# Portfolio Manager 💸

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## 1) Background & Motivation

- There are thousands of stocks out on the stock market, which is **overwhelming** for investors who want to construct their portfolio to meet their **return expectations**.

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**S&P 500** dropped from 4620.64 to 3934.38 in the last 12 months with relatively **large volatility**.

- Our Portfolio Management can generate sector forecasting on the stock market and give investment **advice** on which stocks to invest in and how much weight to assign.
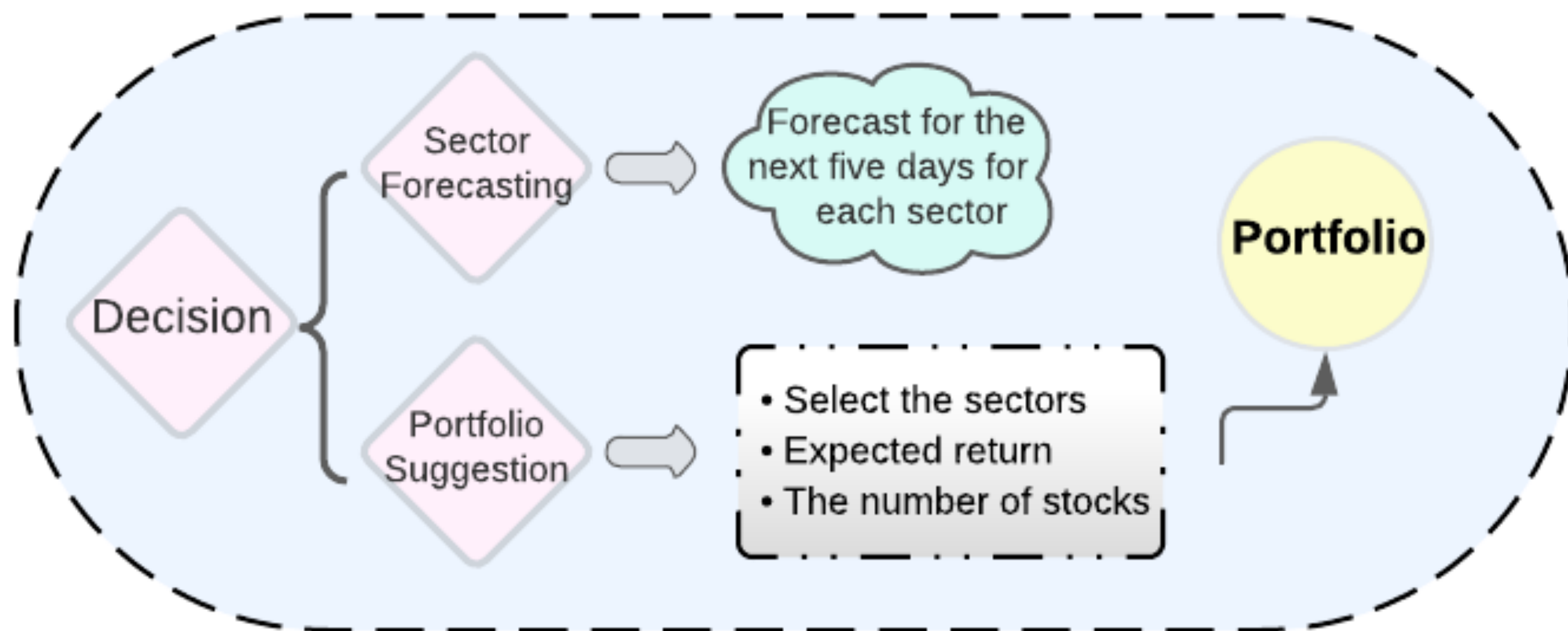


## 2) Development Objective

Help our investors with getting forecasting on **sectors** and give investment advice on constructing a stock **portfolio** from their preferred sectors based on **sector forecasting** and **factor-selecting strategy**.

## 3) Data Source & Preparation

Data Source
➜ Use **Yahoo Finance's API** to access all historical stock data and company financial statements.

Preparation
➜ For **XGBoost** training, we calculated technical market features via stock **close price** and training models with these features.
➜ For **stock factors**, we calculated via stock market data and financial statements.

## 4) Key Components of Tool

| Factor Scoring-Method | Mean-Variance Algorithm |
|---|---|
| All these 3 factors are positively correlated with the stock return, so our scoring method would give a higher score for those stocks that have a larger factor value. Then we add scores together to screen out the best n stocks for each investor-selected sector. | This is a classic investment model for calculating portfolio weight based on Markowitz Optimization. Given a target return level, we can calculate the portfolio weight with minimum variance (risk). |
| **XGBoost** | **Visualization** |
| XGBoost is a machine-learning algorithm to make forecasts on sector return in the following 5 days. We selected some basic market features for XGBoost training. | We use the matplotlib package for plotting our forecasting and back-testing graph. It is a handy and readable way to visualize our prediction. |

## 5) Project Design
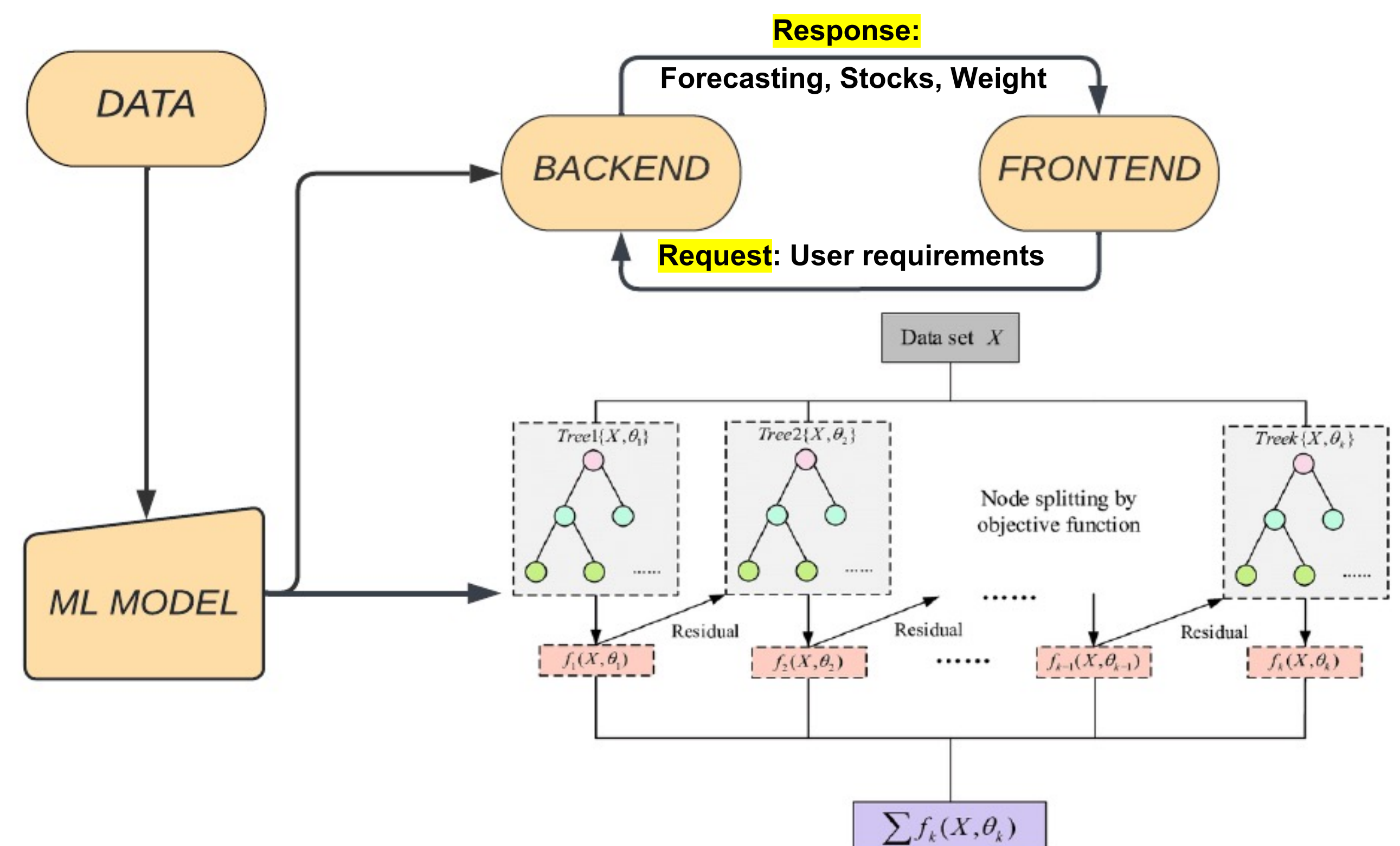


## 6) Main Python Packages Used

| Package | Purpose |
|---|---|
| yfinance | *Financial data fetching* |
| pandas | *Data processing* |
| pypfopt | *Portfolio weight calculation* |
| xgboost | *Model fitting and training* |
| flask | *Web routing and user interaction* |
| matplotlib | *Baseline plotting and visualization* |

## 7) Stock Picker Indicators

**3** significant stock **factors:**

I. **Dividend Rate**: Dividends show how much a company pays out each year relative to its stock price. ⇨ Stock Pricing

II. **Operating Cash Flow / Market Capital**: This indicates how much a company can pay for its operation relative to its total capital. ⇨ Company Earnings

III. **Return On Equity / Price to Book**: This indicates how much a stock is undervalued. ⇨ Signal for Buying

## 8) Demo