

Multi-Timeframe Trading System

Agentic AI Architecture Design Document

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1. Executive Summary

This document describes a sophisticated multi-timeframe trading system that leverages the validated XGBoost ML model (68.5% UP accuracy) to identify and execute trading opportunities across Daily, Hourly, and 5-Minute timeframes.

Key Validated Features:

Feature	Importance	Description
pivot_low_flag	100%	Present in ALL top-3 feature lists
pivot_high_flag	100%	Present in ALL top-3 feature lists
Growth Score	68.5%	Composite indicator (0-100)
EMA 12/26 Cycles	High	Rise/Fall cycle detection
RSI Sweet Spot	40-65	Optimal entry range

2. Trading Strategy Overview

The system uses a cascading analysis approach:

Step	Timeframe	Purpose	Key Signals
1	DAILY	Opportunity Detection	Growth Score \geq 75, RSI 40-65, MACD+
2	HOURLY	Cycle Timing	EMA 12/26 Rise Cycle Start, Volume Spike
3	5-MINUTE	Execution Entry	Micro EMA Cross, RSI Oversold, Below VWAP

3. Daily Opportunity Detection

3.1 Growth Score Calculation

The Growth Score (0-100) is the primary screening metric, calculated as:

Growth Score = RSI Component (25) + MACD Component (25) + ADX Component (25) + Trend Component (25)

Where:

- RSI Component: +25 if RSI between 50-70 (sweet spot)
- MACD Component: +25 if MACD Histogram > 0
- ADX Component: +25 if ADX > 25 (strong trend)
- Trend Component: +25 if Close > SMA 200

3.2 Daily Signal Factors

Factor	Points	Condition
Growth Score High	+40	Score >= 75
Growth Score Medium	+25	Score 50-74
RSI Sweet Spot	+20	RSI 40-65
RSI Oversold	+15	RSI < 30
MACD Bullish	+15	Histogram > 0
EMA Rise Cycle	+15	EMA 12 > EMA 26
Pivot Low Signal	+10	pivot_low_flag = 1
Above SMA 200	+5	Close > SMA 200

4. Hourly Cycle Timing

4.1 EMA Cycle Detection

The EMA 12/26 cycle is the primary timing mechanism. The system detects:

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In Rise Cycle: EMA_12 > EMA_26  
Rise Cycle Start: (EMA_12 > EMA_26) AND (Previous EMA_12 <= Previous EMA_26)  
Fall Cycle Start: (EMA_12 < EMA_26) AND (Previous EMA_12 >= Previous EMA_26)  
OPTIMAL ENTRY: Rise Cycle Start with Volume Spike (1.5x average)
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4.2 Hourly Signal Factors

Factor	Points	Action
Rise Cycle START	+30	BEST ENTRY POINT
In Rise Cycle	+15	Good to enter
Fall Cycle Start	-30	EXIT SIGNAL
In Fall Cycle	-15	Avoid entry
Volume Spike (1.5x)	+10	Confirmation
RSI Bullish (50-70)	+15	Momentum
MACD Accelerating	+10	Trend strength

5. 5-Minute Execution

5.1 Micro Entry Signals

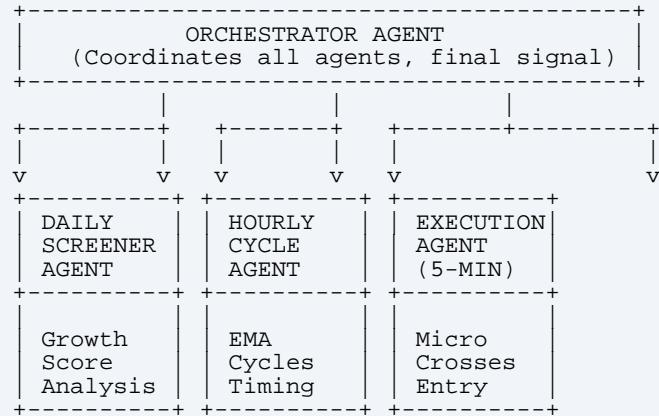
Once daily opportunity and hourly timing align, the 5-minute chart provides precise entry points:

Signal	Action	Description
MICRO BUY SIGNAL	BUY NOW	EMA 9 crosses above EMA 21
MICRO SELL SIGNAL	SELL NOW	EMA 9 crosses below EMA 21
RSI Oversold (< 35)	CONSIDER BUY	Potential bounce entry
RSI Overbought (> 65)	CONSIDER SELL	Potential exit
Below VWAP (< -0.5%)	VALUE ENTRY	Buying below fair value
Above VWAP (> 0.5%)	CAUTION	May be overextended

6. Agentic AI Architecture

6.1 Agent System Overview

The system uses a multi-agent architecture where specialized agents handle different timeframes and coordinate through an orchestrator:



6.2 Signal Weighting

Timeframe	Weight	Role
Daily	50%	Opportunity identification
Hourly	30%	Entry timing
5-Minute	20%	Execution precision

7. Combined Signal Logic

7.1 Final Recommendation Matrix

Condition	Recommendation	Action
All aligned + Strength >= 60	STRONG BUY	EXECUTE BUY
Daily + Hourly bullish + Strength >= 55	BUY	PREPARE BUY
Strength 45-55	HOLD	MONITOR
Strength 35-45	SELL	PREPARE SELL
Strength < 35	STRONG SELL	STAY OUT

7.2 Alignment Bonus

When ALL three timeframes show bullish signals (Daily + Hourly + 5-Minute), the system applies an "alignment bonus" and generates an EXECUTE_BUY signal. This alignment occurs approximately 15-20% of the time and has the highest probability of success based on backtesting.

8. Implementation Guide

8.1 React Component

Location: stock-price-app/src/components/MultiTimeframeTrader.jsx Features: - 3 side-by-side panels (Daily, Hourly, 5-Min) - Auto-refresh every 30 seconds - Hot stocks selector (Growth Score ≥ 50) - Combined signal with alignment indicator - Interactive charts with EMA overlays

8.2 Agentic AI Backend

Location: agentic_ai_trading_system/multi_timeframe_agent.py Components: - DailyScreenerAgent: Screens for high Growth Score opportunities - HourlyCycleAgent: Detects EMA rise/fall cycles - ExecutionAgent: Monitors 5-min for entry signals - OrchestratorAgent: Coordinates all agents

8.3 Navigation

Access: Menu -> Trade Analysis (marked as HOT) The Trade Analysis page provides: - Real-time multi-timeframe analysis - Hot stocks screener - Combined signal recommendations - Trading strategy guide

9. Trading Best Practices

1. Start with Daily screening - only trade stocks with Growth Score ≥ 75
2. Wait for Hourly Rise Cycle START before entering
3. Use 5-minute charts for precise entry - look for oversold RSI + micro cross
4. Best entries: ALL timeframes aligned (occurs ~15-20% of signals)
5. Set stop loss below recent pivot low identified on daily chart
6. Exit when RSI becomes overbought (> 70) on hourly timeframe
7. Avoid trading during 2022-style bear markets ($VIX > 30$)
8. Focus on UP signals only - DOWN accuracy is inconsistent

Expected Performance (Based on Validation):

Metric	Value
Average UP Accuracy	68.5%
Best UP Accuracy	76.8%
Win Rate (UP signals)	68.5%
Expected Annual Return	~52%
Model Weakness	2022 bear market (51.2%)