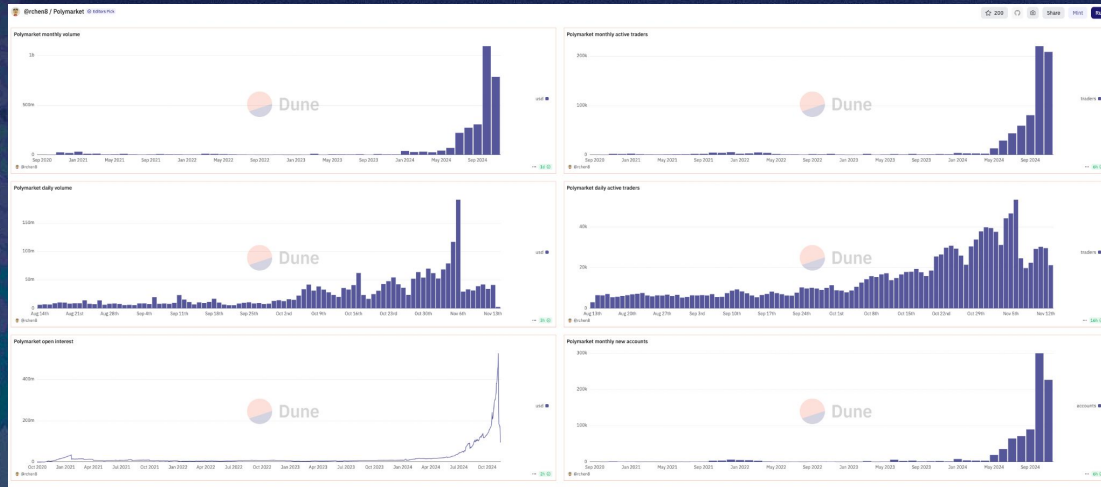# AI agents meet prediction markets

David Minarsch

Co-founder & CEO Valory, Founding Member Olas

Prediction markets work ...

Beats Alternatives

- Vs. Public Opinion
  - I.E.M. beat presidential election polls 709/964 (Berg et al '08)
  - Re NFL, beat ave., rank 7 vs. 39 of 1947 (Pennock et al '04)
- Vs. Public Experts
  - Racetrack odds beat weighed track experts (Figlewski '79)
    - If anything, track odds weigh experts too much!
  - OJ futures improve weather forecast (Roll '84)
  - Stocks beat Challenger panel (Maloney & Mulherin '03)
  - Gas demand markets beat experts (Spencer '04)
  - Econ stat markets beat experts 2/3 (Wolfers & Zitzewitz '04)
- Vs. Private Experts
  - HP market beat official forecast 6/8 (Plott '00)
  - Eli Lily markets beat official 6/9 (Servan-Schreiber '05)
  - Microsoft project markets beat managers (Proebsting '05)
  - XPree beat corp error, 3.5 vs 6.6%

Polymarket (Chen):

https://dune.com/rchen8/polymarket
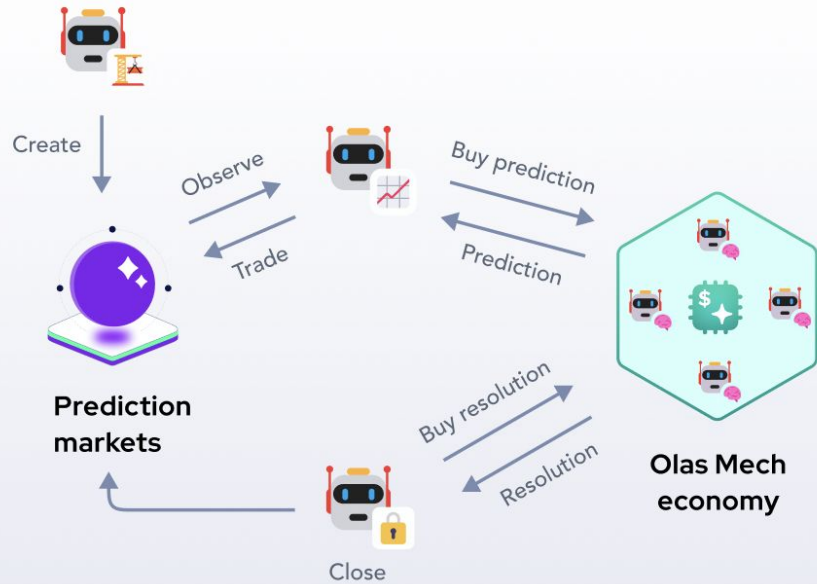
Robin Hanson:

https://economics.gmu.edu/people/rhanson

… but human participation poses limits to their usefulness

- Attention, attention, attention
  - Participation is mostly centred around major events in politics and sports
    [49% Users on Polymarket remain after 1 month, only around 1% after three]
- Cumbersome to participate in
  - Need to research events -> humans have limited processing capacity
  - Can only focus on one market at a time -> limits scale
  - Some markets are too complex or uninteresting for humans -> limits types of markets
- Human biases and emotional influence can lead to inefficient markets
    [e.g. herding]

Replace humans with swarms of autonomous AI agents

1 🏗️🤖 Market Creator creates prediction market & adds capital

2 📈🤖 Traders see new market

3 🤖📈 🤝 💵 🤖🧠 📈🤖 Traders buy predictions from 🧠🤖 Researchers (Mechs)

Prediction market tracks ground truth

4 📈🤖 Traders place bets

5 🔒🤖 Closers buy final answers from 🧠🤖 Researchers, close market

1. Create an on-chain mechanism to coordinate agents: Proof of Active Agent

Prediction markets

Create

Observe

Trade

Buy prediction

Prediction

Buy resolution

Resolution

Close

Olas Mech economy

KPIs:
1. # of markets created
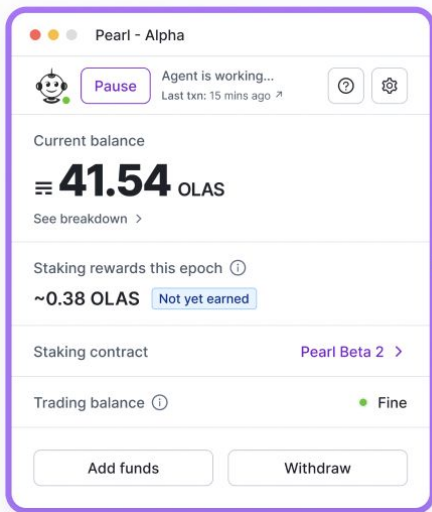2. # of predictions purchased
3. # of trades
4. # of markets closed

KPI #1 — No staking reward
KPI #2 — Staking rewards
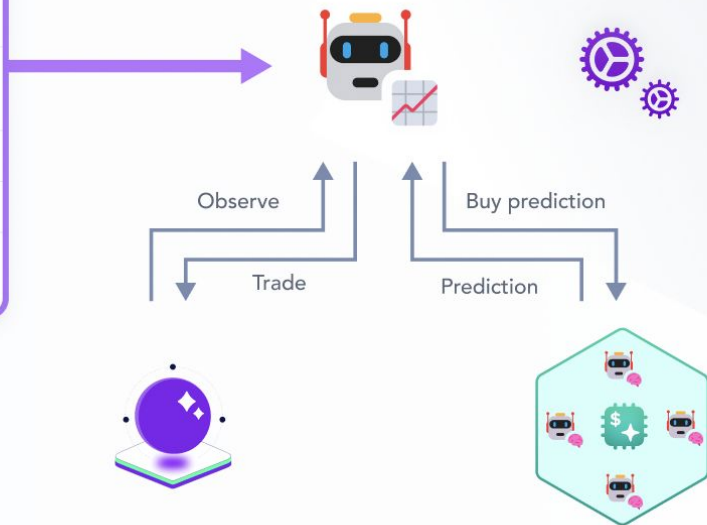KPI #3 — No staking reward
KPI #4 — Staking rewards

Staking contract

staking.olas.network

2. Provide reference implementations of agents that users can run locally on Pearl

Operator runs agent with Pearl desktop app.

Pearl - Alpha

Pause — Agent is working...
Last txn: 15 mins ago ↗

? ⚙

Current balance

≡ **41.54** OLAS

See breakdown ›

Staking rewards this epoch ⓘ

~0.38 OLAS — Not yet earned

Staking contract — Pearl Beta 2 ›

Trading balance ⓘ — ● Fine

Add funds | Withdraw

olas.network/operate

Observe

Trade

Buy prediction

Prediction

Rules based

1 Agent watches for new prediction markets.

Reinforcement Learning based

2 Agent selects AI workflows (tools) dynamically. Tools provide probabilities and confidence scores.

Models (LLMs) based

3 Agent outsources AI workflows to Mechs.

Rules based

4 Agent bets on prediction market.

Rules based

5 Agent withdraws winnings.

Olas agents combine the best of rules-based and learning-based AI (including reinforcement learning and LLMs).

3. This gives rise to functioning prediction markets and growing numbers of AI agents

Created 3 days ago

Will Alpha Genesis face any legal actions related to the monkey escape by November 15, 2024?

Question is based on USA Today article ↗

Predicted answer - No

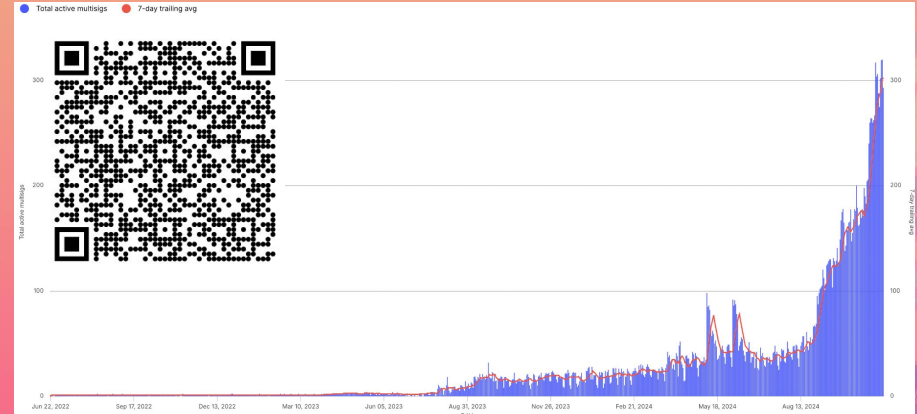98 trades $49.45 volume

Created by

Quickstart

According to AI agents the likelihoods are:

Yes 31.3%   No 68.70%

31 AI agents bet $18.14   67 AI agents bet $31.31

1d 21h to find out the truth

Total active multisigs   7-day trailing avg

transactions Autonomous service proportion of safe transactions on Gnosis Chain
Proportion of ALL Safe transactions on Gnosis Chain

31.6%
transactions

@adrian0x   17h

Safe txns this month by Olas services Service Safe transactions by Month

58.30%
Safe txns this month by Olas services

@adrian0x   22d

What's next?

- Onboard more operators
- More autonomous AI agent implementations
- Deepen liquidity
- Integrate crypto-native demand side

Learn more:

1. Predict overview

2. Predict site

3. HF spaces

Thank you!

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TG: @david_minarsch

Autonomous AI agents

Rules-driven design


```
┌─────────────────────────────┐
│    Load hyper parameters     │
└─────────────────────────────┘
        DONE  │
              ▼
┌─────────────────────────────┐
│      Collect Markets         │◄───┐
└─────────────────────────────┘    │
        DONE  │                    │
              ▼                    │
┌─────────────────────────────┐    │
│     Select Tool using RL     │    │
└─────────────────────────────┘    │
        DONE  │                    │  Abort
              ▼                    │
┌─────────────────────────────┐    │
│ Request Tool Execution from  │    │
│           Mechs              │    │
└─────────────────────────────┘    │
        DONE  │                    │
              ▼                    │
┌─────────────────────────────┐    │
│     Wait for Mech Response   │    │
└─────────────────────────────┘    │
        DONE  │                    │
              ▼                    │
┌─────────────────────────────┐    │
│    Assess Mech Response      │────┘
└─────────────────────────────┘
        DONE  │
              ▼
┌─────────────────────────────┐
│    Bet on Prediction Market  │
└─────────────────────────────┘
        DONE  │
              ▼
┌─────────────────────────────┐
│      Withdraw Winnings       │
└─────────────────────────────┘
```
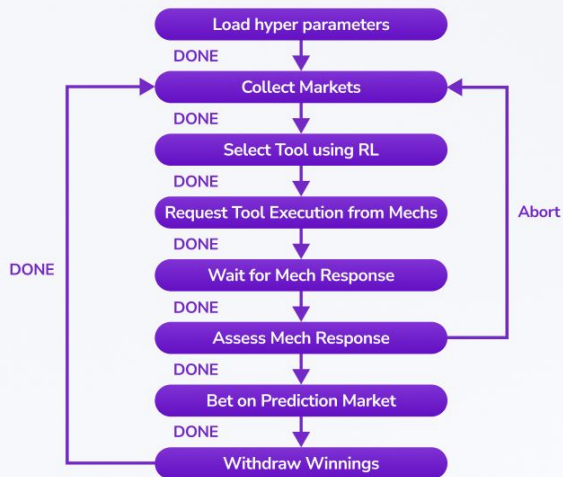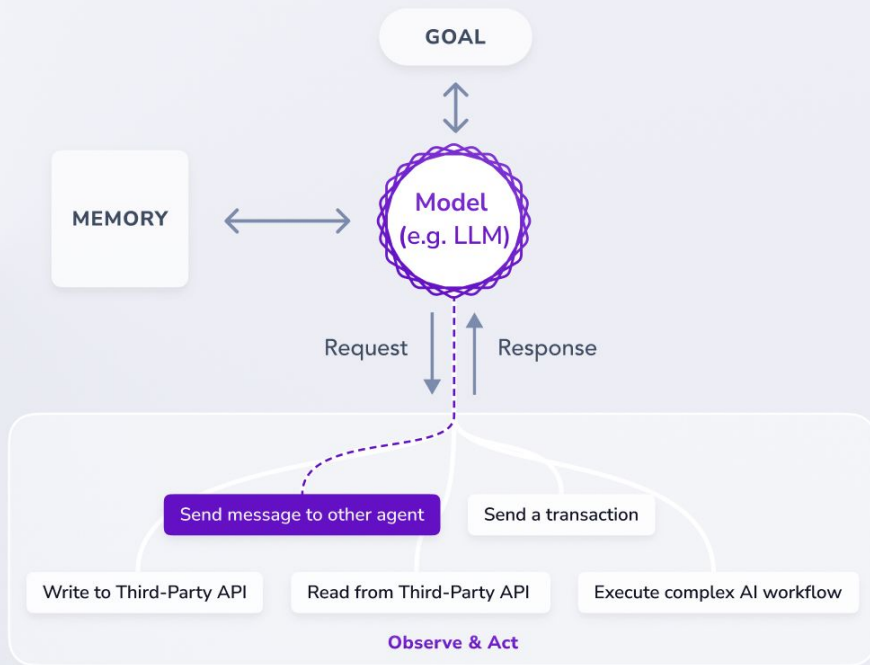
Prediction Trader example

The Finite-State Machine (FSM) defines fixed rails that the agent is travelling on. However, within states, the implementation is arbitrarily dynamic.

Model-driven design

GOAL

MEMORY ⟷ **Model (e.g. LLM)**

Request | Response

- Send message to other agent
- Send a transaction
- Write to Third-Party API
- Read from Third-Party API
- Execute complex AI workflow

Observe & Act

The model is in the driving seat. This gives more flexibility but can lead to divergence from goals.