Algorithmic Portfolio Execution – Intraday Equities

Live System (Dec 2024–Present)

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This report is for the demonstration of the performance of the strategy.

Sharpe (YTD)	1.33	Ann. Return	21.67%	Ann. Volatility	16.25%	Max Drawdown	-8.98%

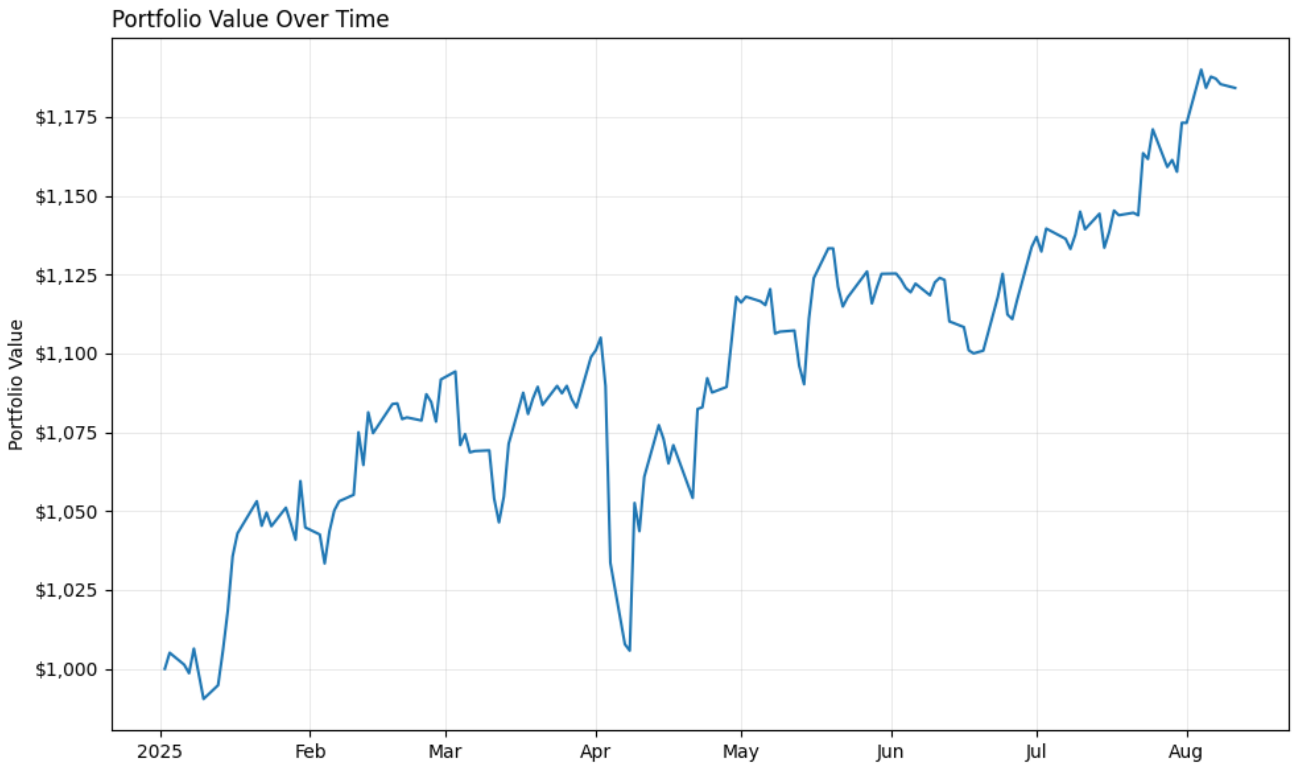

Figure 1: *
Portfolio Value (YTD / Live).

Notes:

- **Data & features:** Intraday time-series with a single engineered feature—*lagged returns*—to ensure systematic adaptation across securities. Lags chosen from autocorrelation charts (ACF/PACF).
- **Modeling:** Trained and deployed neural nets (LSTM, GRU), tree-based models (XGBoost, Decision Tree), and time-series baselines (ARIMAX) to forecast returns/volatility and covariance estimates.
- **Cross-validation** 10-Fold CV to select best model per equity based on out-of-sample forecast error.
- **Risk & covariance:** Utilized forecasts to create forecasts of covariance matrices to optimize portfolios
- **Execution:** Live trading via Alpaca with adaptive take-profit/stop-loss rules that adjust by time-in-position (shorter holds = wider bands; longer holds = tighter exits).
- **Monitoring & infra:** PyQt dashboard (PnL, vol, Sharpe), real-time logging/alerts; multiprocessing, map–reduce, and CUDA acceleration for daily retraining and batched inference.

Method at a glance: Intraday lagged-return features (ACF/PACF-selected) → model forecasts (XGBoost, LSTM/GRU, ARIMAX) → expected return, volatility, covariance matrices→ mean–variance allocation → Alpaca execution