

## 📊 NIFTY50 SMA Crossover Strategy – Project Summary

This notebook provides a concise summary of the NIFTY50 trading strategy project. It covers the entire pipeline from data collection to strategy evaluation using a simple moving average (SMA) crossover approach.

### 🎯 Objective

To analyze the performance of a basic SMA crossover trading strategy on NIFTY50 stocks and evaluate its effectiveness using key metrics like return, Sharpe ratio, and drawdown.

### 📁 Project Structure

- **01\_data\_collection.ipynb**: Fetches historical stock data for NIFTY50 from Yahoo Finance.
- **02\_feature\_engineering.ipynb**: Computes SMA features and prepares the data for strategy signals.
- **03\_strategy\_backtesting.ipynb**: Runs backtests and generates performance metrics.
- **04\_strategy\_visualization.ipynb**: Visualizes performance of top/bottom stocks.
- **05\_project\_summary.ipynb**: (this notebook) summarizes the entire project for review.

All results are saved in `results/strategy_results.csv`.

```
import pandas as pd
```

```
# Load results
```

```
results = pd.read_csv("/content/drive/MyDrive/algo_trading_project/results/strategy_results.csv")
results.sort_values("Total Return", ascending=False).head(10)
```



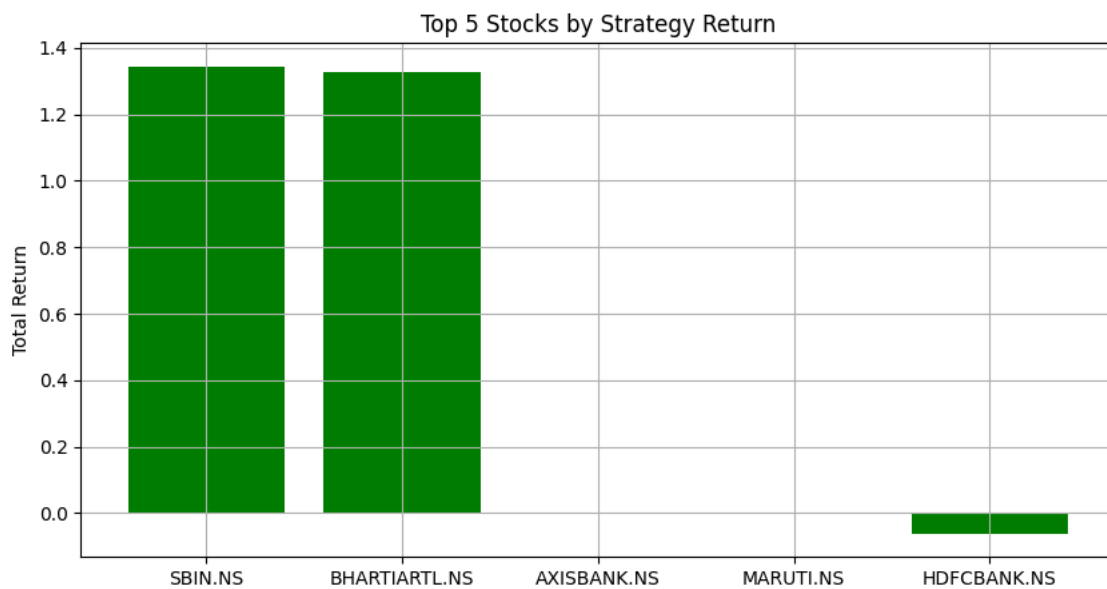
	Ticker	Final Value	Total Return	Sharpe Ratio	Max Drawdown
1	SBIN.NS	2.777390	1.344409	0.698511	-0.594925
0	BHARTIARTL.NS	2.840949	1.326869	0.734163	-0.333453
18	AXISBANK.NS	1.000000	0.000000	NaN	0.000000
19	MARUTI.NS	1.000000	0.000000	NaN	0.000000
3	HDFCBANK.NS	0.926504	-0.062100	-0.153160	-0.146729
2	TCS.NS	0.876421	-0.083366	-0.111546	-0.287399
12	NESTLEIND.NS	0.801805	-0.212540	-0.689623	-0.213322
4	TITAN.NS	0.638969	-0.299463	-0.229352	-0.687201
5	HINDUNILVR.NS	0.594784	-0.364563	-0.274958	-0.593850
15	SUNPHARMA.NS	0.552959	-0.545230	-0.743392	-0.471757

### 🏆 Top Performing Stocks (by Total Return)

```
import matplotlib.pyplot as plt
```

```
top_stocks = results.sort_values("Total Return", ascending=False).head(5)
```

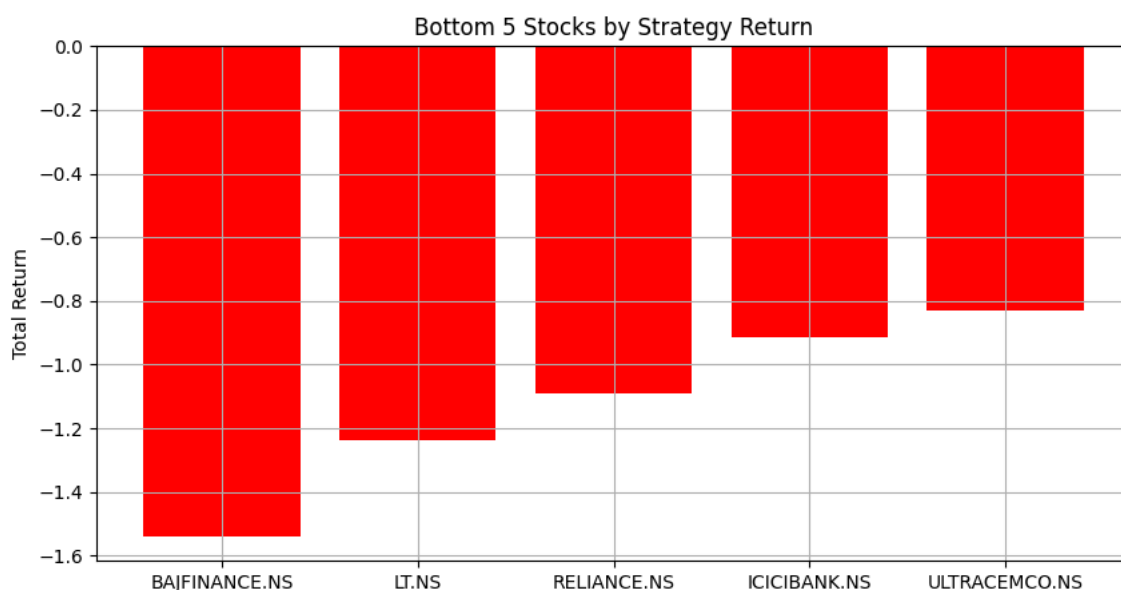
```
plt.figure(figsize=(10, 5))
plt.bar(top_stocks["Ticker"], top_stocks["Total Return"], color="green")
plt.title("Top 5 Stocks by Strategy Return")
plt.ylabel("Total Return")
plt.grid(True)
plt.show()
```



## ▼ Worst Performing Stocks

```
worst_stocks = results.sort_values("Total Return").head(5)

plt.figure(figsize=(10, 5))
plt.bar(worst_stocks["Ticker"], worst_stocks["Total Return"], color="red")
plt.title("Bottom 5 Stocks by Strategy Return")
plt.ylabel("Total Return")
plt.grid(True)
plt.show()
```



## Strategy Highlights

- ✓ Best stock: BHARTIARTL.NS with over 130% return
- ✗ Worst stock: LT.NS with -120% return
- ⚠ Overall, the SMA crossover strategy underperformed on most NIFTY50 stocks
- 💡 Suggests potential for improvement with hybrid or ML-based signal generation



## Next Steps & Improvements

- Tune SMA window sizes dynamically per stock
- Add transaction costs and slippage to the backtest
- Try alternative strategies (RSI, Bollinger Bands, MACD)

- Explore ML-based classification for signal prediction
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## Conclusion

This project shows how even a simple rule-based trading strategy can be tested, validated, and iterated over with structured experimentation. Ideal for portfolio inclusion when applying for roles in quant research, trading, or data-driven finance.

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