Technical Board
IIT Guwahati

InterIIT TechMeet BootCamp 2024-25

Market Neutral Momentum Trading Strategy

Team Size: Up to 3 members
Submission Deadline: October 7th, 12:00 PM
Presentations: October 7th, 6:00 PM

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PROBLEM STATEMENT

Market Neutral Momentum Trading is a trading strategy that aims to profit from the momentum of securities while maintaining a neutral exposure to the overall market. This is achieved by simultaneously taking long positions in assets expected to outperform and short positions in assets expected to underperform, balancing the portfolio in such a way that the overall exposure to market movements is minimized, and reducing systemic risk.

Your Task:

Design and implement a Market Neutral Momentum Trading strategy using companies listed in the NIFTY 50 index. The objective is to create a strategy and backtest it over various time periods, assessing the profitability and risk associated with long and short positions based on momentum signals.

Key Objectives:

1. **Momentum Scoring:**
   Use a combination of technical indicators to rank NIFTY 50 stocks by their momentum profiles. Quantify bullish and bearish momentum to identify potential outperformers or underperformers. The goal is to capture price movement, volatility, and market sentiment with a composite momentum score for each stock.
2. **Strategy Development:**
   Develop a robust market-neutral momentum trading strategy by identifying market inefficiencies while maintaining neutral market exposure. Use technical indicators, historical trends, and relevant data to generate buy/sell signals.
3. **Backtesting:**
   Thoroughly backtest the strategy using historical data, simulating trades over different time periods and market conditions to evaluate performance across various market cycles.

4. **Visualization:**
   Present key insights visually through comprehensive charts and graphs. Clearly illustrate how the strategy performs over time, highlighting:
   - **Cumulative returns** over the backtesting period.
   - Portfolio **drawdowns** and risk-adjusted performance (e.g., Sharpe ratio, Sortino ratio).
   - Comparison of strategy returns to a **benchmark index** (e.g., NIFTY 50).
   - Trade-level analysis: Visualize **entry/exit points** and the impact of individual trades.
   - Market neutrality: Showcase the balance between long and short positions over time, ensuring minimal exposure to market-wide movements.
5. **Performance Evaluation:**
   Conduct a thorough performance evaluation, assessing key metrics such as:
   - Return on investment (**ROI**).
   - **Volatility** and **maximum drawdown**.
   - **Sharpe ratio** and **Sortino ratio** for risk-adjusted performance.

Guidelines:

- You can use the **Yahoo Finance API** to get the historical price data.
- Backtest your strategy for 5 years(**Jan 2019 - Dec 2023**) of NIFTY 50 data.
- Assume an initial capital of **INR 10,00,000.**
- Performance Evaluation: Evaluate the strategy's risk-adjusted returns using key metrics such as:
  i. Cumulative returns
  ii. Annualised Sharpe Ratio
  iii. Maximum Drawdown
  iv. Frequency of Trades Placed

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- Your documentation should be in line with the following template:
    i. Momentum Scoring Criteria
    ii. Trading Strategy and Signal Generation Method
    iii. Risk Management Measures
    iv. Trading Signals Generated and Position Sizing
    v. Portfolio PnL
    vi. Performance Metrics (mentioned above)
- Participants are encouraged to use programming languages such as Python for their implementation. You may also use **Machine Learning Algorithms**, **external libraries**, and tools for data analysis and visualization.

Evaluation Criteria:

- **Momentum Scoring**: Accuracy and logic behind assigning momentum scores to stocks.
- **Strategy Development**: Quality and robustness of the momentum-based trading strategy and signal generation.
- **Backtesting Results**: Strategy effectiveness across historical periods.
- **Performance & Visualization**: Portfolio value, ROI, risk metrics, and clarity of charts and documentation.

Submission Format:

Each team has to submit two files, namely the code file and the strategy presentation file. Submit your files through the following form.