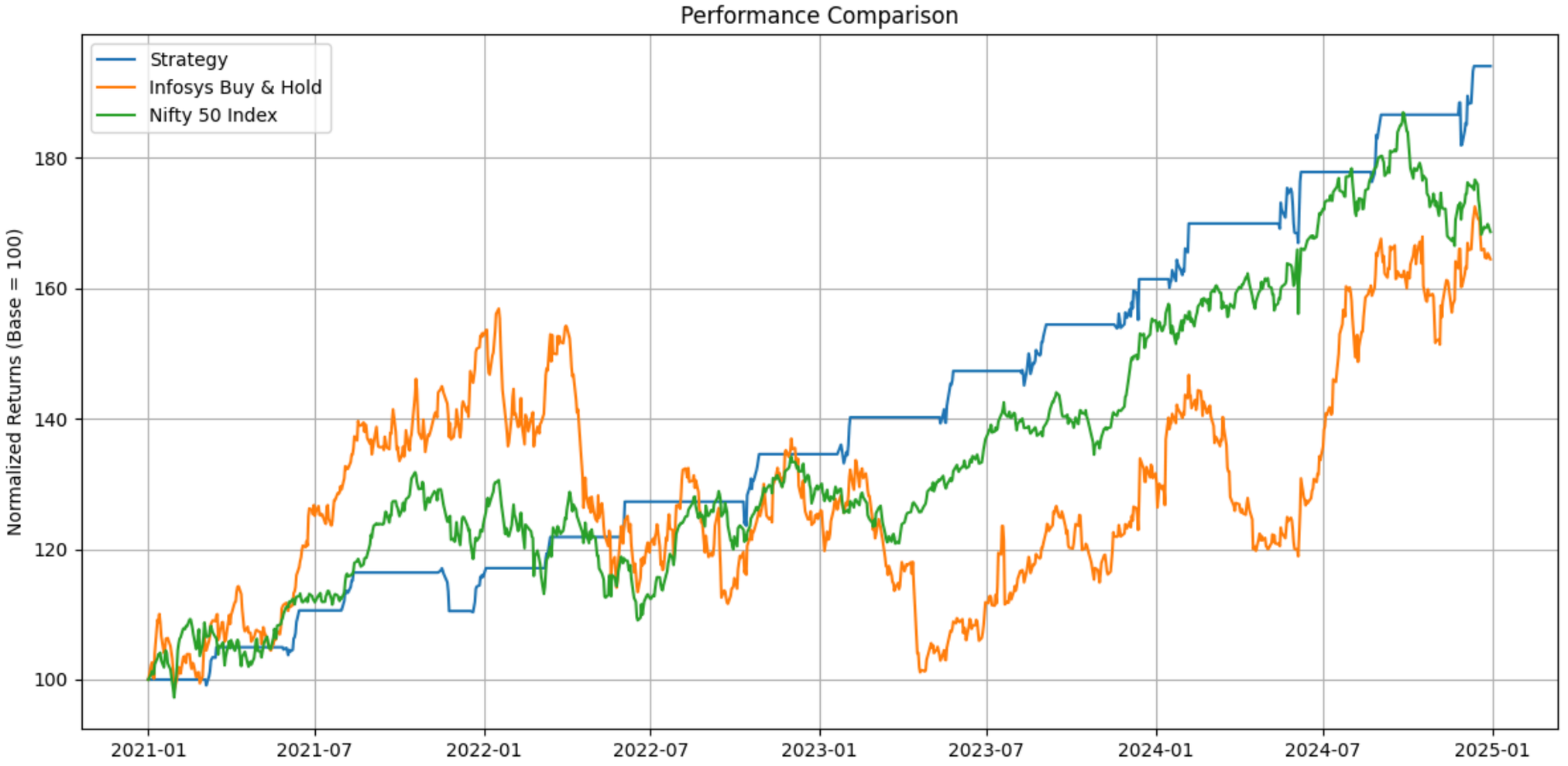
- Strategy Return: 94.10%
- Infosys Buy & Hold: 64.49%
- Nifty 50 Index: 68.67%

These results indicate that the strategy outperformed both the Infosys stock and the Nifty 50 Index over the same period, with a favorable profit factor and win rate.

EQUITY CURVE,MACD AND ADX PRICE CHARTS



PERFORMANCE COPMARISON



RESORCES USED:

- **Libraries:**
  - pandas, numpy, matplotlib for data analysis and plotting
  - yfinance for downloading historical stock and index data
  - backtesting.py for backtesting framework
- **Technical Indicators:**
  - Exponential Moving Averages (EMA)
  - Moving Average Convergence Divergence (MACD)
  - Average Directional Index (ADX)
- **Data Source:**
  - Yahoo Finance (yfinance) for INFY.NS and ^NSEI (Nifty 50)
- **References:**
  - Online documentation and guides for indicator formulas and the backtesting.py framework