By Akash Mishra

Comprehensive Report on Moving Average Crossover Strategy for Top 20 NSE Stocks

Contact

Email – akashm8606@gmail.com

# Introduction

This report presents the implementation and analysis of a simple moving average crossover strategy applied to the top 20 stocks by market capitalization listed on the National Stock Exchange (NSE) over the past five years. The strategy involves using the nselib library for data acquisition, followed by strategy implementation, backtesting, and performance analysis.

# Data Acquisition and Preparation

Objective:  
 Gather daily historical price data for the top 20 stocks by market capitalization listed on the NSE, ensuring the data includes the necessary fields such as open, high, low, close, and volume.  
  
 Steps:

-First take the symbol of top 50 company with using Nselib library after that we use Yfinance library for extract the market cap from that we analyze that the top 20 stocks and then I extract the data with using Yfinance of top 20 companies from 2019 to 2023 and store in a csv file .  
 - Reading the Data: The historical price data is loaded from a CSV file containing columns: Date, Open, High, Low, Close, Volume, Dividends, Stock Splits, and Symbol.  
 - Data Cleaning: Ensure that the 'Date' column is parsed correctly as a date type and the DataFrame is sorted by date for each stock.

# Strategy Implementation

Objective:  
 Implement a simple moving average crossover strategy, where buy and sell signals are generated based on the crossover of short-term and long-term moving averages.  
  
 Steps:  
 - Calculating Moving Averages:  
 - Compute the 50-day (short-term) and 200-day (long-term) moving averages for the closing prices of each stock.  
 - Generating Buy/Sell Signals:  
 - Create a 'signal' column where 1.0 indicates a buy signal (short-term average crosses above long-term average) and 0.0 indicates a sell signal (short-term average crosses below long-term average).  
 - Calculate positions based on the difference of signals to determine when to enter or exit trades.

# Backtesting the Strategy

Objective:  
 Simulate the trading strategy over the historical data to evaluate its performance.  
  
 Steps:  
 - Simulating Trades:  
 - Initialize an initial capital of $100,000.  
 - Simulate buying and selling of stocks based on the generated signals.  
 - Track the positions (number of shares held), the value of these holdings, and the remaining cash after each trade.  
 - Calculating Portfolio Value:  
 - Compute the total portfolio value as the sum of cash and the value of holdings.  
 - Calculate daily returns of the portfolio to assess performance.

# Performance Metrics Calculation

Objective:  
 Evaluate the strategy using key performance metrics.  
  
 Metrics:  
 - Total Returns: Measure the overall profitability of the strategy.  
 - Annualized Returns: Calculate annualized returns to compare the strategy’s performance to other investments.  
 - Annualized Volatility: Assess the risk or variability of returns.  
 - Sharpe Ratio: Determine the risk-adjusted return of the strategy.  
 - Maximum Drawdown: Understand the worst-case loss scenario.  
 - Win/Loss Ratio: Gauge the consistency of the strategy.  
 - Number of Trades: Assess the trading frequency and associated costs.  
  
 Example Calculation:  
 - If the portfolio started with $100,000 and ended with $150,000, the total return is 50%.  
 - If the daily return is 0.1%, the annualized return would be approximately 25.5% (0.1% \* 252 trading days).

# Analysis and Insights

Objective:  
 Visualize and analyze the backtesting results, identifying strengths and weaknesses of the strategy.  
  
 Steps:  
 - Storing Results:  
 - Compile performance metrics for each stock into a DataFrame and save it as a CSV file for record-keeping and further analysis.  
 - Visualizing Performance:  
 - Use some charts to compare total returns, annualized returns, maximum drawdown, and Sharpe ratio for each stock.

According to this analyzation I find this insights –

1.Adani Enterprises had a high annualized return in 2022, but it dropped after 2022. Other stocks showed high annualized returns from 2021 to 2022 and from 2023 onwards. Recently, all stocks are showing upward trends in annualized returns.

2. Adani had the highest Sharpe ratio in January 2022 but it dropped post-2022. Currently, NTPC has the highest Sharpe ratio, indicating favorable risk-adjusted returns. Most companies' Sharpe ratios improved post-January 2023.

3. Adani has the highest max drawdown currently. Investors should be cautious with Adani. Other stocks had high drawdowns in January 2021 but stabilized afterward.

4. All top 20 companies had the best win/loss ratios from January 2020 to January 2022. Adani had the best ratio from January 2022 to January 2023 but then dropped. Other companies have maintained good win/loss ratios post-January 2023.

5. : All stocks had high volatility from January 2020 to January 2021, which then dropped significantly. Adani has higher volatility than others, indicating more risk.  
 - Analyzing Market Conditions:  
 - Evaluate how different market conditions (bull vs. bear markets) affected the strategy's performance.  
 - Identifying Improvements:  
 - Based on the analysis, suggest potential improvements or modifications to enhance the strategy’s performance.

# Conclusion

This report demonstrated the implementation of a moving average crossover strategy on the top 20 NSE stocks. Through data preparation, strategy implementation, backtesting, and performance analysis, we evaluated the strategy's effectiveness and identified areas for potential improvement. The results provide valuable insights into the strategy’s strengths and weaknesses, helping in making informed decisions for future trading strategies.

# Recommendations for Improvement

**Enhance** Risk **Management**: Incorporate stop-loss orders, position sizing, or diversification to mitigate large losses.

Optimize **Strategy Parameters**: Adjust moving averages, entry/exit criteria, or trading rules to improve performance.

Reduce **Volatility**: Use volatility filters or adjust the strategy to be more conservative during high market fluctuation periods.

**Increase** Efficiency: Focus on higher return opportunities or reduce exposure to low-performing trades.

**Evaluate Market Conditions**: Review performance under different market conditions and make adjustments to enhance performance.

THANK YOU FOR READING TILL HERE

THIS DOCOMENT MADE BY – AKASH MISHRA

EMAIL- [akashm8606@gmail.com](mailto:akashm8606@gmail.com)

GITHUB LINK - https://github.com/Akashmishra08