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FinDash Pro: An Integrated R-Shiny Dashboard for Real Time Financial Analysis, Machine Learning Forecasting and LLM-Augmented Decision Support

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2026



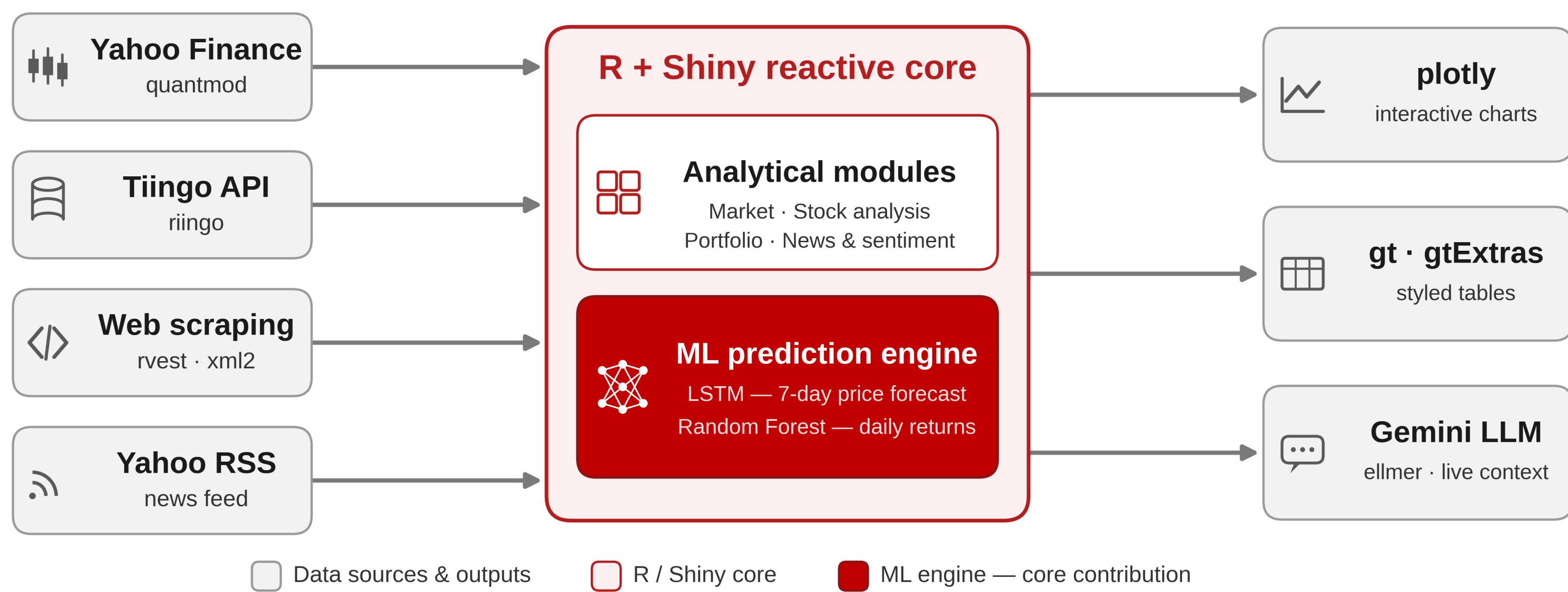
Summary

- FinDash Pro** is a production-grade, fully reproducible financial-analytics dashboard built entirely in **R/Shiny**.
- It unifies live market data (Yahoo Finance, Tiingo, web-scraped fundamentals), **interactive visualization** (plotly, gt/gtExtras), and **machine-learning forecasting** in a single dark-themed interface.
- Its core contribution is a dual ML engine — an **LSTM** network for 7-day price forecasting and a **Random Forest** for daily-return prediction — augmented by a context-aware **LLM assistant** (Google Gemini via ellmer) grounded in live dashboard state.

What You Can Do

- Market Overview** — S&P 500 cap rankings with 30-day sparkline trends
- Stock Analysis** — candlestick charts, RSI/MACD, multi-stock comparison
- ML Predictions** — LSTM 7-day price forecast with confidence bands; Random Forest return forecast with feature-importance attribution
- Portfolio Calculator** — CAGR, annualized volatility, Sharpe ratio, benchmarked vs S&P 500
- News & Sentiment** — real-time headlines with lexicon-based scoring (sentimentr)
- AI Assistant** — natural-language stock analysis grounded in live price/technical context

Architecture & Ingredients



Packages



Live data + ML forecasting + an LLM analyst — institutional-grade and fully reproducible, in pure R

User Interface

1-Market Overview: Two live tables: top-10 S&P 500 companies by market cap, and a fundamental-metrics screener.



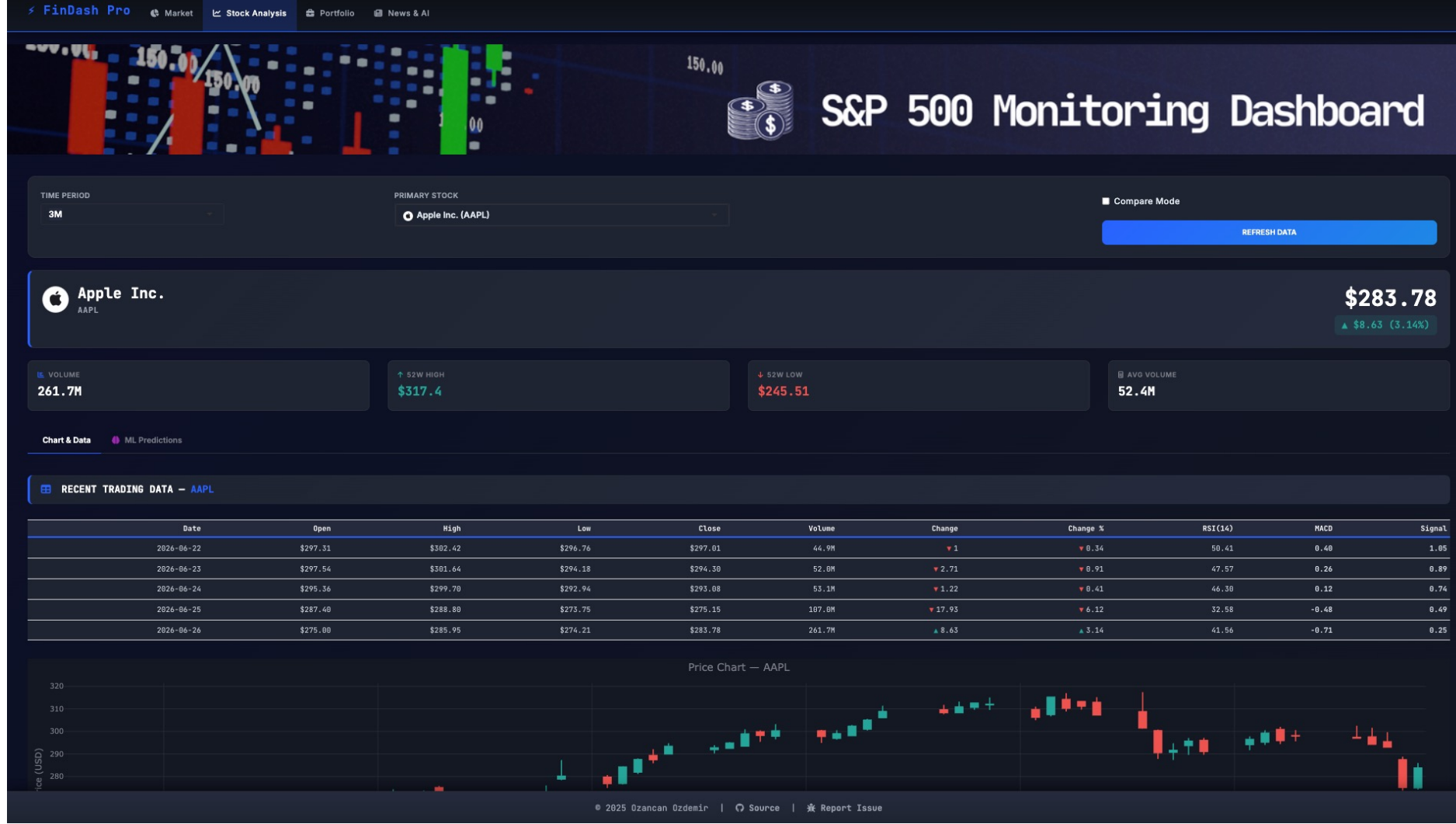
Top 10 Companies By Market Cap

- Inline market-cap bar charts and a colour-scaled Revenue column (gtExtras).
- 30-day price sparklines per company — area chart, green = uptrend, red = downtrend, extreme point marked.

S&P 500 Fundamental Metrics

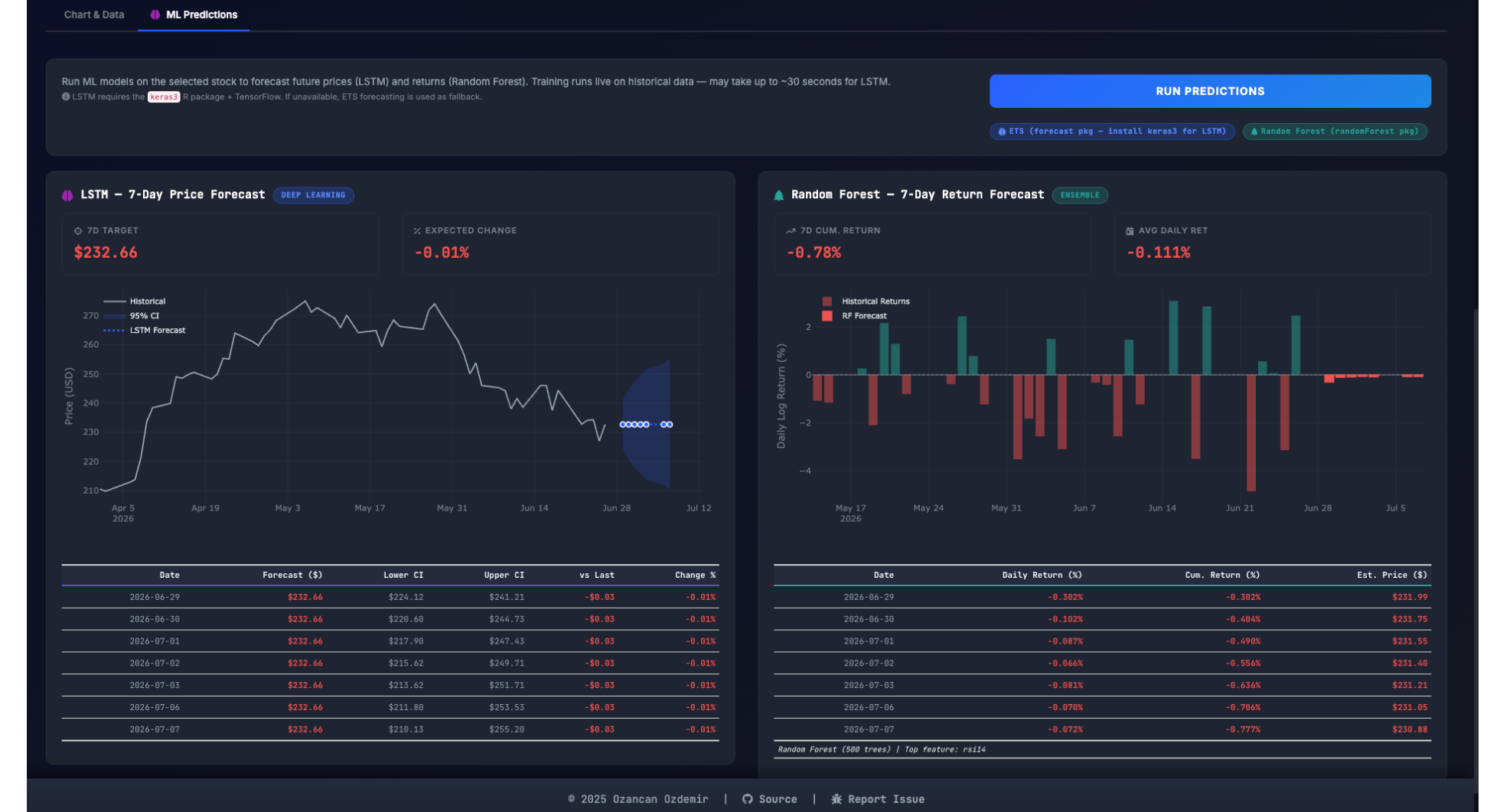
- Fundamental Screener (TradingView) — P/E, EPS (TTM), dividend yield, analyst rating.
- Analyst ratings colour-coded (Strong buy → Strong sell); adjustable row count (10/20/50/All).

2-Stock Analysis – Chart & Data: Single-stock view with live price header, key stats, recent-trading table and candlestick chart.



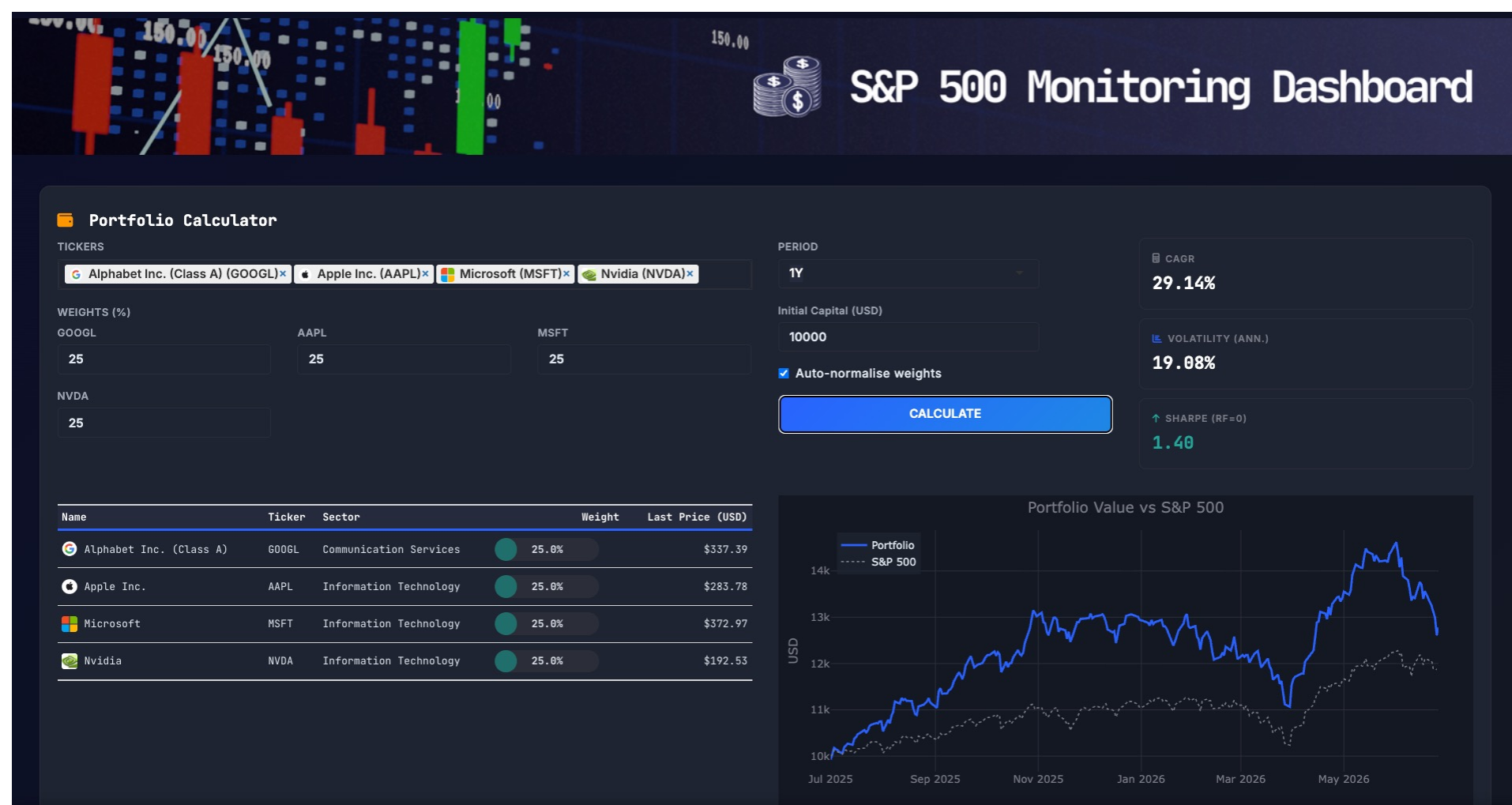
- Pick any **S&P 500 ticker** (logo dropdown) and **time period (1D–5Y)**; live **OHLCV**
- Header shows live price, daily change, 52-week high/low, last and average volume.
- Recent-trading table (last 5 sessions): OHLCV, volume, change, RSI(14), MACD, signal — with direction arrows and RSI overbought/oversold highlights.
- Interactive candlestick chart (plotly), green/red bodies.
- Compare Mode overlays two stocks' normalised % returns and shows side-by-side tables.

3-Stock Analysis – ML Prediction: Dual ML forecasting panel — LSTM price forecast (left), Random Forest return forecast (right).



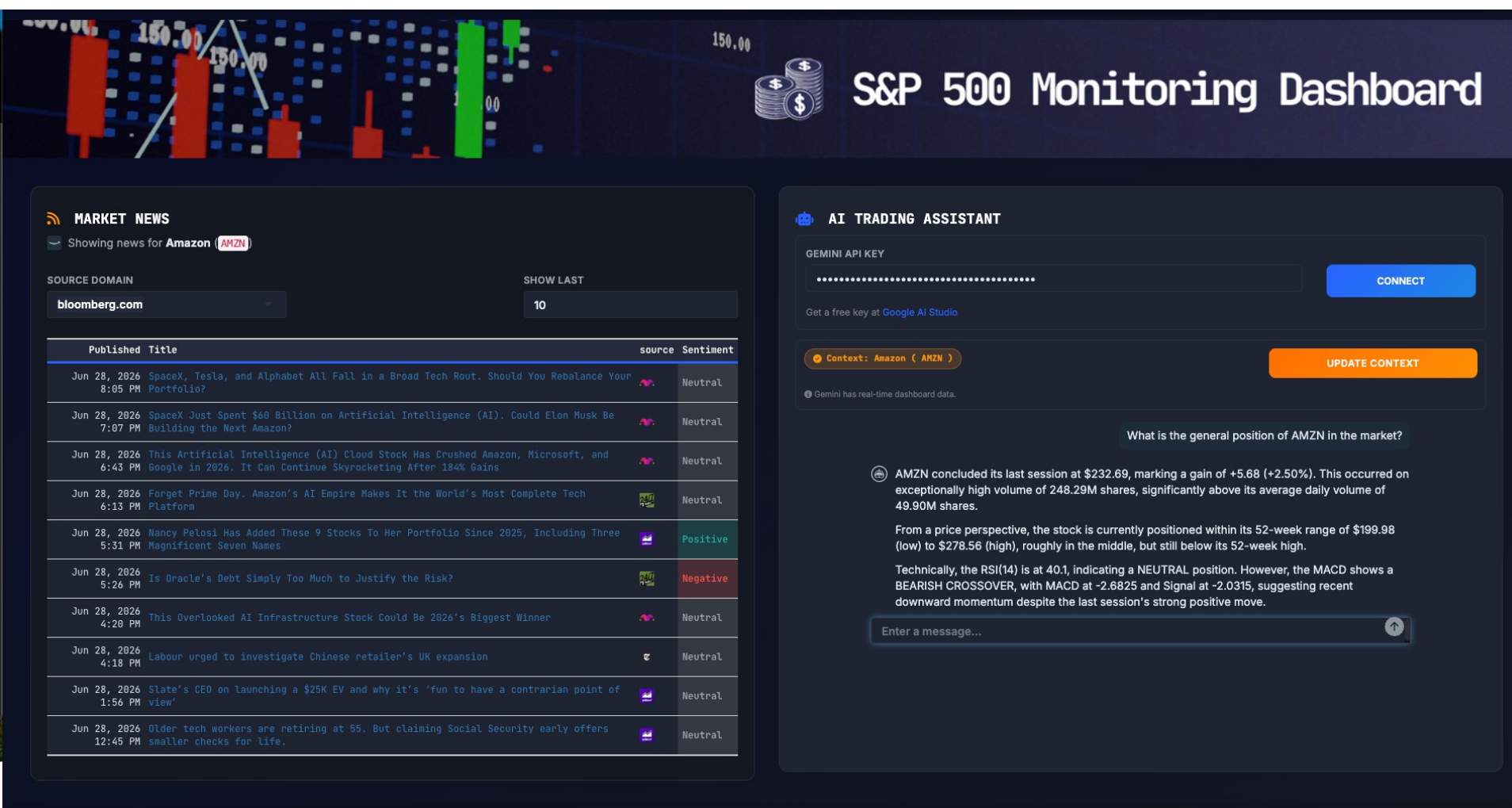
- One click trains both models live on 2 years of daily data for selected stock.
- LSTM: 60-day input window -> Recursive 7-day price forecast with a 95% CI and forecast table
- Random Forest: 500 trees on 11 engineered technical features -> 7-day daily return forecast with cumulative return and estimated price table
- Feature-importance attribution reports the top driver; a method badge shows the actual model used.
- Historical and forecast shown together [price line + return bars]

4-Portfolio Calculator: Allocation table and equity curve benchmarked against the S&P 500



- Build a portfolio up to 8 tickers with custom or auto-equal weights over a chosen period.
- Compute **CAGR**, **annualised volatility** and **Sharpe Ratio**
- Allocation table with weight pill-bars, sector and last price.
- Equity curve of portfolio value vs the S&P 500 benchmark. (plotly)
- Optional weight auto-normalisation user-set initial capital.

5-News & AI Assistant: Real-time news with sentiment scoring and context-aware Gemini chat assistant



Market News

- Real-time headlines for the selected stock (Yahoo Finance RSS)
- Lexicon-based sentiment (sentimentr) labels each headline: Positive/Neutral/Negative, colour-coded.

AI Trading Assistant

- Google Gemini via ellmer, connected with users' own API key.
- System prompt auto-populated with live price action and technical signals- answers grounded in current dashboard state.
- Update context reloads the latest data; the assistant replies in the user's language.

Source Code



Try the app live!



Theoretical Reference

Ozdemir, O., Biehl, M., & Petkov, N. (2026). A survey of fundamental indicators, machine learning techniques and feature extraction techniques for stock price prediction. *Discover Artificial Intelligence*. <https://doi.org/10.1007/s44163-026-01635-z>