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Regime-Switching Prediction of Intraday Equity Trading Outcomes:A Hidden Markov Model Approach for Semi-Automated Scalping and Swing Strategies

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Abstract

Retail and independent traders increasingly rely on semi-automated systems that combine discretionary judgment with rules-based technical signals, yet little empirical research examines whether the market conditions underlying a trade, also known as its latent "regime," can be systematically identified and used to predict trade outcomes before entry. This dissertation applies the concept of "Hidden Markov Models (HMMs)" to a longitudinal dataset of personal intraday and swing equity trades, using a structured technical framework (Smart Money Concepts, VWAP, EMA, RSI, and MACD) as the observable signal layer from which latent market states are inferred. The study treats each trade's surrounding price and indicator behavior as an emission sequence, fits an HMM to recover hidden regime states (e.g., trending, ranging, high-volatility, low-volatility), and tests whether regime classification at the time of entry improves the predictability of trade outcome (win/loss, magnitude, and risk-adjusted return) relative to indicator signals alone. Using single-account, semi-automated equity trading data collected over 27 months, this research contributes: (1) an applied methodology for retail-scale regime detection without institutional-grade data infrastructure; (2) an empirical assessment of whether regime-aware trade filtering measurably improves outcome prediction; and (3) a case-study framework other independent and semi-automated traders can replicate on their own trade logs. Findings are framed as a single-subject, proof-of-concept study rather than a population-generalizable trading system, with explicit discussion of the tradeoffs this design choice implies for external validity.

Keywords: technical analysis; latent state estimation; market microstructure; retail trading performance; behavioral finance