

# AI in IDE's

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# Agenda

- \*Disclaimer
- Examples
  - 20230601 Music Composition
  - 20240705 Momentum Analysis Tool
  - 20250207 CoPilot – github video
  - 20250209 Agents
- Timeline
  - Then
  - Overheard
  - Now
- Summary

# Disclaimer: Elephants & Microbes



# Disclaimer: It is tough to learn at MIT

- Getting an education from MIT has been likened to drinking from a fire hose—the sheer number of opportunities and rigor of our coursework can leave students feeling hosed.





# Disclaimer: It's tougher to follow GPTs

- There are literally 1000's of GPT efforts out there.
- ChatGPT - 20221130
- Llama 1 - 202302
- Claude – 202303
- DeepSeek - 202412



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# 20230601 Music Composition: Question

- Theme from Beethoven: Symphony No. 7, 2nd movement is 3 notes E F# G
- Q: Compose a melody using the chord progression from Beethoven: Symphony No. 7, 2nd movement as bass.
- Q: Transcribe the melody from first seven bars of Beethoven: Symphony No. 7, 2nd movement.
  - ChatGPT generated melodies in each case, but it hallucinated. The melodies bore no relationship to the Symphony
- Q: Do you know the score of the symphony?
  - chatGPT: As an AI text-based model, I don't have direct access to specific external files or resources such as the score of Beethoven's Symphony No. 7.
- Q: Do you know the rules of counterpoint?
  - A: Yes, (followed by list of rules)
- Q: The python variable 'cantusFirmus' below is in the form of a list of (pitch,duration) pairs, where the pitch uses the MIDI pitch standard and the duration is 1 for whole notes, 0.5 for half notes, 0.25 for quarter notes and 0.125 for eighth notes. Compose a melody above it and output it in the same format. Ensure the following: The melody has a contour with several high and low points. The melody has a variety of note lengths. The melody has at least 2 skips of a perfect 4<sup>th</sup>.

# 20230601 Music Composition: Answer

<https://paseman.com/Posts/20230601%20Chat%20GPT%20In%20its%20Own%20Words/Presentation/charGPTBeethovenSeventhExercises/index.html>

- melody = []
- # Transpose cantusFirmus and add melodic variations
- for i, (pitch, duration) in enumerate(cantusFirmus):
- melody\_pitch = pitch + 7 # Transpose by a perfect 5th
- melody\_duration = duration
- # Add melodic variations
- if i == 6 or i == 13: # Skip of a perfect 4th
- melody\_pitch -= 5
- if i % 3 == 0: # High point in the contour
- melody\_pitch += 2
- if i % 4 == 0: # Low point in the contour
- melody\_pitch -= 2
- melody.append((melody\_pitch, melody\_duration))

This is wild!!  
chatGPT didn't compose.  
It generated code that  
created a composition!!



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# Momentum Analysis Tool

Strgy Analysis

Strgy rtn vs time

Strgy rtn vs risk

Uvrse Analysis

Uvrse rtn vs time

Uvrse rtn vs risk

Universe

FAANNG



Lags

1,3,6,12

Member count

6



Months back

12



Use Cache?

Submit

[FinGPT](#)

[Articles](#)

[Log](#)

[Help](#)

- “3 click” App I used to explain stock momentum to a waitress.
- Streamlit UI – Generated using chatGPT/claude.ai Prompt
  - One Pulldown (Universe)
  - One Field (Lags)
  - Submit
- Calls Backend (Written in python)

10

Universe

FAANNG

Lags

1,3,6,12

Member count

6

Months back

12

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Date	0	1	2	3	4	5	CASH?	Port1Rtn	Port2Rtn	Port3Rtn
2023-10-31 00:00:00	META	NVDA	NFLX	AMZN	GOOG	AAPL	CASH	0.8972	1.0271	1.0026

- The first tab recommends stocks to buy based on price momentum.
- The user picks the Universe, lagged return to compare, total stocks in the portfolio and how far back in time to start measuring the strategy return.
- The User then presses submit to generate a table (which scrolls left/right and up/down)
- And since the tool identifies about 3 stocks max, I have a link to finGPT where the user can plug in each one and see if they want to buy it or not. This subsumes the function of a timer.
- There are also links a list of articles I like, a place where the user can log their rationale for their choices and help.

Date	0	1	2	3	4	5	CASH?	Port1Rtn	Port2Rtn	Port3Rtn	Port4Rtn	Port5Rtn	Port6Rtn	URtn
2023-08-31 00:00:00	NVDA	META	NFLX	GOOG	AMZN	AAPL	STOCK	0.8813	0.948	0.9222	0.9316	0.9295	0.9265	0.9265
2023-09-29 00:00:00	NVDA	META	GOOG	NFLX	AMZN	AAPL	STOCK	0.8263	0.92	0.8888	0.9274	0.9349	0.9305	0.9305
2023-10-31 00:00:00	META	NVDA	NFLX	AMZN	GOOG	AAPL	CASH	0.8972	1.0271	1.0026	1.0391	1.0378	1.0333	1.0333
2023-11-30 00:00:00	META	NVDA	NFLX	AMZN	AAPL	GOOG	STOCK	0.9708	1.0994	1.0588	1.0931	1.0838	1.0805	1.0805
2023-12-29 00:00:00	NVDA	META	AMZN	NFLX	GOOG	AAPL	STOCK	1.2061	1.2889	1.188	1.2365	1.1989	1.1685	1.1685
2024-01-31 00:00:00	NVDA	META	NFLX	AMZN	GOOG	AAPL	STOCK	1.5508	1.6382	1.4299	1.4683	1.3752	1.3079	1.3079
2024-02-29 00:00:00	NVDA	META	NFLX	AMZN	GOOG	AAPL	STOCK	1.7712	1.747	1.4967	1.5273	1.444	1.3512	1.3512
2024-03-28 00:00:00	NVDA	META	NFLX	AMZN	GOOG	AAPL	STOCK	1.6937	1.6091	1.3713	1.4199	1.3863	1.3047	1.3047
2024-04-30 00:00:00	NVDA	META	GOOG	AMZN	NFLX	AAPL	STOCK	2.1491	1.894	1.5591	1.5687	1.5483	1.4597	1.4597
2024-05-31 00:00:00	NVDA	META	NFLX	GOOG	AMZN	AAPL	STOCK	2.4217	2.09	1.6936	1.6915	1.6747	1.5823	1.5823
2024-06-28 00:00:00	NVDA	META	NFLX	GOOG	AMZN	AAPL	STOCK	2.5146	2.142	1.728	1.7264	1.71	1.6238	1.6238
2024-07-03 00:00:00	NVDA	META	NFLX	AMZN	GOOG	AAPL	STOCK	2.5146	2.142	1.728	1.7264	1.71	1.6238	1.6663

Following each end of month time slot is a sorted list of stock recommendations.

Following that is a recommendation to either buy stocks or stay in cash.

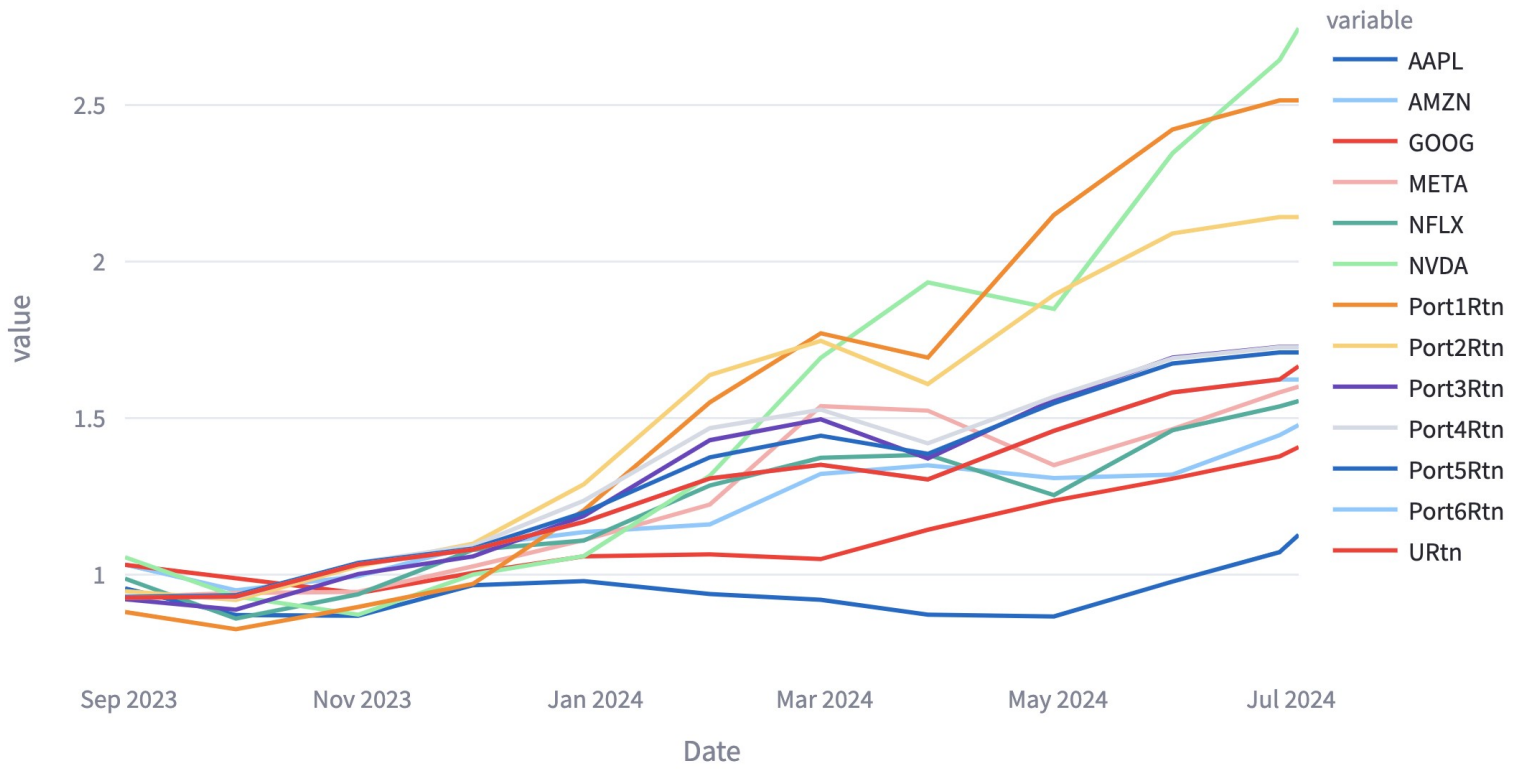
Following that is the return from portfolios consisting of the top 1-6 of the recommended tickers.

The final column shows the return of the universe.

- Portfolios of 2 stocks, rebalanced monthly, have done best lately.
- Note the 0.8263 entry. Here the system lost 17.37% of the portfolio value from 7 2023 to 10 2023.
- This occurred if you picked the top best stock each month.
- Note the 2.142 entry. Here the system added 114.2% to the portfolio value from 7 2023 to 6 2024.
- This occurred if you picked the top two best stocks each month.

# Momentum Analysis Tool

Strgy Analysis   **Strgy rtn vs time**   Strgy rtn vs risk   Uvrse Analysis   Uvrse rtn vs time   Uvrse rtn vs risk

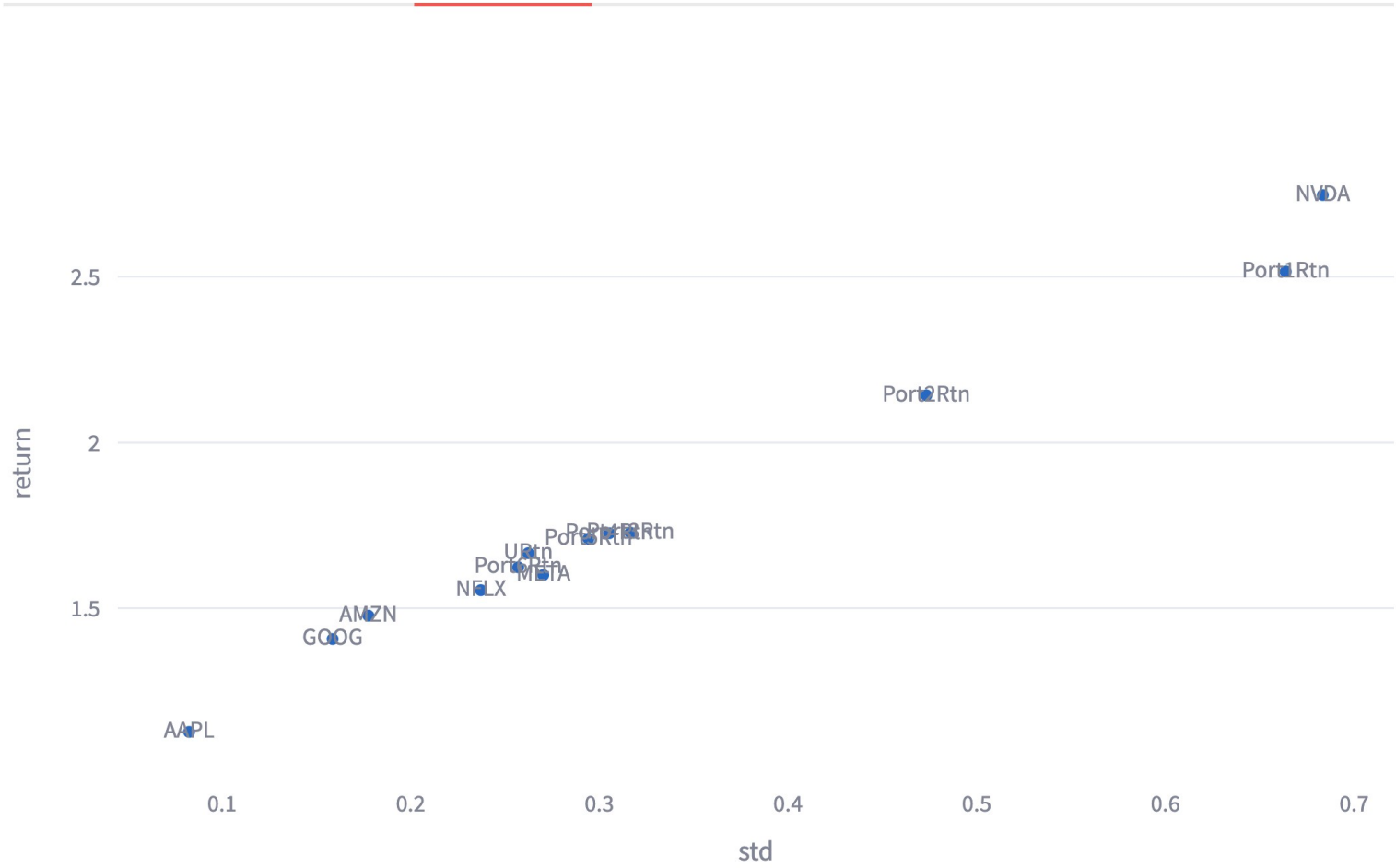


The Second tab shows the stock/portfolio returns vs time.



# Momentum Analysis Tool

Strgy Analysis   Strgy rtn vs time   **Strgy rtn vs risk**   Uvrse Analysis   Uvrse rtn vs time   Uvrse rtn vs risk



The Third  
tab is a  
risk/reward  
plot

# Momentum Analysis Tool

Strgy Analysis   Strgy rtn vs time   Strgy rtn vs risk   **Uvrse Analysis**   Uvrse rtn vs time   Uvrse rtn vs risk

Universes

D30 ×

N100 ×

SP500 ×

R1000 ×

FAANNG ×

× ▾

Lags

1,3,6,12 ×

1,3,6,6 ×

8 ×

9 ×

10 ×

11 ×

13 ×

× ▾

Universe Member count

6 ▾

Universe Months back

12

Universe Submit

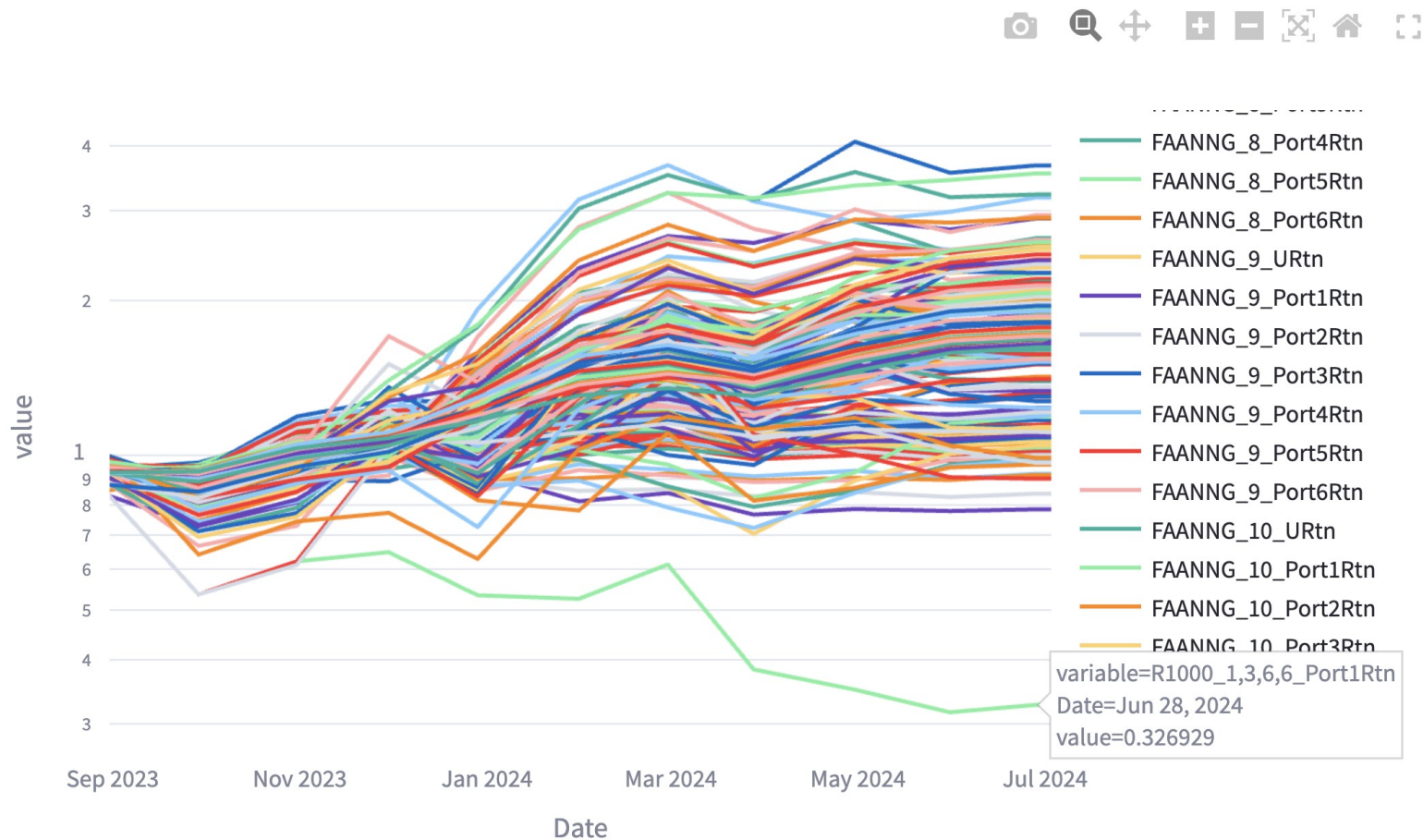
☒ Universe Use Cache?

	UName	Lags	0	1	2	3	4	5	CASH?	Port1Rtn	Port2Rtn	Por
0	D30	1,3,6,12	AMZN	MSFT	GS	WMT	AAPL	JPM	STOCK	0.921	0.9902	1

The Fourth  
tab  
compares  
universe/  
lag/  
timeframe/  
period  
cross  
products

# Momentum Analysis Tool

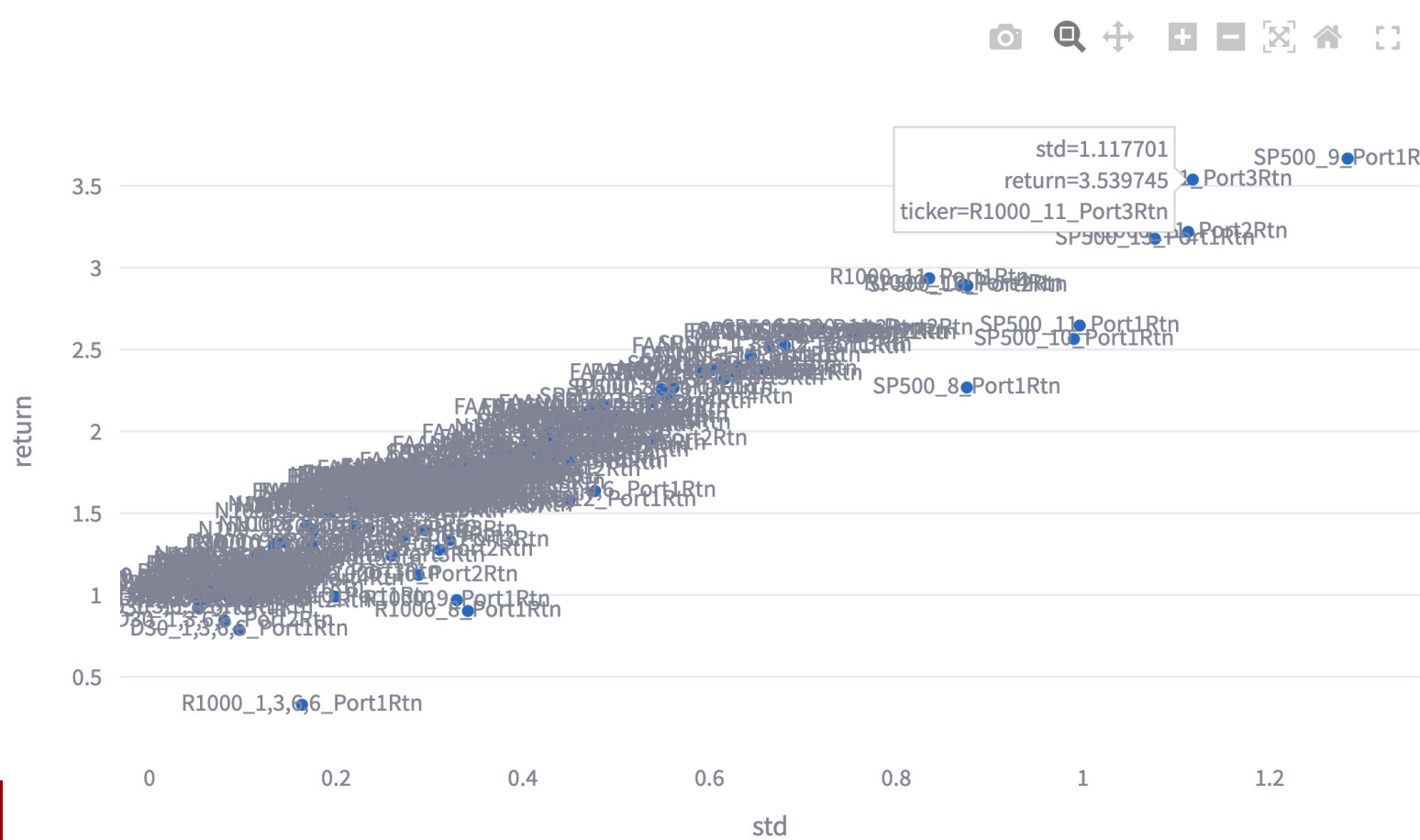
Strgy Analysis   Strgy rtn vs time   Strgy rtn vs risk   Uvrse Analysis   **Uvrse rtn vs time**   Uvrse rtn vs risk



The Fifth  
tab shows  
cross  
product  
time  
behavior

# Momentum Analysis Tool

Strgy Analysis   Strgy rtn vs time   Strgy rtn vs risk   Uvrse Analysis   Uvrse rtn vs time   **Uvrse rtn vs risk**



The last tab  
is a cross  
product  
risk/reward  
plot

# UI Generation – First GPT Prompt

- Please generate streamlit application with
- a pulldown labeled "universe" with items labeled "N100", "R1000" and "FANG" that defaults to "N100".
- a text field labeled "lags" that allows me to enter a list of comma delimited numbers and initialized with the string "1,3,6,12",
- a pulldown labeled "member count" with 6 items labeled 1-6 that defaults to 6.
- a text field labeled "months back" initialized to 12.
- and a "Submit" button.
- When "Submit" is pressed, I want the application to call streamlitEntry passing (universe,lags,memberCount,monthsback=12).
- It will return a text field with embedded carriage returns.
- Please print the result in a text area called "Results".

<https://paseman.com/Posts/20240705%20Momentum%20Analysis%20Tool/UI%20Generation%20Prompt%20-%20Streamlit.txt>



# UI Generation – Generated Code

```
import streamlit as st
import plotly.express as px
#from momentumtiming import strategyAnalysis, universeAnalysis
from momentumtiming20240716 import strategyAnalysis, universeAnalysis

st.set_page_config(page_title="Momentum analysis tool", layout="wide")

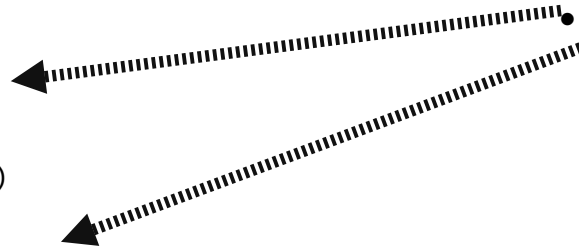
tab1, tab2, tab3, tab4, tab5, tab6 = st.tabs(["Strgy Analysis", "Strgy
rtn vs time", "Strgy rtn vs risk", "Unvrse Analysis", "Unvrse rtn vs
time", "Unvrse rtn vs risk"])

...

with tab2:
    if 'monthlyReturns' in locals():
        fig = px.line(monthlyReturns)
        st.plotly_chart(fig)
with tab3:
    if 'returnStd' in locals():
        #WGP fig = px.scatter(returnStd, hover_data=['ticker'])
        fig = px.scatter(returnStd, x="std", y="return", text="ticker")
        st.plotly_chart(fig)
```

<https://paseman.com/Posts/20240705%20Momentum%20Analysis%20Tool/20240716ClaudeStreamlit.py.txt>

- GPT generated a couple of bugs. I needed to understand the interface enough to fix it ('#WGP')
- Note the 'line' and 'scatter plot' generation
- Small wrappers around big functionality



# Demo

file:///Users/katherinepaseman/Documents/projects/\_Websites/paseman/Posts/20240705\ Momentum\ Analysis\ Tool/\_20240716momentum.command

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# Agents

- Bill: Talks to other Caregivers, reads new literature
- Builds Caregiver Tools
  - Bill's Electronic Health Record
  - Clinical Trial Selection Tool
  - Decision Support tool (Tumor Board Application)
  - ...
- Bill's Caregiver Agent
  - Talks to other Caregiver Agents, reads new literature
  - Bill's Electronic Health Record
  - Clinical Trial Selection Tool
  - Decision Support tool (Tumor Board Application)
  - ...
- Anthropic “building effective agents”
- Agentic Workflows in LlamaIndex

[cubeomatic](#)

```
file:///Users/katherinepaseman/Documents/projects/_Websites/paseman/Posts/20241231\Decision\ Support\ Tool/20241230DSS.command
```

[building-effective-agents](#)  
[Agentic Workflows in LlamaIndex](#)  
[later...](#)



# Agents: Decision Support Tool Prompt

Generate streamlit application entitled "Decision Support Tool" with 5 vertical UI elements.

The first UI element is a pull down entitled "Question",

"Question" is immediately populated by calling `getQuestions()` which returns a list of Question strings.

The second UI element is a multiple select radio button entitled "Moderators".

Once a "Question" is chosen, "Moderators" is populated with a call to `getModerators(Question)` which returns a list of Moderator strings.

The third UI element is a submit button.

If the submit button is pressed and no "Moderator" button is selected, the application prints "At least one Question and one Moderator must be selected".

If the submit button is pressed and at least one "Moderator" button is selected, the application calls `getOpinionsAndAnswers(Question,Moderators)` passing the "Question" string as the first argument and the list of elected "Moderators" strings as a second argument.

`getOpinionsAndAnswers` returns two dataframes.

Print the first dataframe in fourth UI element entitled "Opinions".

Print the second dataframe in fifth UI element entitled "Answers".

Do not generate any dummy calls

Instead create an "from decisionSupport import getQuestions, getOpinionsAndAnswers" import.

Include this entire prompt as a comment in the header of the generated file.

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# Timeline: Then

- 197606xx Rice
  - APL: “Draw the square rotated by 90 and translated to 10 10”
- 1982xxxx Daisy
  - Chuck Rich’s MIT Programmer’s Apprentice demo
    - Rich spent most of his time debugging code he didn’t write
- 1995xxxx Miller
  - “Setting up a SLIP server and Gopher site”
    - New tech ultimately becomes Detritus buried under years of tech debris
- 20xxxxxx Schachter
  - Stand alone Twitter Box
    - Twitter didn’t care.

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# Timeline: Overheard

- 202302xx – Bill Paseman
  - Bill: “Let’s get together to talk about GPT!”
  - Response: “Waste of time. We’ve seen this type of hype before.”
- 20250206 – Marguerite Paseman in Hong Kong
  - met three young boys from Australia, 2 comp sci major, complaining how hard it is to find jobs.. the running joke for them is that they are competing with arts major graduates for “a job as a checkout receptionist”...a worse version is “a bed in homeless shelter” 😞. bleak future! what a diff a few decades make
- 20250209 WSJ
  - As happened with operators, tellers, travel agents and so on, jobs lost are replaced by new and better-paying jobs in emerging industries. Every time.

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# Timeline: Now

- The New Wave of AI Is Here: Google claims that more than 25% of its internal source code is now AI-generated. Salesforce has announced a hiring freeze for software engineers. [Facebook](#) hopes to automate “midlevel” software engineers. There will soon be a proliferation of startups stocked with **more high-level software architects vs. coders.**
- GPTs have enabled new ways of thinking
- Migrating from implementing algorithms in Languages to managing entities that create applications for you.
- People are working to create whole companies with the founder at the top and GPTs fulfilling roles in Marketing, Sales, Finance and Product.
- Tools enabling this transition are the next obvious step (Companies in a can)
  - Architecting on a Cellphone vs. Coding on cellphone