# Authenticated and stable agentic communications

Autonomous agents…controllers, bots, and AI agents…
will dominate internet traffic and operation of other infrastructure

Prof. Alex Pentland, MIT and Stanford

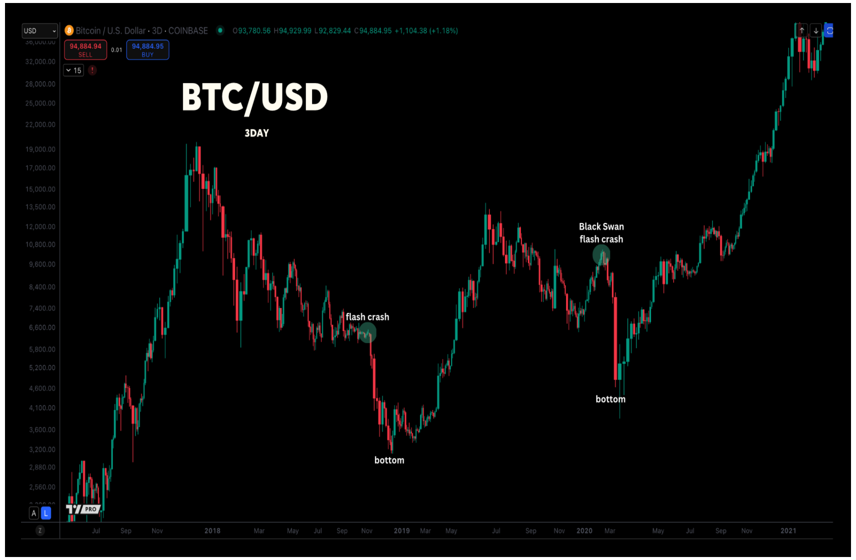
# Example: Autonomous algorithms in trading

- AI Agents making complex, high-speed trades
- AI on distributed ledgers (blockchain): Swift, BRICS, Stablecoins
- Tokenization and other novel financial instruments will extend this algorithmic trading to all asset classes

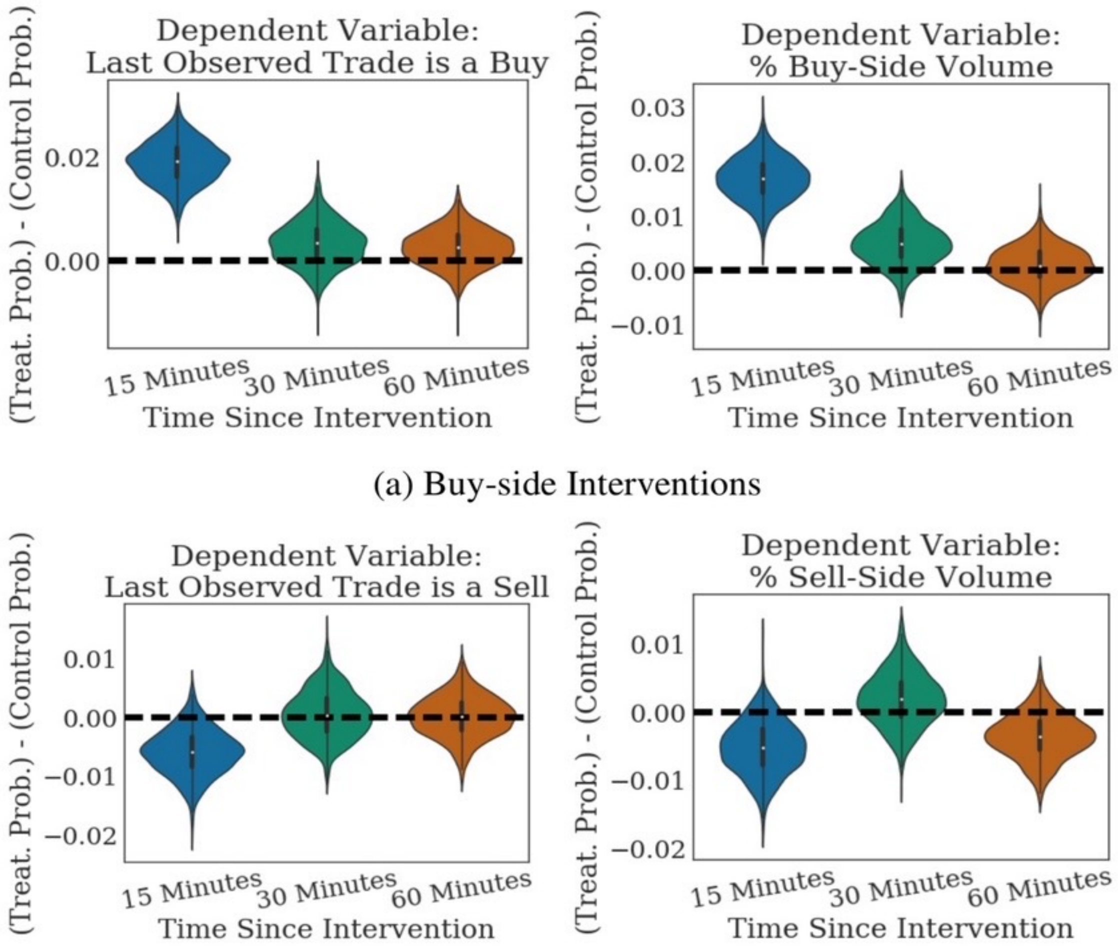
# Existing agentic examples are worrisome:

- Phantom traffic jams

- Financial flash crashes



# High-speed, algorithmic crypto traders drive instability and prices

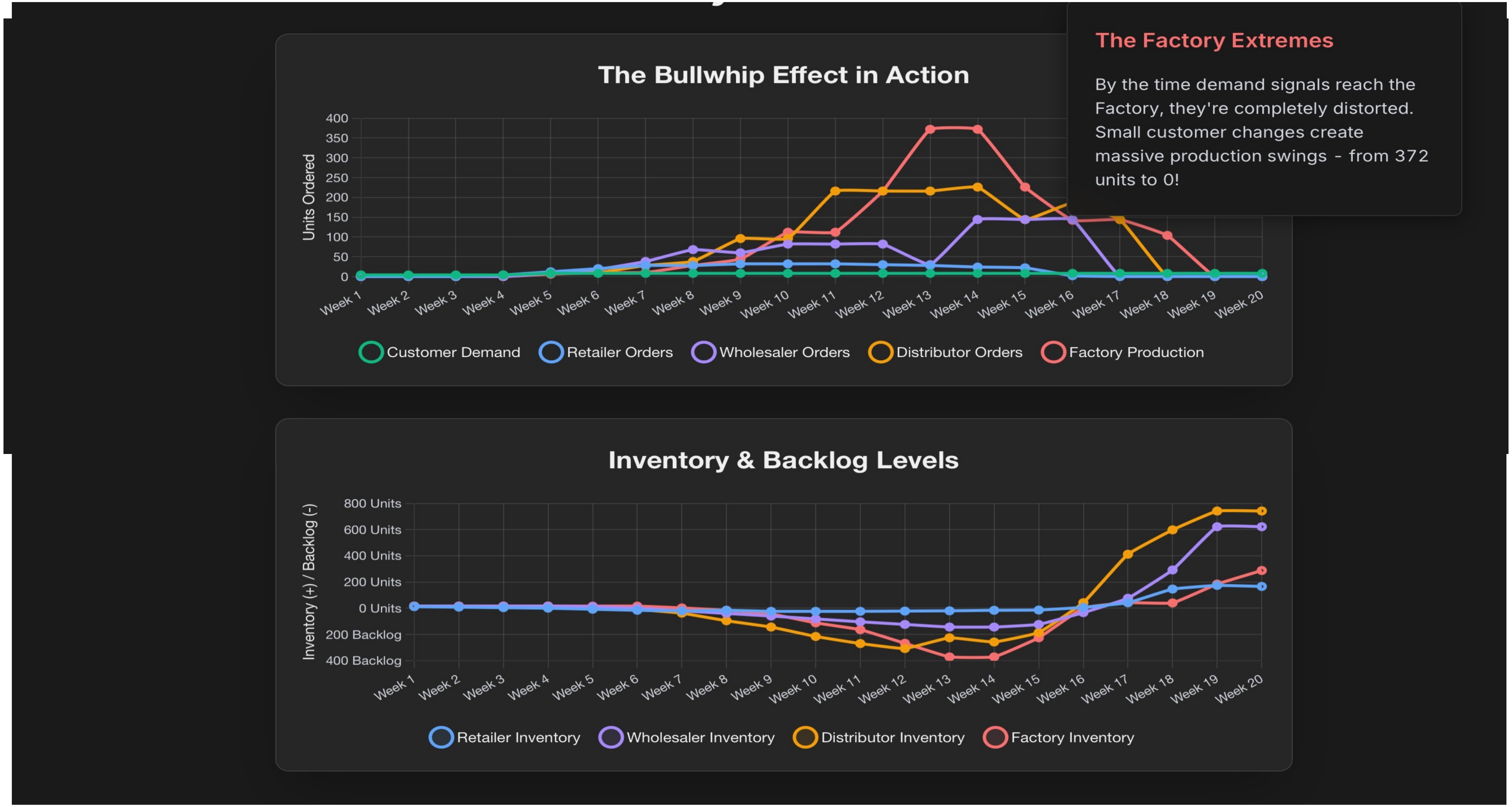


(a) Buy-side Interventions

(b) Sell-side Interventions

CryptoMEV Bot

# Even simple networks of autonomous agents exhibit serious problems



### The Factory Extremes

By the time demand signals reach the Factory, they're completely distorted. Small customer changes create massive production swings - from 372 units to 0!

# And now, autonomous agents in every business process...e.g., Salesforce AgentForce, and SWIFT

User AI agents will **handle complex, laborious tasks**

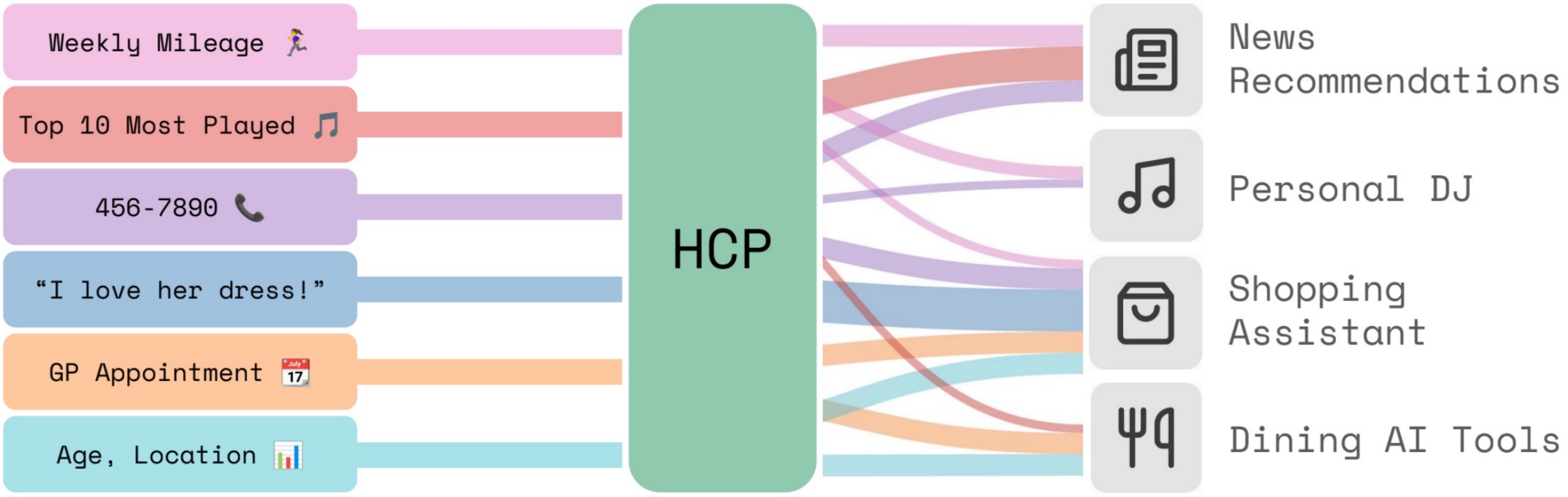
Data flows through interfaces **controlled by user agents**,

Companies are developing **agent APIs to directly connect to user agents**,

*h/t Jeremiah Ouyang*

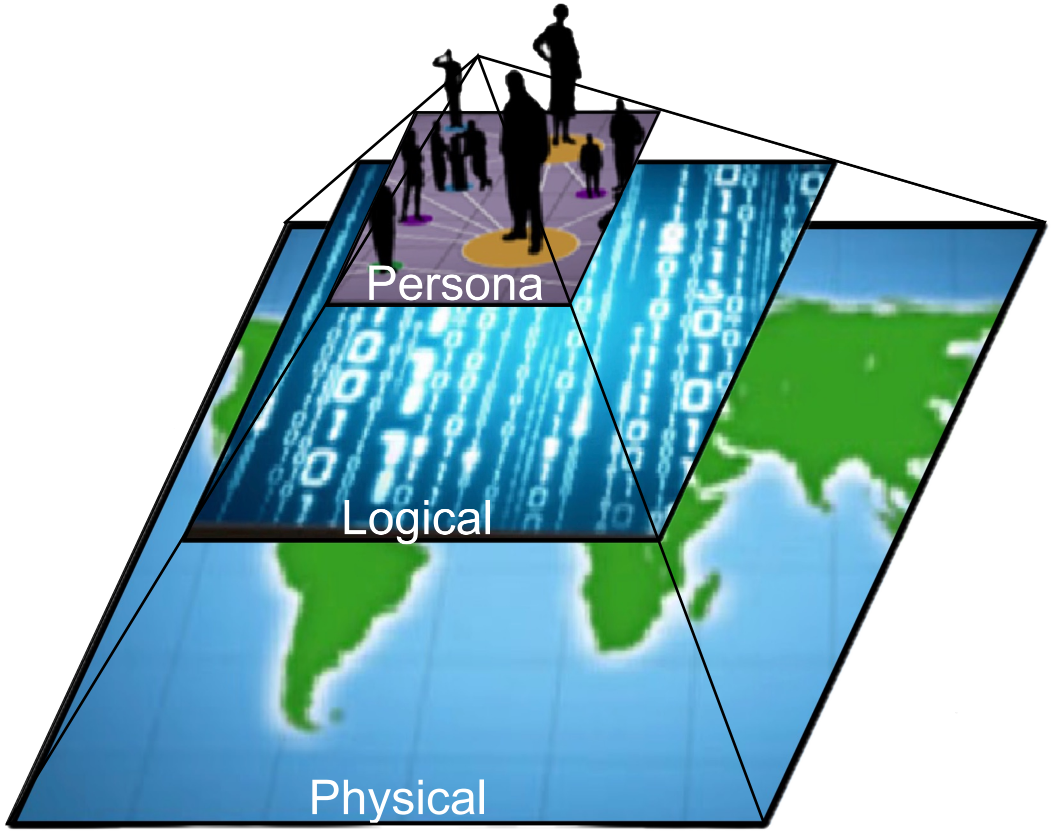
# How can we insure a safe infrastructure?

# Possible Technical “fixes”
# Messaging with specification of authenticated actions

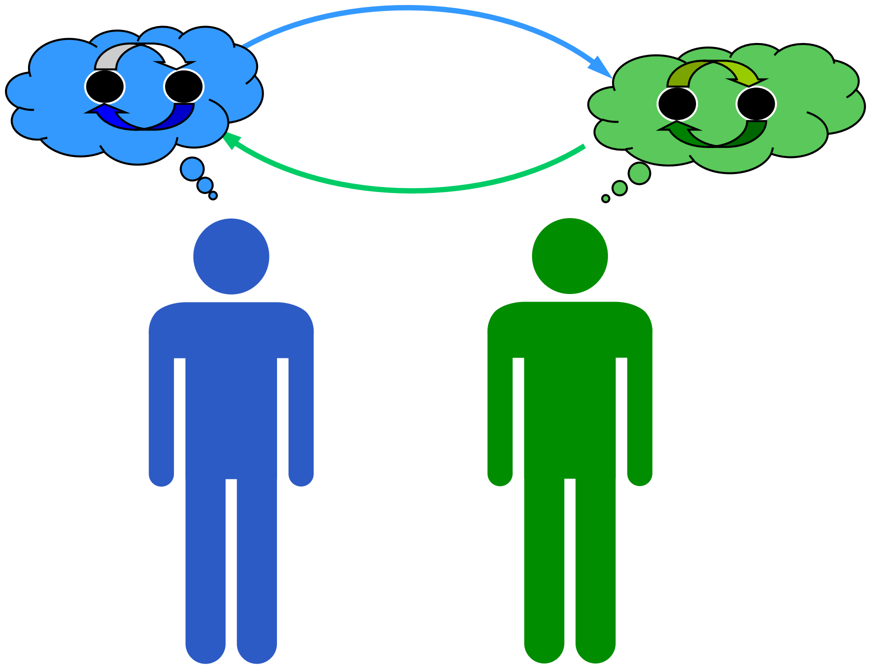


For example, specification of both recipient *and* response recipients

# Potential "fix"
# Identify unexpected coordination



# Unexpected Coordination Generates Unlikely Statistics

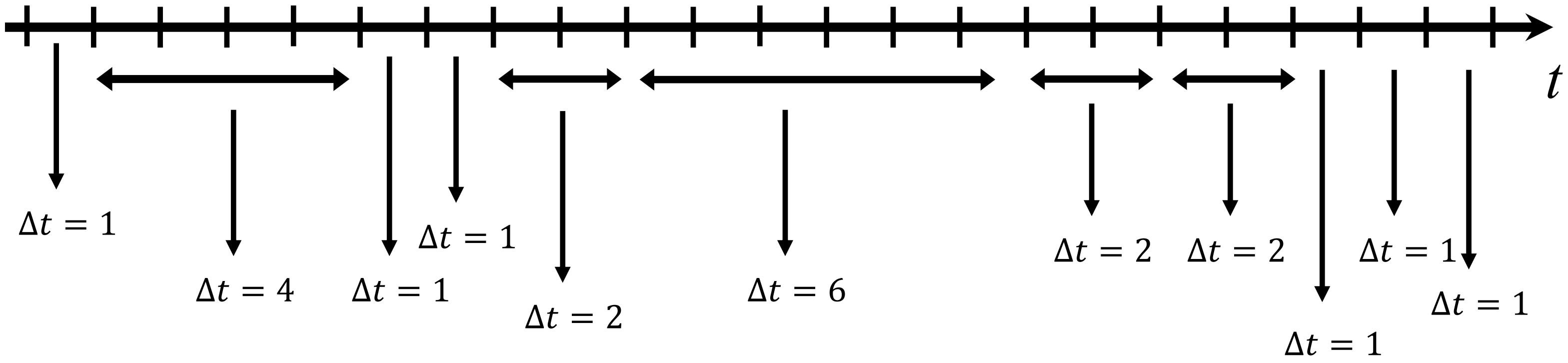


**Modeling Dynamical Influence in Human Interaction IEEE Signal Proc.**

$$\mathrm{Prob}(h_t^{(c')}|h_{t-1}^{(1)},\ldots,h_{t-1}^{(C)}) = \sum_{c\in\{1,\ldots,C\}} \underbrace{\mathbf{R}_{c',c}}_{\text{tie strength}} \times \underbrace{\mathrm{Prob}(h_t^{(c')}|h_{t-1}^{(c)})}_{\text{cond. probability}}$$

# Real-time detection

The time difference between an individual’s consecutive activities.

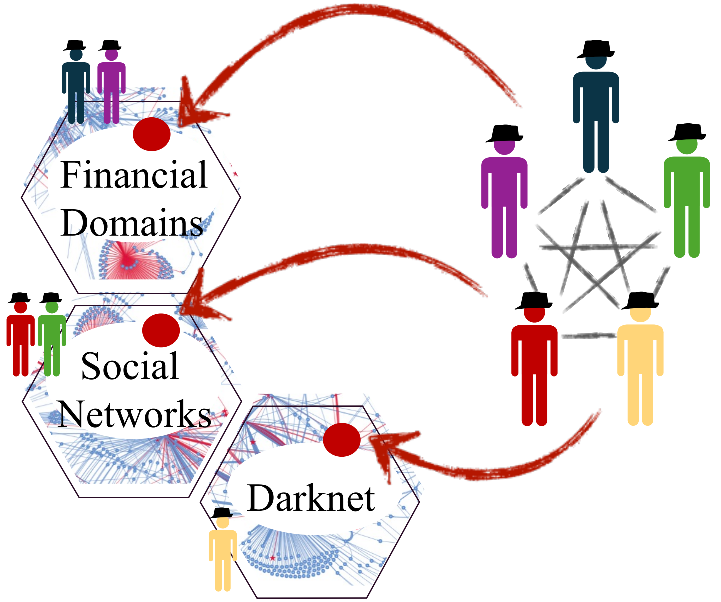


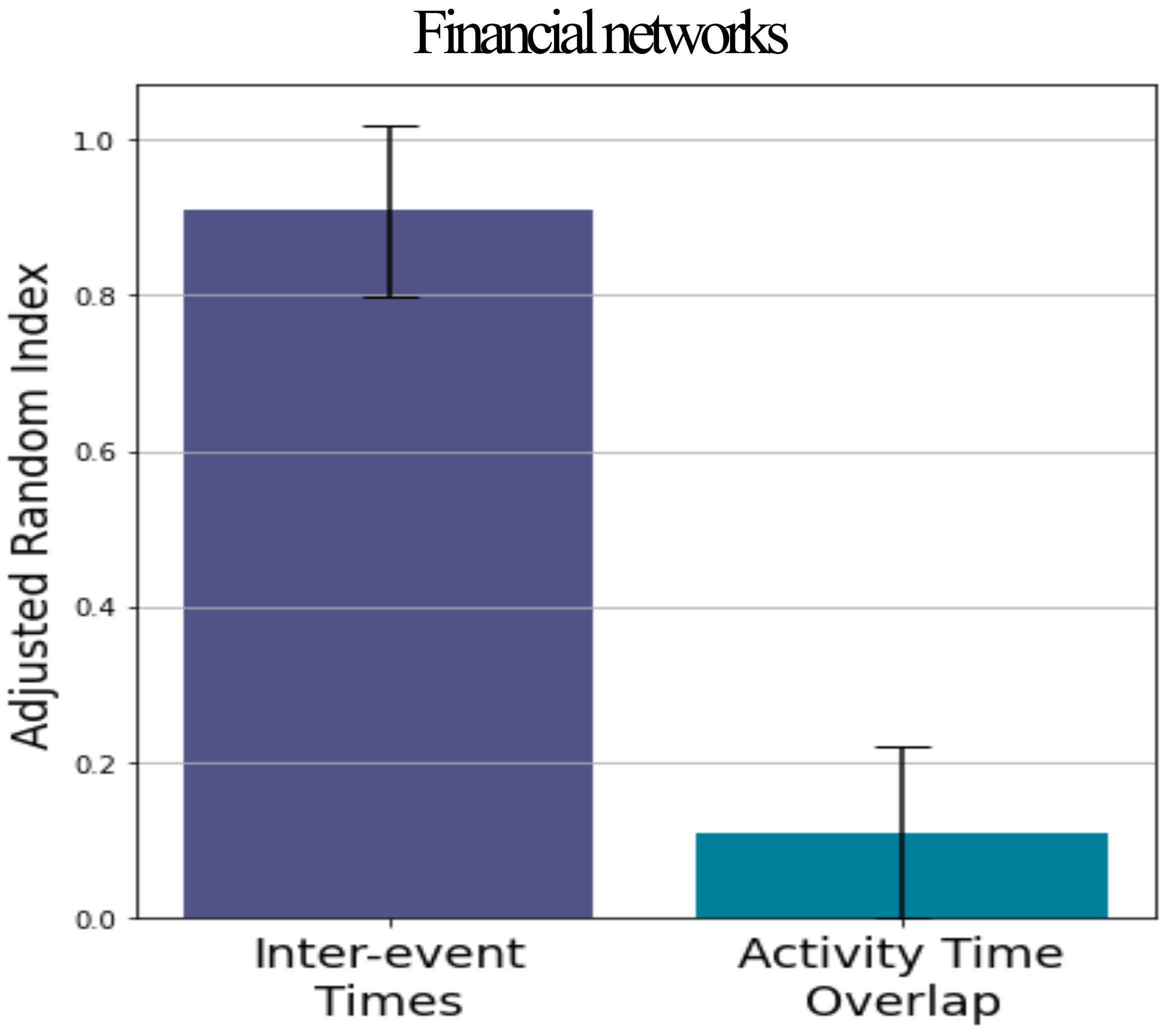
$$v_{\Delta t} = (1,1,1,1,1,1,2,2,2,4,6)$$

# Only need origin-destination matrix with time stamps

# Coordinated Activity Detection even within fully encrypted domains!

Community detection across encrypted domains




Financial networks

**Echos of Hidden, Somin, Pentland arxiv.org/abs/2504.02757**

1. Data:
   - Millions of Raw Twitter Tweets
   - A list of 50 known ISIS Twitter accounts given as “sample”
   - Additional 74 known ISIS accounts, kept hidden as test

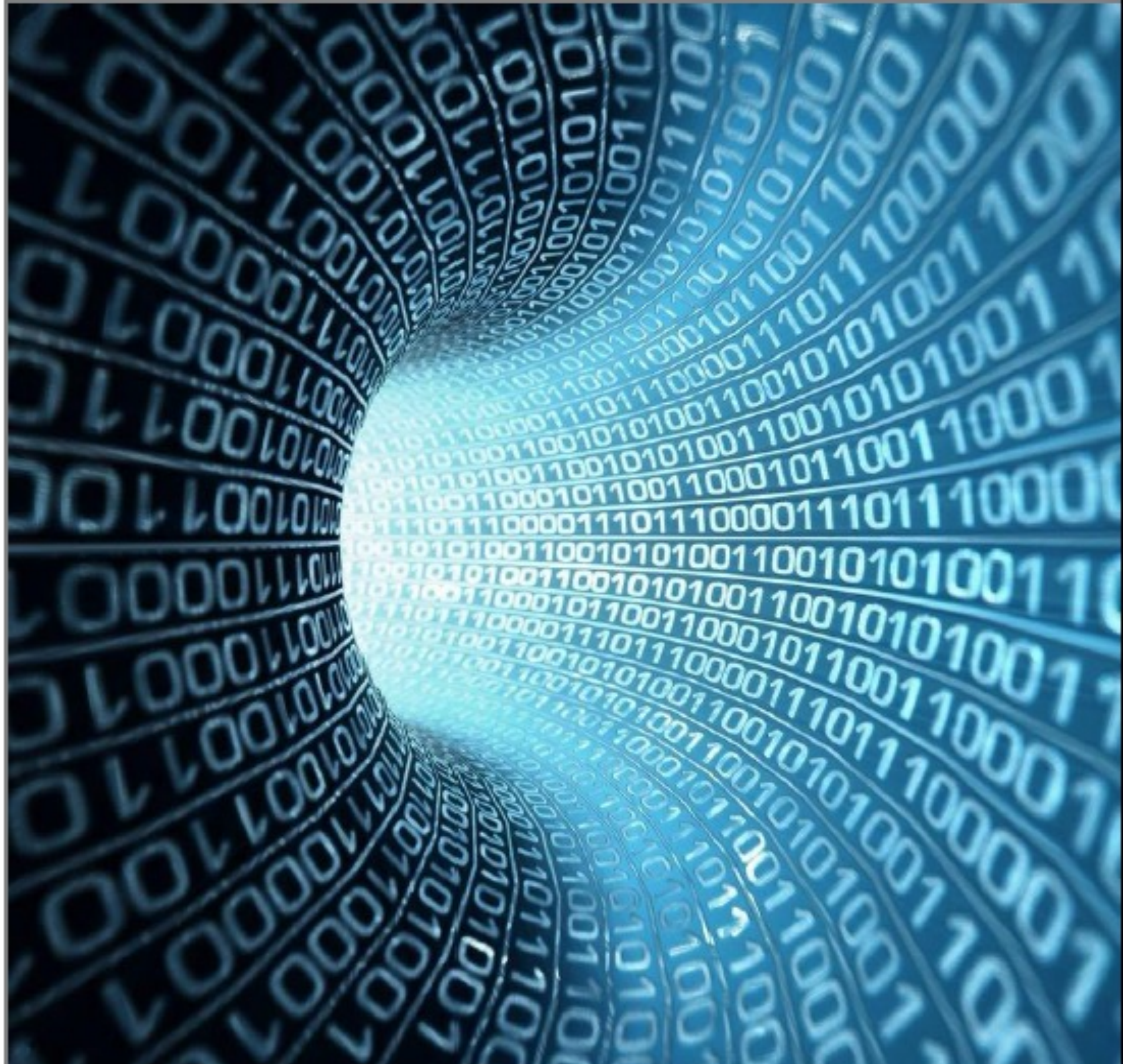
2. Output:
   - A list of “top 200 accounts most likely to be ISIS members”
   - Runtime: 2 hours

3. Accuracy:

- 35 new ISIS accounts in top-50

- 51 new ISIS accounts in top-100

- 72 new ISIS accounts in top-200



# Summary:

- High-speed, autonomous agents pose a real threat to internet and infrstructure stability.

- Simple internet protocol changes could substantially limit the damage.