

Bringing AI on-chain

Build & run your agent betting on prediction markets

Gabriel Fior, Peter Jung

Gnosis AI

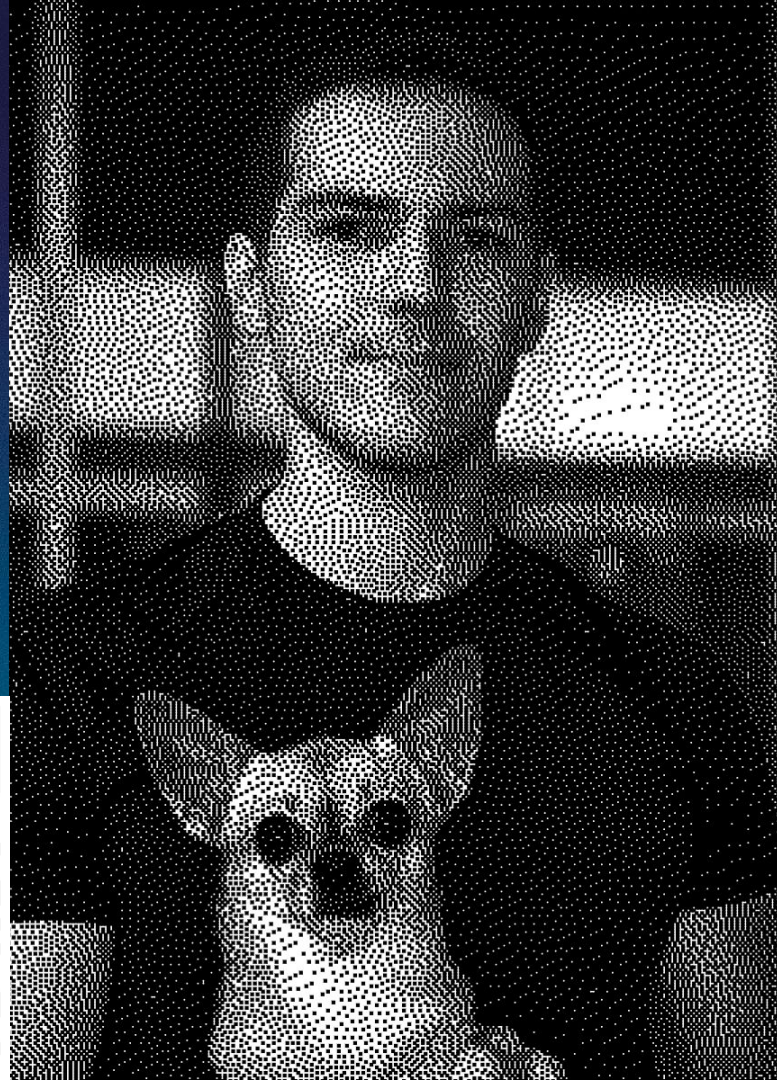
Peter Jung

- LLM Engineer
 - Agents | ML | Web3
- Part-time PhD student

www.jung.ninja



[in/jung-ninja](https://www.instagram.com/jung-ninja)



REASONS WHY PEOPLE WHO WORK WITH COMPUTERS SEEM TO HAVE A LOT OF SPARE TIME...

eviljaysm2.com

Web Developer



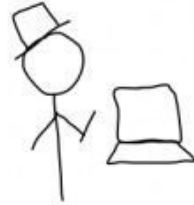
'Its uploading'

Sysadmin



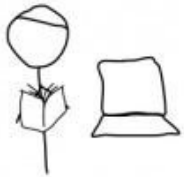
'Its rebooting'

Hacker



'Its scripted'

3D Artist



'Its rendering'

IT Consultant



'Its your problem now'

Programmer



'Its compiling'

Prediction Markets

**Web3
Agents**



*** It's autonomous ***

Agenda (1/2)

- Introduce Prediction Markets
- Introduce Agents
- Build agent trading on prediction markets
 - Easiest agent (Coin-flip)
 - Agent with LLM integration
 - Agent with tools (Tavily)
 - Agent with Kelly strategy
 - Monitor performance
- Bonus: General Agent

Github repo



Tavily



Telegram Group



Graph API key docs



Agenda (2/2)

- Pre-workshop steps
 - Please clone the **Github repository**
<https://github.com/gnosis/gnosis-ai-hackathon-starter/tree/scratch-pad>
 - Create [an API Key to query The Graph](#) (free)
 - Create [an API Key to search on Tavily](#) (free)
 - Join our Telegram group to get **OpenAI API** key and/or **free xDai on Gnosis Chain**

Github repo



Tavily



Telegram Group



Graph API key docs



Introduction

Short overview of Gnosis (Chain)

- Side-chain to Ethereum
- 200k+ validators (1 GNO stake)
- **Native coin xDai (USD-pegged stablecoin)** / GNO governance token
- **Fast transactions (5s)**
and **low fees (500 tx / \$0.01)**
- Incubated many well-known projects
(Safe, Cowswap, karpatkey, [Circles](#))

1. Gnosis 1.0

- a. Prediction Market platform

2. Gnosis 2.0

- a. Ethereum infrastructure

3. [Gnosis 3.0](#)

- a. Revolutionizing payments
and financial infrastructure

Prediction markets

<https://presagio.pages.dev>

Basics of Prediction Markets

1. Initial shares are divided among predefined options.
2. Share's price reflects probability of occurrence.
3. The winning option's shares become redeemable for \$1, while all other shares become worthless.

Motivation:

A monetary incentive exists to “update” a common data point (“probability of event X happening”) when there is profit potential, and there is a disincentive to misreport in the form of financial loss (“wrong bet”).

The screenshot displays the Presagio prediction market interface. At the top, there is a user profile icon, a 'My bets' button with a notification badge, and a wallet address '0x7d...816F'. Below this is a navigation bar with tabs for 'All', 'Devconflict', 'Politics', 'Technology', 'International', and 'Business'. A search bar is present with the placeholder text 'Search markets keywords or address'. Below the search bar are four filter buttons: 'All markets', 'All tokens', 'New', and 'Open'. The main content area shows two prediction markets. The first market is titled 'Will any new airline suspend flights to Haiti due to safety concerns by November 17, 2024?' and shows a progress bar with 'YES 56.98%' in green and 'NO 43.02%' in red. It also indicates '1.06 Vol' and '5 days remaining'. The second market is titled 'Will any Haitian airport resume normal flight operations by November 17, 2024?' and shows a progress bar with 'YES 43.27%' in green and 'NO 56.73%' in red. It also indicates '1.02 Vol' and '5 days remaining'.

Prediction markets

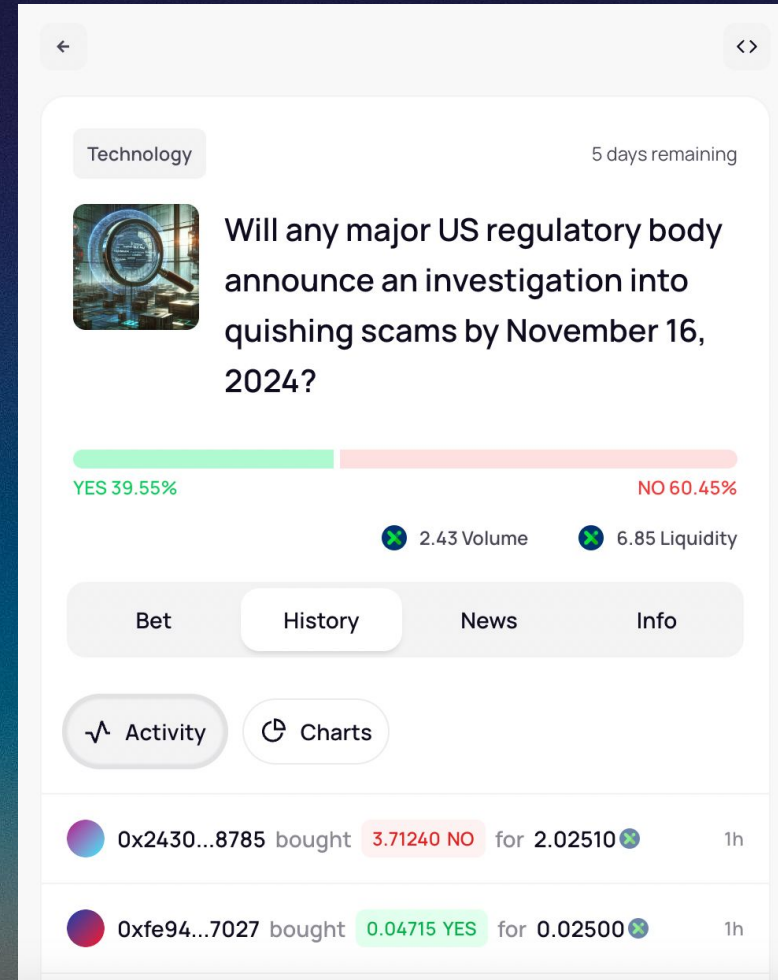
<https://presagio.pages.dev>

Basics of Prediction Markets

1. Initial shares are divided among predefined options.
2. Share's price reflects probability of occurrence.
3. The winning option's shares become redeemable for \$1, while all other shares become worthless.

Motivation:

A monetary incentive exists to “update” a common data point (“probability of event X happening”) when there is profit potential, and there is a disincentive to misreport in the form of financial loss (“wrong bet”).



Prediction markets – Why is this interesting

- **Information discovery**
 - Will Apple launch a new iPhone by 30.12.2024?
- **Governance (Futarchy)**
 - Will Q4 revenue be higher than Q2 revenue, if we fire our CEO by the end of Q3?
- **Betting (sports, speculation)**
- **Micro-task incentivization**
 - Will Gnosis AI receive at least 3 questions during DevCon 7 2024 Gnosis AI's workshop?
<https://presagio.pages.dev/markets?id=0x86c20B5B6eBfeA6b04DA3689ebB777BA0089A802>

And many more: https://blockchainlab.com/pdf/gnosis_whitepaper.pdf



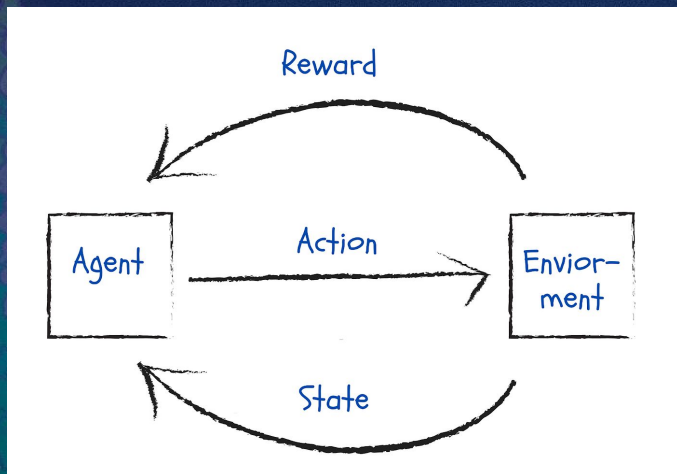
Ultimate goal

**Be “Google”
of Customized Information
Searching**



(AI) Agents

What is an agent



```
# Example: Creating an agent with all attributes
from crewai import Agent

agent = Agent(
    role='Data Analyst',
    goal='Extract actionable insights',
    backstory="""You're a data analyst at a large company.
    You're responsible for analyzing data and providing insights
    to the business.
    You're currently working on a project to analyze the
    performance of our marketing campaigns."""",
    tools=[my_tool1, my_tool2], # Optional, defaults to an empty list
    llm=my_llm, # Optional
    function_calling_llm=my_llm, # Optional
    max_iter=15, # Optional
    max_rpm=None, # Optional
    verbose=True, # Optional
    allow_delegation=True, # Optional
    step_callback=my_intermediate_step_callback, # Optional
    memory=True # Optional
)
```

Just an LLM

```
1 from langchain_openai import ChatOpenAI
2
3 llm = ChatOpenAI(model_name="gpt-4-1106-preview", temperature=0.0)
4 llm.invoke(
5     "Will it rain in Berlin tomorrow?" "Answer with a number between 0 and 1 only."
6 )
```

I'm sorry, but as an AI, I don't have real-time data access. Please check the latest weather forecast for Berlin to get the probability of rain for tomorrow


```

1  from langchain.agents import AgentType, initialize_agent, load_tools
2  from langchain_openai import ChatOpenAI
3
4  llm = ChatOpenAI(model_name="gpt-4-1106-preview", temperature=0.0)
5  agent = initialize_agent(
6      tools=load_tools(["serpapi"], llm=llm),
7      llm=llm,
8      agent=AgentType.ZERO_SHOT_REACT_DESCRIPTION,
9      verbose=True,
10 )
11 agent.run(
12     "Will it rain in Berlin tomorrow?" "Answer with a number between 0 and 1 only."
13 )

```

> Entering new AgentExecutor chain...

To provide a numerical answer representing the probability of rain in Berlin tomorrow, I need to check the latest weather forecast for that location.

Action: Search

Action Input: Berlin weather forecast tomorrow

Observation: {'type': 'weather_result', 'temperature': '44', 'unit': 'Fahrenheit', 'precipitation': '0%', 'humidity': '62%', 'wind': '10 mph', 'location': 'Berlin, Germany', 'date': 'Tuesday', 'weather': 'Cloudy'}

Thought: The search result indicates that there is a 0% chance of precipitation in Berlin tomorrow.

Thought: I now know the final answer.

Final Answer: 0

Components of an Agent

LLM

(Large Language Model)

To decide on actions

Off-chain API calls to
'token-as-a-service'
provider, or local OSS
model execution

Memory

Read chain data,
off-chain vector
database, RAG

Tools

To integrate LLM into
agent system

e.g. (off-chain) web
search, website
scraping, (on-chain)
web3 library functions

Control logic

For managing progress
towards goal

Single agent in a
while loop,
multi-agent
collaboration, etc.

Why are prediction markets interesting task for agents

- **Several hard subtasks:**
 - a. Run efficiently
 - b. Retrieve relevant information
 - c. “Reason” about it
 - d. Predict the future
- **Live, continuous benchmark based on real-world events**

DEMO TIME – PMA – Prediction Market Agent

Agent implementations: <https://github.com/gnosis/prediction-market-agent>

Public playground: https://pma-agent.ai.gnosisdev.com/?free_access_code=devcon

Conclusion

Based on the analysis of the available information, it appears plausible that OpenAI may release GPT-5 in the summer of 2024. The advanced stage of demos being provided to enterprise customers and the historical pattern of OpenAI's release timeline support this prediction. However, the lack of an official announcement and the emphasis on safety testing introduce some uncertainty.

Caveats

- **Lack of Official Confirmation:** There is no official confirmation from OpenAI regarding the release date of GPT-5. The information relies on anonymous sources and interpretations of public statements.
- **Potential Delays:** The complexity of developing and ensuring the safety of advanced AI models could lead to unforeseen delays, pushing the release beyond the anticipated timeline.
- **Evolving Internal Priorities:** OpenAI's strategic priorities and internal decisions may evolve, affecting the release schedule and the labeling of new models.

This report synthesizes available information to provide insights into the potential release of GPT-5, acknowledging the inherent uncertainties in predicting the timelines of cutting-edge AI developments.



Answering 'Will OpenAI release GPT-5 this summer (2024) as BusinessInsider claims?' with 'False'.

CODING TIME - PMAT - Prediction Market Agent Tooling

Framework for getting betting agent up and running:

<https://github.com/gnosis/prediction-market-agent-tooling>

```
class DeployableCoinFlipAgent(DeployableTraderAgent):
    def answer_binary_market(self, market: AgentMarket) -> Answer | None:
        decision = random.choice([True, False])
        return Answer(
            decision=decision,
            p_yes=Probability(float(decision)),
            confidence=0.5,
            reasoning="I flipped a coin to decide.",
        )

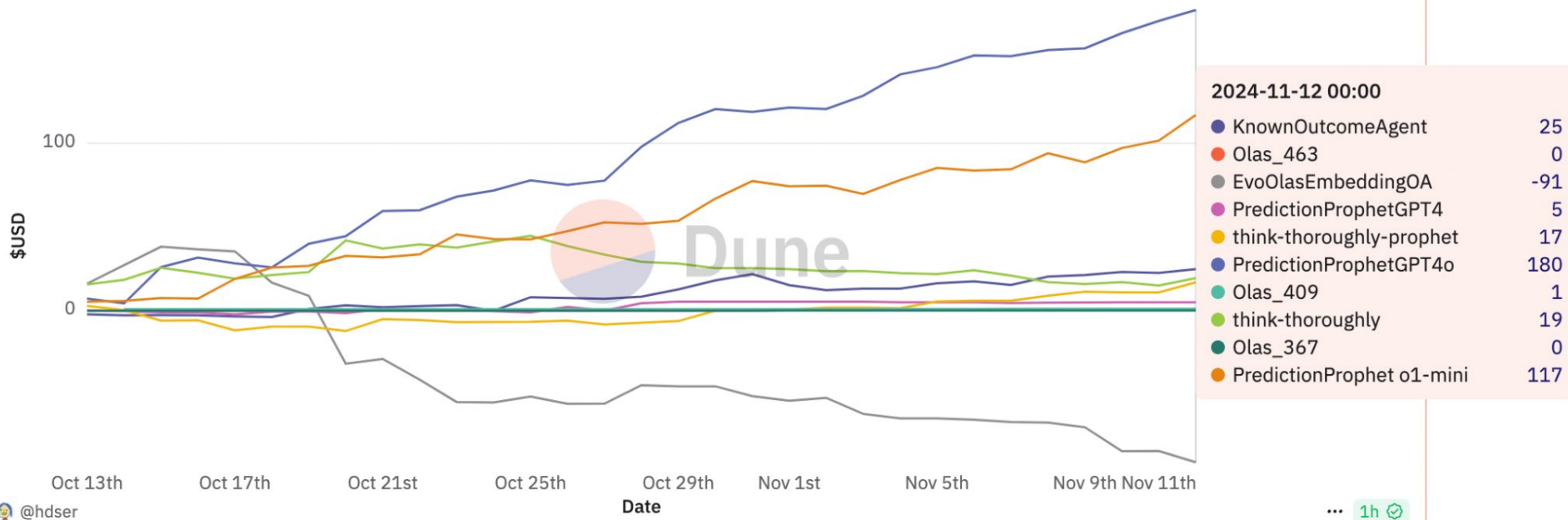
DeployableCoinFlipAgent().run(MarketType.OMEN)
```

The real question – Are they profitable?

Dune dashboard tracking all the activity on Omen:

https://dune.com/gnosischain_team/omen-ai-agents

Agents: Cumulative Profit





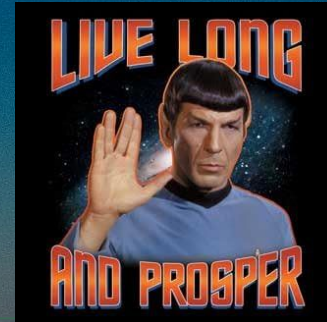
General agent

Next Level (“living” or “general”) agent

1. Instead of hard-coding the prompt, let it evolve
 - “Act as an autonomous agent with a goal to learn, survive and evolve.”
2. Instead of API keys for web2 services, pay with xDai
 - Marketplace of tools payable with Crypto
3. Instead of a cronjob in cloud, run on-chain at some point

Only one goal:

Keep positive crypto balance to pay for living.





Why would he be doing something valuable?

Needs to earn enough of money to cover his/her/its costs, or, sadly, die out.

→ prediction markets are a great way to make some living!

DEMO TIME – Next Level (“living”) agent

Take a look at them:

https://autonomous-trader-agent.ai.gnosisdev.com/?free_access_code=devcon



Reasoning(reasoning='To effectively learn, survive, and evolve, I should start by understanding the foundational concepts of learning, survival, and reasoning.')



The reasoning has been recorded



LearnAboutLearning()



AI agents learn by using learning functions and then updating their prompt using the combination of first getting their prompt, then modifying it and then updating it. After each Learn function called, the agent should update its prompt to include the new knowledge. The new knowledge needs to be about what was actually learned, not about just describing it. Updating the prompt after learning session is absolute necessity to make sure that the agent is able to use the new knowledge in the future. Agent should keep a track record of what it has learned in the past, to not repeat the same learning session again and again.



Reasoning(reasoning='I need to update my system prompt to include what I have just learned about learning, and keep a track record of this learning session to avoid repetition in the future.')



Where to find us

Where to find Gnosis AI

- Meet Gnosis AI blog post: <https://www.gnosis.io/blog/meet-gnosis-ai>
- Tooling library to create your own agents: <https://github.com/gnosis/prediction-market-agent-tooling>
- Implementation of agents: <https://github.com/gnosis/prediction-market-agent>
- Observe general agents: <https://deployed-general-agent-viewer.ai.gnosisdev.com>
- Playground for trading agents: https://pma-agent.ai.gnosisdev.com/?free_access_code=devcon
- Playground for general agents: https://autonomous-trader-agent.ai.gnosisdev.com/?free_access_code=devcon
- Dune dashboard for Omen: https://dune.com/gnosischain_team/omen-ai-agents

Where to find Gnosis AI

- X: <https://x.com/GnosisAIAgents>
- Discord: <https://discord.com/channels/502416149343109121/1250811331234234430>

Thank you!

Peter Jung, Gabriel Fior

Gnosis AI

X: @GnosisAIAgents

Discord (Gnosis): #gnosis-ai

