Future of Decentralization, AI, and Computing Summit: Cooperative AI with Decentralized Trust

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The views expressed in this presentation are those of the author and not those of affiliated organizations.

Why is cooperative AI research important?

- Most AI research and development so far have focused on a single-agent setting or adversarial setting in multi-agent context (e.g. zero-sum games)
- Cooperation is often needed to achieve pareto optimal in games, e.g. prisoner's dilemma

	Cooperate	Defect
Cooperate	2, 2	-1, 3
Defect	3, -1	0, 0

- Real-world examples of AI:
  - self-driving cars interacting with other autonomous or human drivers
  - algo pricing models reacting to other merchants' pricing
  - trading bots that generate pecuniary externalities, e.g. flash crashes and liquidation cycles

What are the main challenges to cooperative AI?

- Cooperative AIs face typical challenges in contract theory:
  - **Information asymmetry** in the form of *adverse selection* (hidden information) and *moral hazard* (hidden action)
  - **Incomplete contracting** (not all states of the world are knowable in advance)

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  - Tacit knowledge and understanding of norms
  - Communication and commitment device
  - Recall of history in repeated games

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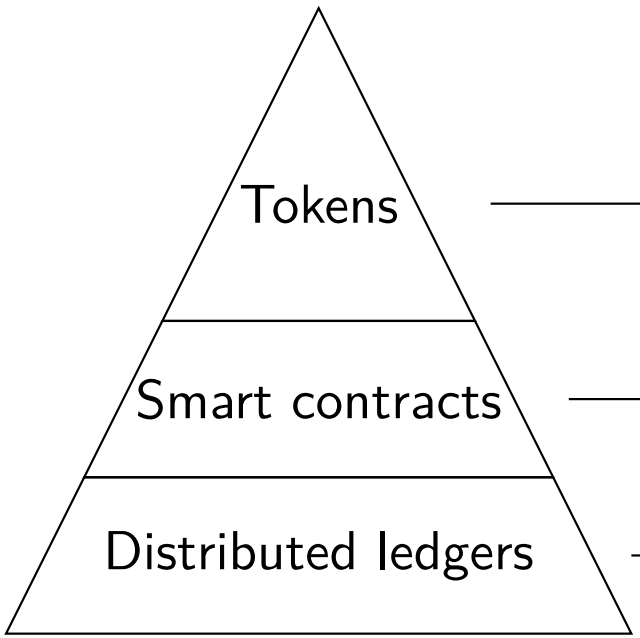
- The "human touch" learned in model training might be problematic
  - Turing experiments with GPT models on games such as ultimatum game, Milgram shock experiment have produced outcomes that resemble human tendencies [1]

How can decentralization aid cooperative AI development?

Decentralization of data, contracting, and finance can address key informational frictions for cooperative AI



→ align incentives on uncertain, contingent payoffs

→ programmed for signaling and commitments

→ reduce information asymmetry among agents

Centralization in cooperative AI can pose serious downsides

- Centralization in AIs can lead to too much information sharing and excessive cooperation in a societally harmful way — e.g. price collusion [2]
- Bias and exclusion are harder to correct with too much centralization in AI models
- Excessive coercive behavior can arise with too much centralization- e.g. gang up on new entrants

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