

HSI Trading Strategy Backtesting Report

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Author: TSE Wang Pok

Subject: Performance Analysis of Sentiment-Based Trading Strategies for Hang Seng Index

1. Executive Summary

This report presents a comprehensive backtesting analysis of various trading strategies applied to the Hang Seng Index (HSI) for the period from February 24, 2022, to March 12, 2025. The analysis evaluates four distinct strategies:

- Pure Sentiment
- Sentiment combined with Moving Averages (MA)
- Sentiment combined with Relative Strength Index (RSI)
- Logistic Regression-based approach

The **Sentiment + MA Strategy** emerged as the top-performing approach, delivering a total return of 4.15%, outperforming the market's cumulative return of 3.05%.

2. Data Overview

The dataset covers 747 trading days of Hang Seng Index (HSI) historical data and associated sentiment indicators.

Metric	Value
Time Period	2022-02-24 to 2025-03-12
Total Trading Days	747
Average HSI Close Price	19,049.84
Average Daily Return*	0.0187%
Daily Return Volatility*	1.7180%
Sentiment Prediction Accuracy*	53.41%

Average Daily Return* = Mean daily percentage change in HIS close price.

Daily Return Volatility* = Standard deviation of daily returns, measuring price fluctuations.

Sentiment Prediction Accuracy* = Percentage of days where the Up/Down vote ratio correctly predicts same-day market direction (positive/negative return).

3. Strategy Performance Result Comparison

Strategy	Cumulative Return	Alpha	Sharpe	Win Rate	Number of Trades	Final Portfolio Value
Market Benchmark	3.05%	0.00%	-	-	-	-
Pure Sentiment	-2.21%	-5.26%	0.107	49.2%	349	\$97,789.81
Sentiment + MA	4.15%	+1.10%	0.165	48.7%	198	\$104,150.56
Sentiment + RSI	-1.27%	-4.32%	0.106	48.8%	328	\$98,731.22
Logistic Regression	2.94%	-0.11%	0.158	53.0%	144	\$102,938.48

4. Machine Learning Model Performance Explanation

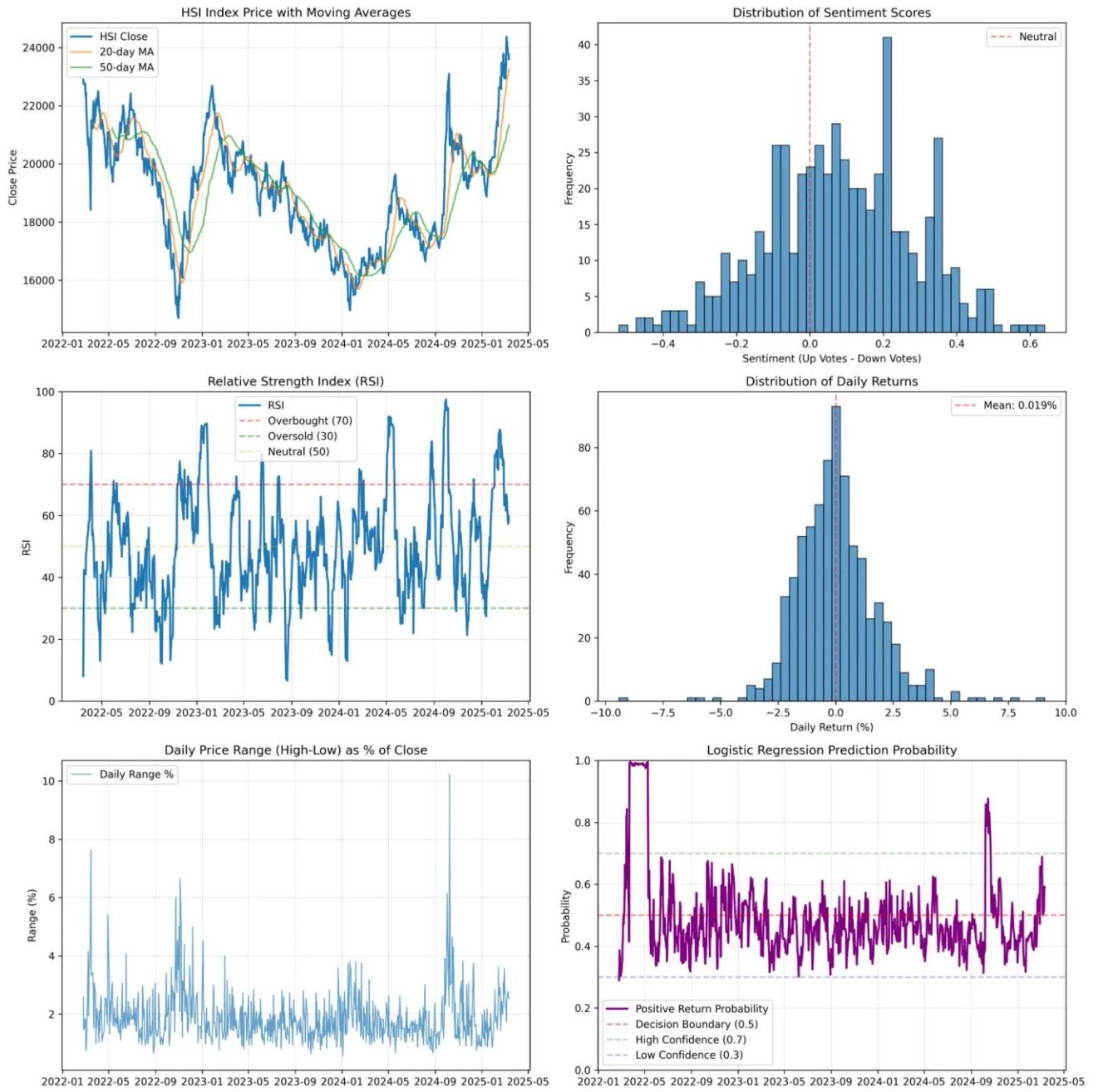
The Logistic Regression model was trained on features including "Sentiment", "Sentiment Strength", "Return", "RSI", "Volatility", "MA_20", "MA_50", "Momentum_5", "Momentum_10", "High_Low_Ratio". With 70% training dataset and 30% testing dataset, L2 regularization and 1000 iterations.

Results are shown below:

- Training Accuracy: 58.52%
- Testing Accuracy: 48.03%

The discrepancy between training and testing accuracy suggests some degree of overfitting or a shift in market dynamics during the testing period.

5. Visualizations



6. Conclusion and Recommendation

Based on the backtesting results, the **Sentiment + MA Strategy** is the recommended approach for HSI trading. It successfully combined sentiment indicators with trend-following technical analysis to deliver superior risk-adjusted returns compared to the market and other tested strategies.

Key Takeaways:

1. Prediction Vote analysis: The HSI Up/Down votes from the social media are not a good enough predictor of market direction. The social media sentiment prediction is only slightly better than a coin flip (53.41%).
2. Trend Filtering is Crucial: Sentiment signals alone are noisy, combining them with trend indicators like Moving Averages significantly enhances reliability. However, the strategy is still not good enough since the Sharp ratio is just 0.165.
3. Risk Management: The Sentiment + MA strategy reduced the number of trades by nearly 43% compared to the Pure Sentiment strategy, leading to lower transaction costs and better signal selection.
4. Future Work: Further optimization of the Logistic Regression model and exploring other technical indicators could potentially enhance the alpha generation, such as LSTM model, GAN model, etc. And more strategies like “Rubber Band Trading Strategy”, “MFI Indicator Strategy” can be implemented.

*Disclaimer: Past performance is not indicative of future results.
Trading involves significant risk of loss.*
