Justification for Including EMA20, RSI14, ATR14, and MACD in Short-Term Trading Models

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1 What This Is About

I'm building a dataset for short-term trading models and plan to include four technical indicators: EMA20, RSI14, ATR14, and MACD. This report explains why these indicators make sense, backed by their use in trading practice and insights from respected traders and financial literature.

2 Why These Indicators?

Technical indicators help capture price patterns, momentum, and volatility, which are critical for short-term trading. I chose EMA20, RSI14, ATR14, and MACD because they're widely used, complementary, and proven effective by traders and analysts. Below, I break down each one and why it's included.

2.1 EMA20 (Exponential Moving Average, 20-Period)

The EMA20 smooths price data, giving more weight to recent prices, making it ideal for spotting short-term trends. John J. Murphy, a leading technical analyst, emphasizes in *Technical Analysis of the Financial Markets* that EMAs are more responsive than simple moving averages, especially for day trading [1]. The 20-period EMA is a popular choice because it balances sensitivity to price changes with noise reduction, as noted by Investopedia [6]. It's often used with other indicators (like MACD) to confirm trends, making it a solid pick for my dataset.

2.2 RSI14 (Relative Strength Index, 14-Period)

RSI14 measures momentum and identifies overbought (above 70) or oversold (below 30) conditions. Developed by J. Welles Wilder in *New Concepts in Technical Trading Systems*, it's a staple for detecting potential reversals [2]. Constance Brown, in *Technical Analysis for the Trading Professional*, refines RSI for trending markets, showing its versatility [3]. Traders like Alexander Elder combine

RSI with moving averages for stronger signals [5]. Its 14-period setting is standard for short-term trading, per TradingView, making it a must-have.

2.3 ATR14 (Average True Range, 14-Period)

ATR14 measures volatility, helping set stop-losses or position sizes. Also created by Wilder, it's praised by Perry J. Kaufman in *Trading Systems and Methods* for managing risk in fast-moving markets [4]. Investopedia highlights ATR's role in adapting to price swings, crucial for short-term strategies [7]. The 14-period setting is widely used for its balance of responsiveness and stability, ensuring my models can handle volatility effectively.

2.4 MACD (Moving Average Convergence Divergence)

MACD uses 12- and 26-day EMAs with a 9-day signal line to track momentum and trend changes. Developed by Gerald Appel, it's valued for spotting crossovers and divergences, as Murphy and Elder note in their works [1, 5]. StockCharts.com calls MACD a go-to indicator for its versatility in short-term trading [8]. Its ability to combine trend and momentum signals makes it a powerful addition to my dataset.

3 Why They Work Together

These indicators complement each other: - EMA20 tracks trends. - RSI14 signals momentum and reversals. - ATR14 manages volatility and risk. - MACD confirms trend shifts and momentum. Together, they provide a robust feature set for machine learning models, capturing key market dynamics. Their widespread use by traders and endorsement by experts like Murphy, Wilder, Kaufman, and Elder justify their inclusion.

4 Wrapping Up

EMA20, RSI14, ATR14, and MACD are proven tools for short-term trading, backed by decades of use and support from top analysts. They capture trends, momentum, and volatility, making them ideal for my dataset. I'll compute these indicators using standard formulas and validate their impact on model performance.

References

[1] John J. Murphy, *Technical Analysis of the Financial Markets*, 1999.

[2] J. Welles Wilder, *New Concepts in Technical Trading Systems*, 1978.

[3] Constance Brown, *Technical Analysis for the Trading Professional*, 1999.

[4] Perry J. Kaufman, *Trading Systems and Methods*, 2013.

[5] Alexander Elder, *Trading for a Living*, 1993.

[6] Investopedia, *What is EMA? How to Use Exponential Moving Average*, 2024. https://www.investopedia.com

[7] Investopedia, *Average True Range (ATR) Formula,* 2024. https://www.investopedia.com

[8] StockCharts.com, *MACD Oscillator*, 2024. https://chartschool.stockcharts.com