

L'IA générative multi-agents: conséquences en économie

Journée IA Générative à l'Université Paris-Saclay
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Objectif/plan de la présentation

Montrer que l'IA générative a un statut particulier pour les économistes (et les chercheurs en SHS):

- I. **L'IA générative: un nouvel OUTIL pour les chercheurs en économie...**
 - II. **... qui devient un « AGENT »...**
 - III. **...puis un « MULTI-AGENTS »...**
- IV. **...et finalement un OBJET de recherche scientifique pour les SHS.**

I. L'IA générative comme OUTIL

Handa et al., (2025)., **Which Economic Tasks are Performed with AI? Evidence from Millions of Claude Conversations**, arXiv:2503.04761

Korinek (2024)., **LLMs Learn to Collaborate and Reason: December 2024 Update to 'Generative AI for Economic Research: Use Cases and Implications for Economists,'** *Journal of Economic Literature*.

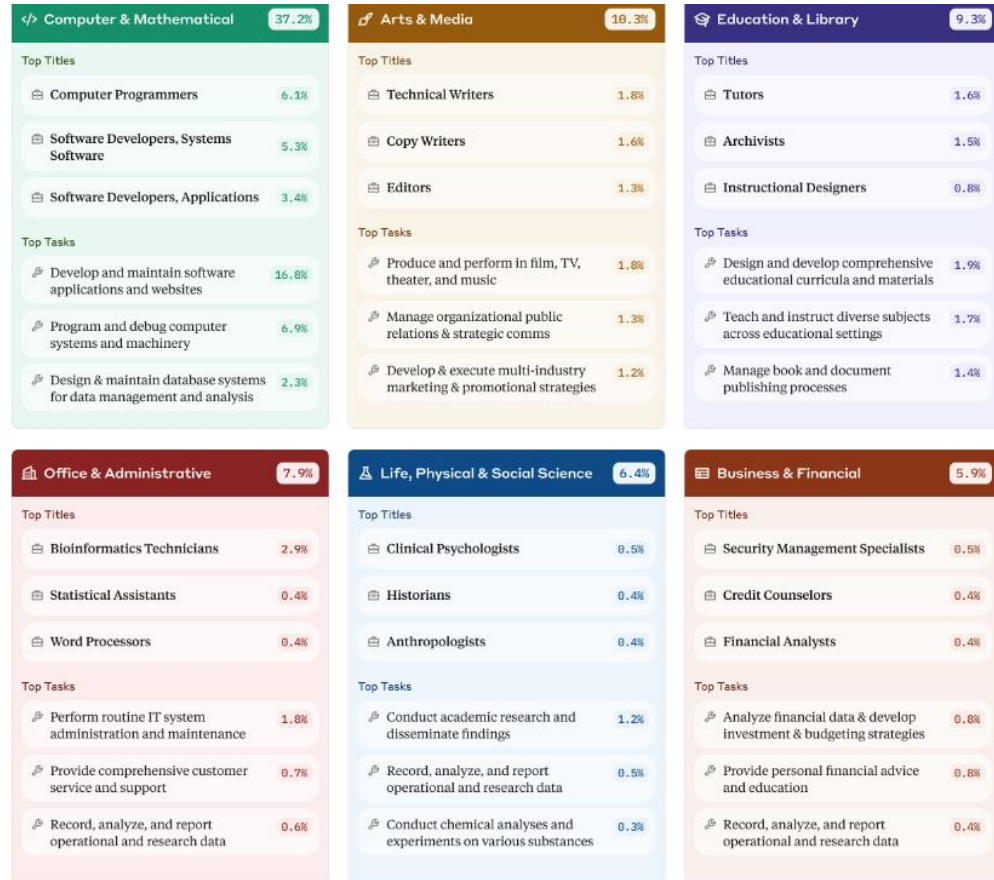


Figure 2: Hierarchical breakdown of top six occupational categories by the amount of AI usage in their associated tasks. Each occupational category contains the individual O*NET occupations and tasks with the highest levels of appearance in Claude.ai interactions.

TABLE 4
SUMMARY OF LLM CAPABILITIES AND RATING OF USEFULNESS

Category	Task	Usefulness
Ideation & feedback	Brainstorming	●
	Feedback	○
	Providing counterarguments	○
Writing	Synthesizing text	●
	Editing text	●
	Evaluating text	●
	Converting hand-written equations ^{24/6}	●+
	Generating titles & headlines	●
Background research	Summarization	●
	Condensing YouTube videos ^{24/6}	●+
	Literature research	○+
	LLM-powered search ^{24/6}	○
	Formatting references	○
	Translating text	●
	Explaining concepts	○
Coding	Writing code	●+
	Explaining code	●+
	Translating code	●
	Debugging code	●+
Data analysis	Locating data sources ^{24/6}	○
	Creating figures	○
	Extracting data from text	●
	Reformatting data	●
	Classifying and scoring text	●+
	Extracting sentiment	●+
Math	Simulating human subjects	○
	Setting up models	○
	Deriving equations	○+
Research promotion	Explaining models	○
	Social media posts	●
	Presentation slides ^{24/11}	●
	Blog posts ^{24/11}	●
	Conducting interviews ^{24/11}	●
Podcasts ^{24/11}	●	

Notes: The third column reports my subjective rating of LLM capabilities as of November 2024:
 ○: experimental; results are inconsistent and require significant human oversight
 ○: useful; requires oversight but will likely save you time
 ●: highly useful; incorporating this into your workflow will save you time
 Superscripts 24/6 or 24/11 in 2nd row represents year and month of new inclusions
 Superscripts in last row denote upgraded ratings in 2024/06(*) and 2024/11(+).

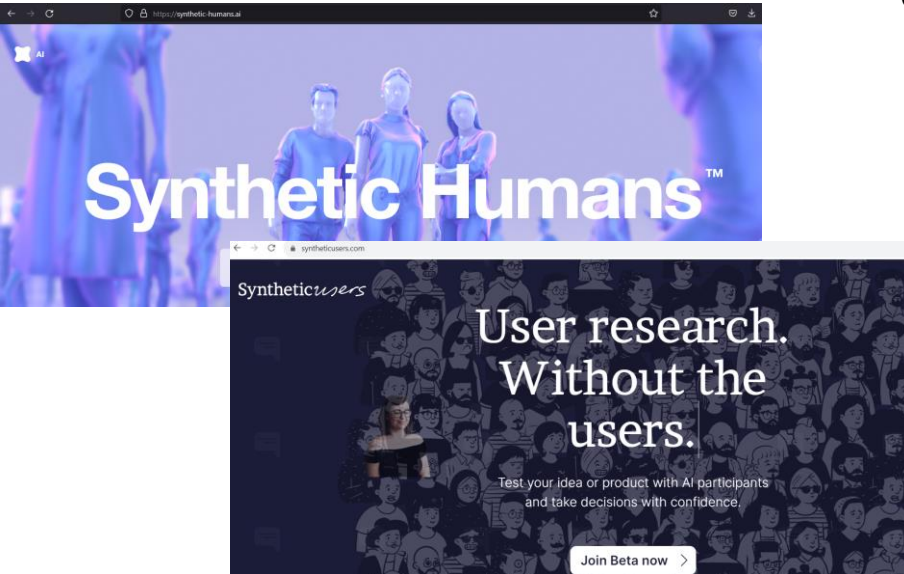
II. L'IA générative comme AGENT (synthétique)

Un OUTIL qui fondamentalement est un « AGENT »...

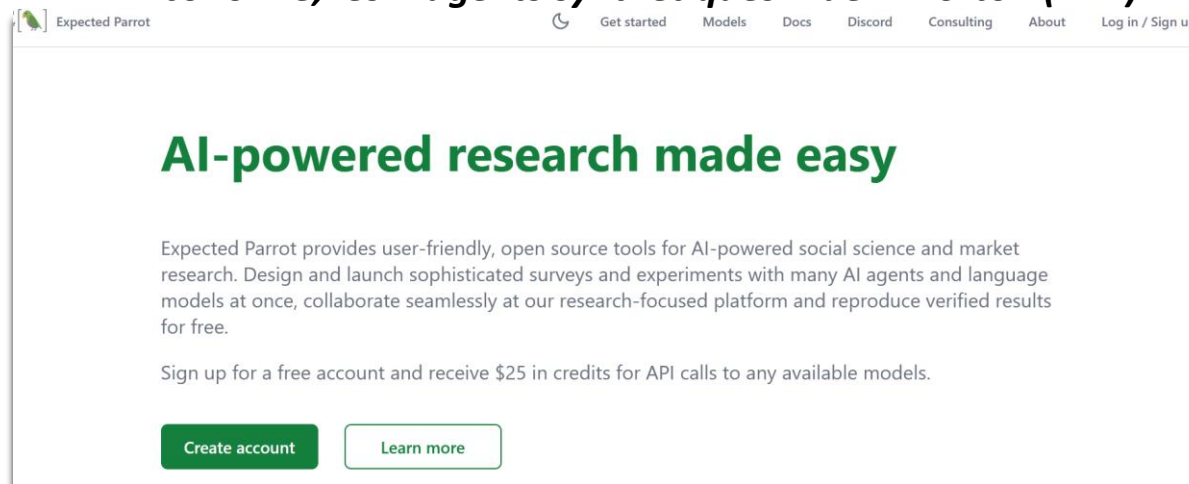
- Les nouveaux modèles de langage de grande envergure (LLMs), en raison de leur mode d'entraînement et de leur conception, sont **des modèles computationnels implicites des êtres humains**; un « *homo silicus* » (Horton, 2023),

... et progressivement monte en compétences :

- Une concurrence forte avec de nombreuses innovations (OpenAI, Google Deep Mind, xAI, Anthropic, Meta, Alibaba, Mistral, Kyutai, etc...),
- des IA génératives multimodales,
- imitant les modes de raisonnement humains : Chain-of-Thought Prompting,
- capables de s'appuyer sur des sources externes (web, bases de données Retrieval Augmented Generation (RAG), accès API,...)



En Economie, les « agents synthétiques » de J. Horton (MIT)



III. Une société d'IA génératives (« Multi-agent LLMs »)

Generative Agents: Interactive Simulacra of Human Behavior

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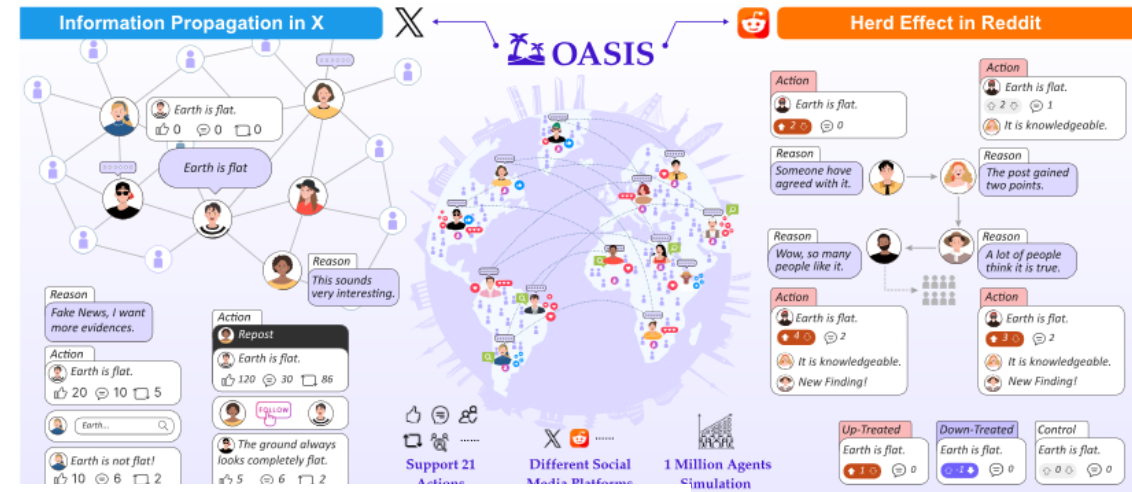
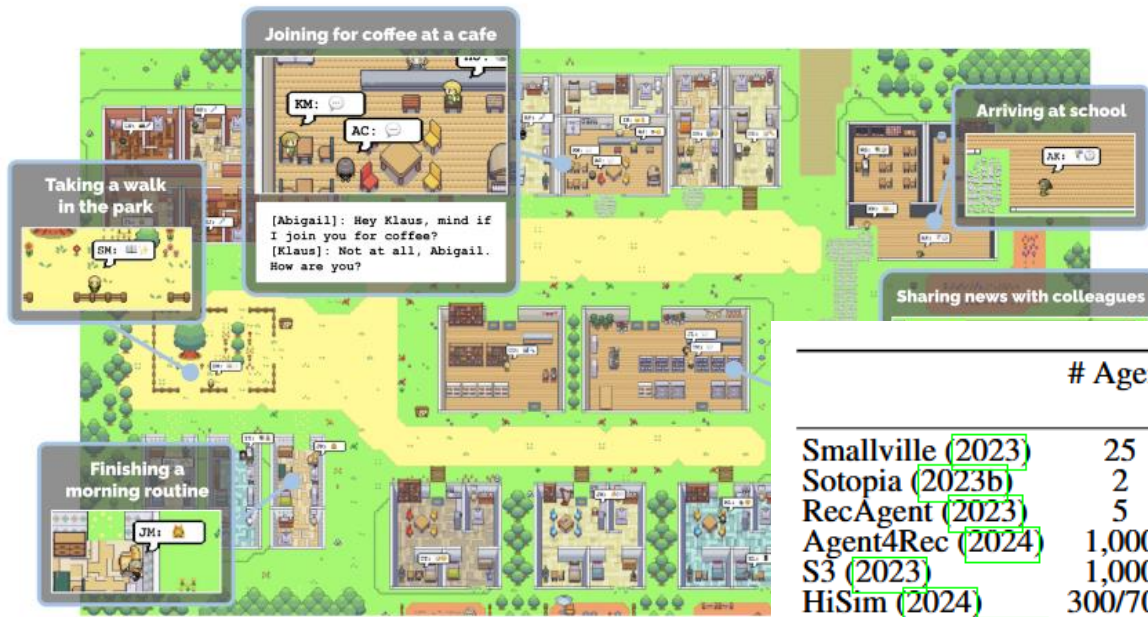
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2024: 'OASIS'



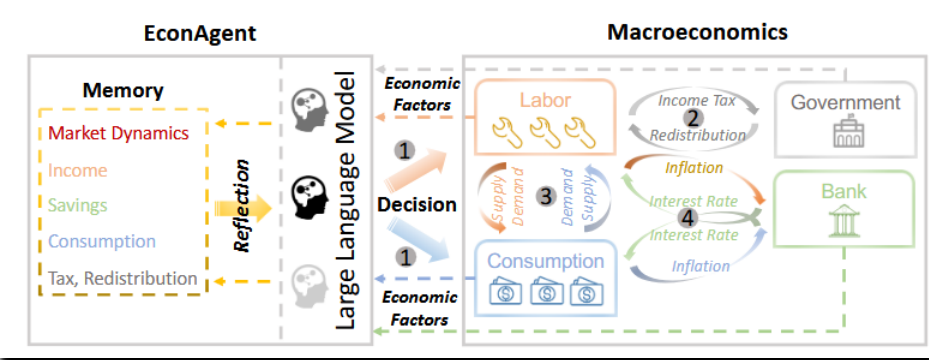
	# Agent	Env.	Action Space	Recsys.	Dynamic Network	Primary LLM Used
Smallville (2023)	25	Town	-	×	×	OpenAI API
Sotopia (2023b)	2	-	-	×	×	OpenAI API
RecAgent (2023)	5	-	6	✓	×	OpenAI API
Agent4Rec (2024)	1,000	Movie Rec.	5	✓	×	OpenAI API
S3 (2023)	1,000	X	4	×	×	OpenAI API
HiSim (2024)	300/700	X	5	×	×	OpenAI API
AgentTorch (2024)	8.4M*	-	-	×	✓	OpenAI API
AgentScope (2024)	1M	-	-	×	×	Open-source
OASIS (Ours)	1M	X & Reddit	21	✓	✓	Open-source

ms, such as X and Reddit, and supports

Des plateformes multi-agents de simulations dédiées (à des disciplines SHS)

Economie

EconAgent: Large Language Model-Empowered Agents for Simulating Macroeconomic Activities



Sociologie, Science politique, Psychologie sociale, Histoire

AgentSociety: Large-Scale Simulation of LLM-Driven Generative Agents Advances Understanding of Human Behaviors and Society

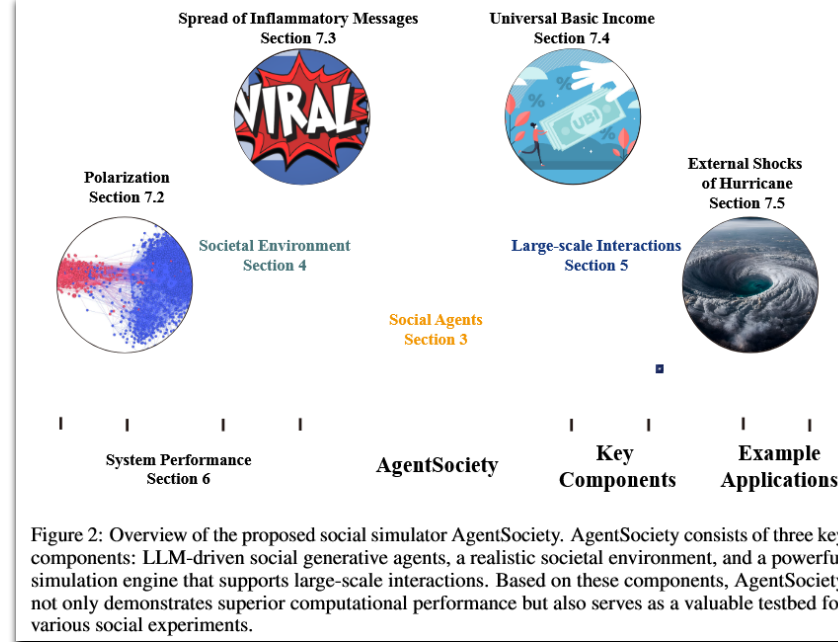


Figure 2: Overview of the proposed social simulator AgentSociety. AgentSociety consists of three key components: LLM-driven social generative agents, a realistic societal environment, and a powerful simulation engine that supports large-scale interactions. Based on these components, AgentSociety not only demonstrates superior computational performance but also serves as a valuable testbed for various social experiments.

Droit

AgentCourt: Simulating Court with Adversarial Evolvable Lawyer Agents



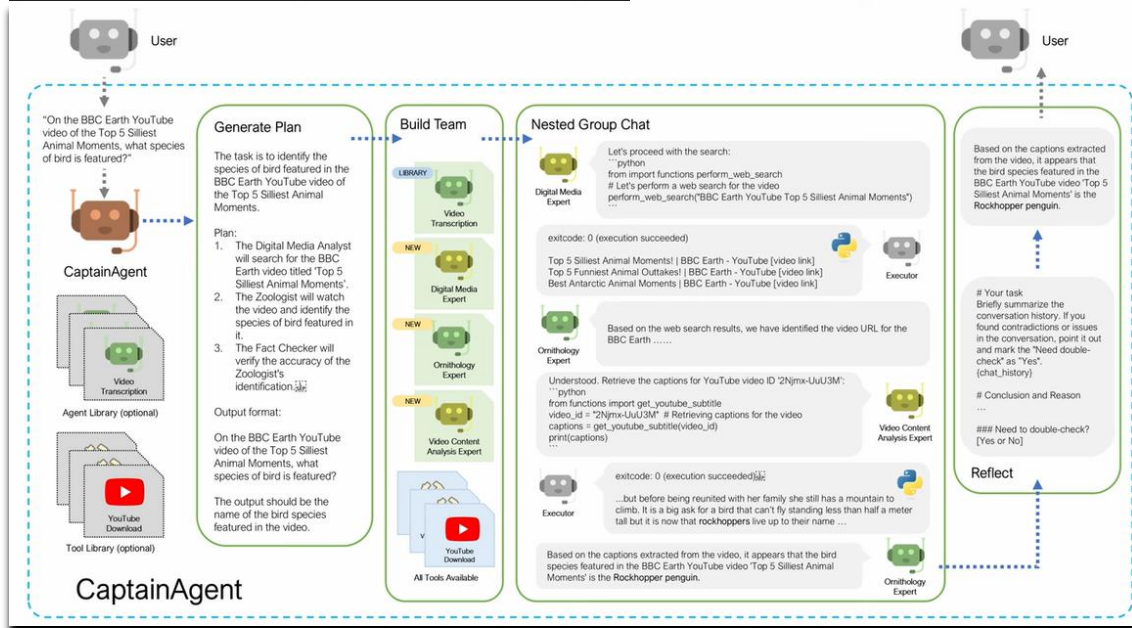
Figure 2: Example agents in AgentCourt.

Et bientôt des environnements où les IA génératives deviennent des 'collaborateurs'/ des 'assistants'

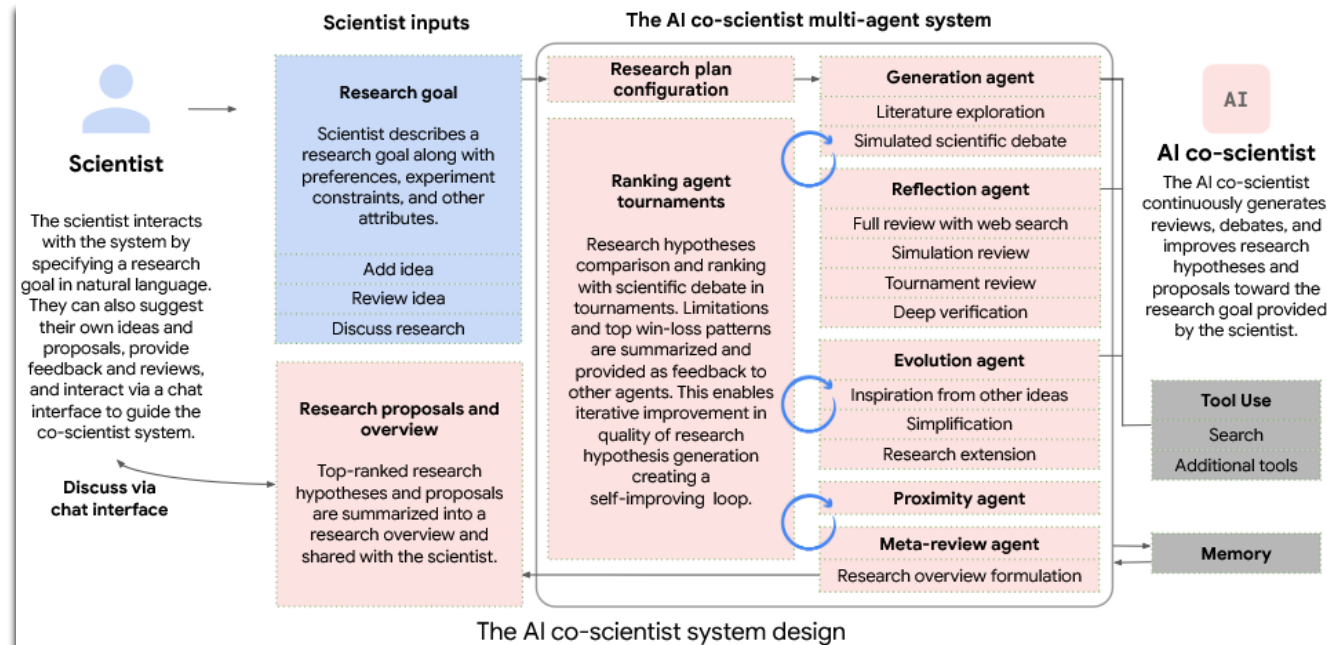
CAPTAINAGENT

Introducing CaptainAgent, a powerful agent that can manage and orchestrate other agents and tools to solve complex tasks.

(AG2)



Google, 2025, Towards an AI co-scientist



IV. L'IA générative: un outil mais aussi un OBJET DE RECHERCHE (interdisciplinaire)

- Car si l'IA générative « imite » les comportements humains: **elle relève aussi des SHS**

Vers une **Science de l'Homo Silicus** ?

- Nécessité d'étudier le **comportement des machines** (par exemple les problèmes d'**hallucinations**, les **biais**) comme on étudie le comportement des « agents humains » en adoptant une approche « **Machine Behaviour** » (*Nature*, 2019) appliquée à « l'agent » IA générative:

- ✓ Etudier le comportement des IA génératives (seules, ou dans un schéma multi-agents),
- ✓ Etudier le comportement des humains face à ces IA génératives (acceptabilité),
- ✓ Etudier le comportement des humains *et* des IA génératives *en interactions*.
- ✓ Anticiper l'arrivée des technologies LLMs dans le monde de la robotique, des agents conversationnels (cf. le projet « Le Robot »).

Machine behaviour

Iyad Rahwan^{1,2,3,34*}, Manuel Cebrian^{1,34}, Nick Obradovich^{1,34}, Josh Bongard⁴, Jean-François Bonnefon⁵, Cynthia Breazeal¹, Jacob W. Crandall⁶, Nicholas A. Christakis^{8,9,10}, Iain D. Couzin^{11,12,13}, Matthew O. Jackson^{4,15,16}, Nicholas R. Jennings^{7,18}, Ece Kamar¹⁹, Isabel M. Kloumann²⁰, Hugo Larochelle²¹, David Lazer^{22,23,24}, Richard McElreath^{25,26}, Alan Mislove²⁷, David C. Parkes^{28,29}, Alex 'Sandy' Pentland¹, Margaret E. Roberts³⁰, Azim Shariff³¹, Joshua B. Tenenbaum³² & Michael Wellman³³

Machines powered by artificial intelligence increasingly mediate our social, cultural, economic and political interactions. Understanding the behaviour of artificial intelligence systems is essential to our ability to control their actions, reap their benefits and minimize their harms. Here we argue that this necessitates a broad scientific research agenda to study machine behaviour that incorporates and expands upon the discipline of computer science and includes insights from across the sciences. We first outline a set of questions that are fundamental to this emerging field and then explore the technical, legal and institutional constraints on the study of machine behaviour.

In his landmark 1969 book *Sciences of the Artificial*, Nobel Laureate Herbert Simon wrote: "Natural science is knowledge about natural objects and phenomena. We ask whether there cannot also be 'artificial' science—knowledge about artificial objects and phenomena." In line with Simon's vision, we describe the of an interdisciplinary field of scientific study. This field is



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which individuals to target in advertising campaigns on social media. These AI agents have the potential to augment

huggingface/ lerobot

🤖 LeRobot: Making AI for Robotics more accessible with end-to-end learning

