# Stocks Analyzer — Behind-the-Scenes Computing

This document explains how the Stocks Analyzer app works behind the scenes. It describes the full pipeline from fetching stock data to generating Top-5 lists and visualizations. The goal is to show the backend processes that go beyond simple data fetching.

## 1. Fetch Stock Data

For each ticker, the app fetches market data from Yahoo Finance using the yfinance API:  
- Daily price history (1y, 2y, etc.)  
- Dividend history  
- Company information (sector, market cap)

Code snippet:  
hist = yf.Ticker(ticker).history(period="1y", interval="1d", auto\_adjust=True)  
div = yf.Ticker(ticker).dividends  
info = yf.Ticker(ticker).info

## 2. Calculate Momentum

Momentum is the % change in stock price over short- and long-term windows.  
Example: If a stock rose from 100 → 120 in 21 days, momentum = +20%.  
- High momentum = strong growth trend  
- Low or negative momentum = weak or declining trend

Code snippet:  
mom\_short = s.pct\_change(short\_days).iloc[-1]  
mom\_long = s.pct\_change(long\_days).iloc[-1]

## 3. Calculate Volatility (60 Days)

Volatility measures how much a stock fluctuates. It is the standard deviation of daily returns over the past 60 days (≈ 3 months).  
- Low volatility = stable, less risky  
- High volatility = jumpy, more risky

Code snippet:  
r = s.pct\_change().dropna()  
vol\_60d = r.rolling(60).std().iloc[-1]

## 4. Calculate Dividend Yield

Dividend Yield = total dividends paid in the last 12 months divided by the last stock price. This helps identify high-income stocks (Dividend Kings).

Code snippet:  
ttm\_div = div.loc[div.index >= start].sum()  
div\_yield = ttm\_div / last\_price

## 5. Classify Buy / Hold / Sell

Decision rules apply thresholds to categorize stocks:  
- Buy → momentum above Min Momentum AND volatility below Max Volatility  
- Sell → momentum below –Min Momentum  
- Hold → all other cases

Code snippet:  
if (mS >= min\_mom) and (mL >= min\_mom) and (vol <= max\_vol): return 'buy'  
elif (mS <= -min\_mom) and (mL <= -min\_mom): return 'sell'  
else: return 'hold'

## 6. Rank and Show Top-5 Lists

Within each category, stocks are ranked and the Top 5 are displayed:  
- Buys ranked by strongest momentum  
- Sells ranked by weakest momentum  
- Holds ranked by lowest volatility  
- Dividend Kings ranked by highest yield

Code snippet:  
buy = df[df.action=='buy'].sort\_values(['mom\_long','mom\_short'], ascending=False).head(5)  
sell = df[df.action=='sell'].sort\_values(['mom\_long','mom\_short'], ascending=True).head(5)  
hold = df[df.action=='hold'].sort\_values(['vol\_60d'], ascending=True).head(5)  
kings= df.sort\_values('div\_yield', ascending=False).head(5)

## 7. Visualizations

The app uses Plotly charts to create intuitive visuals:  
- Growth charts (normalized performance over time)  
- Risk vs Return scatter (momentum vs volatility)  
- Market Map treemap (Finviz-style overview of Top-5 categories)

Code snippet:  
px.scatter(df\_all, x='vol\_60d', y='mom\_long', color='action')  
px.treemap(df\_map, path=['action','symbol'], values='market\_cap', color='mom\_long')

## Conclusion

The Stocks Analyzer app is not just fetching data from yfinance. It transforms raw market data into indicators (momentum, volatility, yield), applies decision rules, ranks stocks into Top-5 lists, and visualizes results interactively. This makes it a lightweight but powerful decision-support tool for retail investors.