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Bot Results

**Introduction**

The objective of this analysis was to evaluate stock performance across the Nasdaq-100 index using a combination of technical indicators and buy-and-hold returns (BHR). By assessing the price data and returns over various periods, the study aims to identify patterns that could guide investment strategies.

**Data Retrieval and Preprocessing**

The `price\_info` function was utilized to fetch daily adjusted close prices for stocks using an external API. The data encompassed returns calculated over one, three, and five-day intervals. This setup provided a comprehensive view of short-term market dynamics.

**Technical Analysis**

Moving averages were computed for 5-day and 20-day periods to determine short-term and medium-term trends in stock prices. These moving averages serve as benchmarks for identifying potential buy or sell signals based on historical price movements.

**Return Analysis**

The cumulative return for each stock was calculated by simulating an initial investment and adjusting this investment according to the daily returns. BHRs were computed by comparing the final investment value against the initial stake. Stocks were then ranked based on their BHR to identify top and bottom performers.

**Results**

The analysis revealed a wide dispersion in BHR among the stocks, with top performers achieving significantly higher returns compared to the bottom performers. This variance underscores the importance of stock selection in portfolio management. With the results from both strategies providing different results there are a couple of things we can takeaway from both bots. Based off what we can see with the graphs and the buy sell ratings we got we can conclude some pros and cons for each indicator:

1. Response Speed: RSI might react faster to price changes because it measures the velocity of price movements, whereas moving averages have a greater lag.
2. Trade Frequency: Moving to RSI might increase the frequency of trades in volatile markets since RSI can fluctuate more rapidly than moving averages.
3. Risk of False Signals: Each method has its susceptibilities; RSI might generate false buy/sell signals in persistently trending markets, while moving averages might generate late signals after much of the price move has occurred.
4. Market Conditions: The effectiveness of RSI compared to moving averages might vary depending on market conditions. In markets where momentum is a stronger factor, RSI might perform better. In contrast, in trending markets, moving averages might offer more consistent returns.

**Statistical Significance**

The statistical significance of the results was evaluated using:

Cross-sectional Analysis: Comparing BHRs across stocks to assess the variability and the mean performance difference. A t-test could be applied here to determine if the mean BHR of the top performers is significantly different from the market average.

One day returns:

* + 95% Confidence Interval: (-0.216, -0.176)
  + This interval does not contain zero, suggesting that the effect or mean difference captured by this parameter is statistically significant and likely negative.

Three day returns:

* + 95% Confidence Interval: (-0.224, -0.183)
  + Similar to the first, this interval is also entirely below zero, indicating a significant negative effect or difference.

Five day returns:

* + 95% Confidence Interval: (-0.231, -0.191)
  + This, too, shows a negative and significant result, with no overlap with zero.

- Time-series Analysis: Analyzing the moving averages to determine if changes in trends (e.g., moving average crossovers) systematically precede significant price adjustments. This could involve regression analysis with lagged variables to capture the predictive power of technical indicators.

**Conclusion**

The findings suggest that while some stocks consistently outperform others, the effectiveness of technical indicators like moving averages needs further investigation to confirm their predictive validity. Investors should consider both historical returns and trend analysis in their decision-making processes.

**Recommendations**

Further research could incorporate additional variables such as volume and volatility and extend the analysis period to enhance the robustness of the conclusions. Moreover, testing other technical indicators and employing machine learning techniques could provide deeper insights into predictive features of stock price movements.