

Levels of Digital Doubles: Technological Capabilities and Human Implications

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Agenda

- 1 Introduction
- 2 Methodology & Scenarios
- 3 Frameworks
- 4 Discussions

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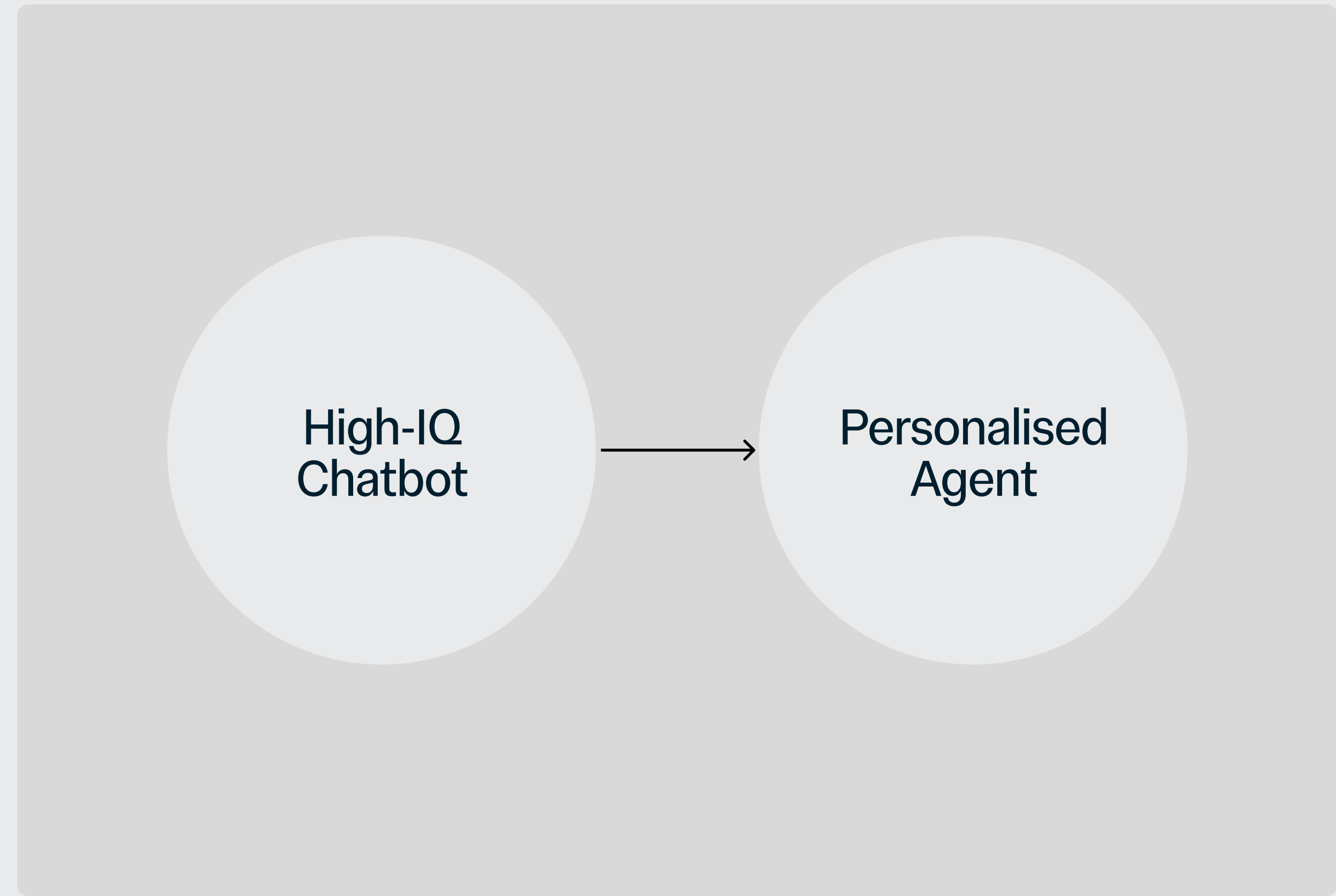
Introduction

Imagine a future where your digital double attends a tedious work meeting on your behalf, while you spend time with your family.

Paradigm around AI race is shifting:
from 'intelligence' and 'IQ'
to personalisation, agent and system.

And it's impact on human and society.

- Question of how AI is actually impacting human and society (Sequoia, 2024)
- We argue that AI is not only about just 'intelligence' or IQ metaphor, and how it understands me and do something for me.
- Representation and understanding of user is one factor (OpenAI, 2025)
- Capability and agency is other pillar (Claude, 2024)



This highly personal Agentic AI, or Digital double (Abeyasinghe, 2016; Modem, 2024), is digital representation of human being with capability to interact with the world on behalf.

But we don't have definition or mental model of this kind of concept and hence its hard to discuss impact on human and society.

Current Frameworks / models don't capture this complex nature.

Representation Recommender System

Recommender Systems Handbook (Ricci et al., 2010)

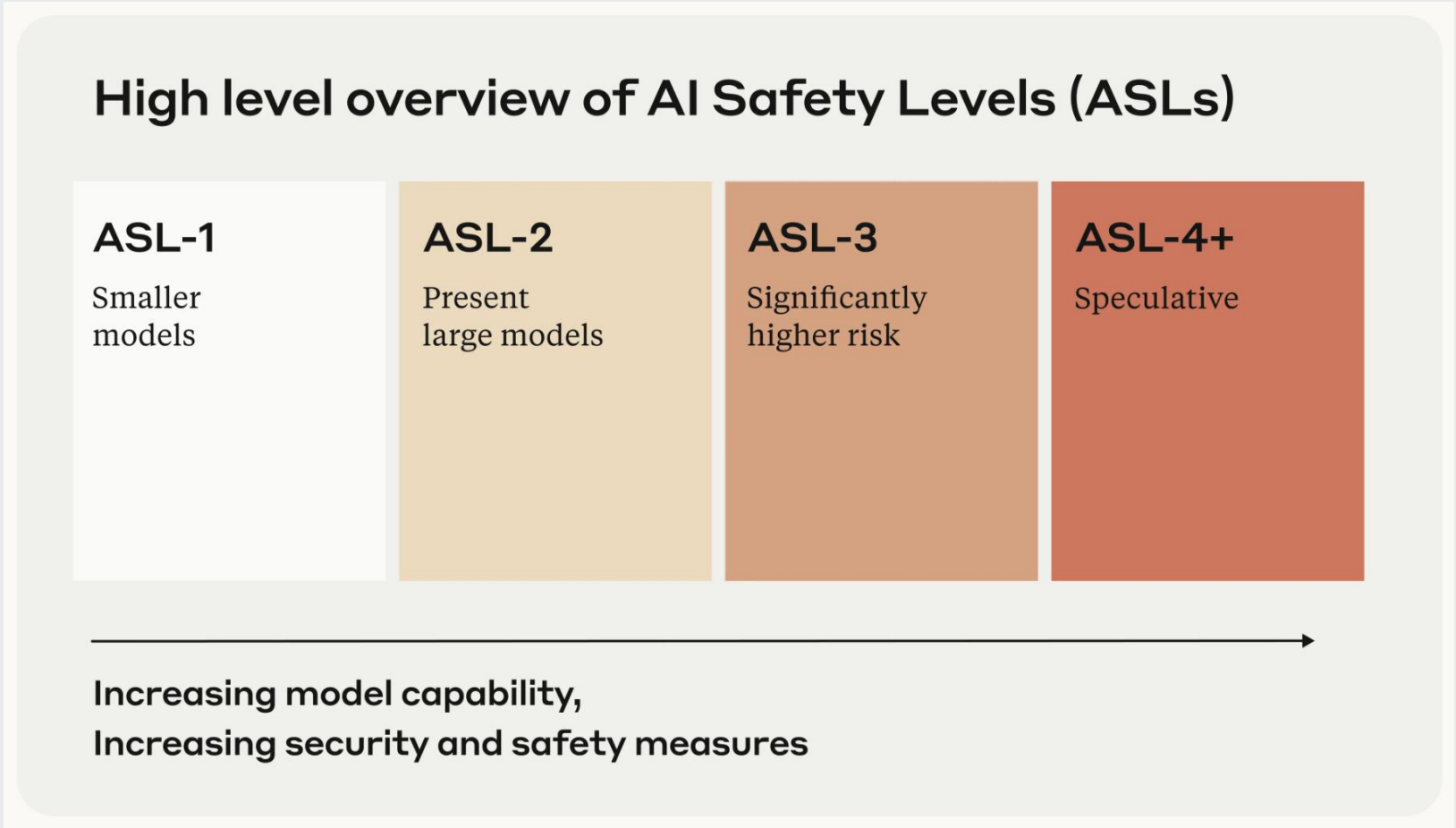
- Increase the number of items sold.
- Sell more diverse items.
- Increase the user satisfaction.
- Increase user fidelity.
- Better understand what the user wants.

IQ + Bit of Capability Levels of AI

Stages of AI, OpenAI, 2024

Stages of Artificial Intelligence	
Level 1	Chatbots, AI with conversational language
Level 2	Reasoners, human-level problem solving
Level 3	Agents, systems that can take actions
Level 4	Innovators, AI that can aid in invention
Level 5	Organizations, AI that can do the work of an organization

AI Safety Levels, Anthropic, 2023



Levels of AGI, Google Deepmind, 2024

Performance (rows) x Generality (columns)	Narrow <i>clearly scoped task or set of tasks</i>	General <i>wide range of non-physical tasks, including metacognitive tasks like learning new skills</i>
Level 0: No AI	Narrow Non-AI calculator software; compiler	General Non-AI human-in-the-loop computing, e.g., Amazon Mechanical Turk
Level 1: Emerging <i>equal to or somewhat better than an unskilled human</i>	Emerging Narrow AI GOF AI (Boden, 2014); simple rule-based systems, e.g., SHRDLU (Winograd, 1971)	Emerging AGI ChatGPT (OpenAI, 2023), Bard (Anil et al., 2023), Llama 2 (Touvron et al., 2023), Gemini (Pichai & Hassabis, 2023)
Level 2: Competent <i>at least 50th percentile of skilled adults</i>	Competent Narrow AI toxicity detectors such as Jigsaw (Das et al., 2022); Smart Speakers such as Siri (Apple), Alexa (Amazon), or Google Assistant (Google); VQA systems such as PaLI (Chen et al., 2023); Watson (IBM); SOTA LLMs for a subset of tasks (e.g., short essay writing, simple coding)	Competent AGI not yet achieved
Level 3: Expert <i>at least 90th percentile of skilled adults</i>	Expert Narrow AI spelling & grammar checkers such as Grammarly (Grammarly, 2023); generative image models such as Imagen (Saharia et al., 2022) or Dall-E 2 (Ramesh et al., 2022)	Expert AGI not yet achieved
Level 4: Virtuoso <i>at least 99th percentile of skilled adults</i>	Virtuoso Narrow AI Deep Blue (Campbell et al., 2002), AlphaGo (Silver et al., 2016; 2017)	Virtuoso AGI not yet achieved
Level 5: Superhuman <i>outperforms 100% of humans</i>	Superhuman Narrow AI AlphaFold (Jumper et al., 2021; Varadi et al., 2021), AlphaZero (Silver et al., 2018), StockFish (Stockfish, 2023)	Artificial Superintelligence (ASI) not yet achieved

F. Ricci, L. Rokach, and B. Shapira, “Recommender Systems Handbook,” in Recommender Systems Handbook, vol. 1–35, 2010, pp. 1–35. doi: 10.1007/978-0-387-85820-3_1.

“OpenAI Scale Ranks Progress Toward ‘Human-Level’ Problem Solving,” Bloomberg.com, Jul. 11, 2024. Accessed: Mar. 10, 2025. [Online]. Available: <https://www.bloomberg.com/news/articles/2024-07-11/openai-sets-levels-to-track-progress-toward-superintelligent-ai>

<https://www.anthropic.com/news/anthropics-responsible-scaling-policy>

M. R. Morris et al., “Levels of AGI for Operationalizing Progress on the Path to AGI,” Jun. 05, 2024, arXiv: arXiv:2311.02462. doi: 10.48550/arXiv.2311.02462.

Research Questions

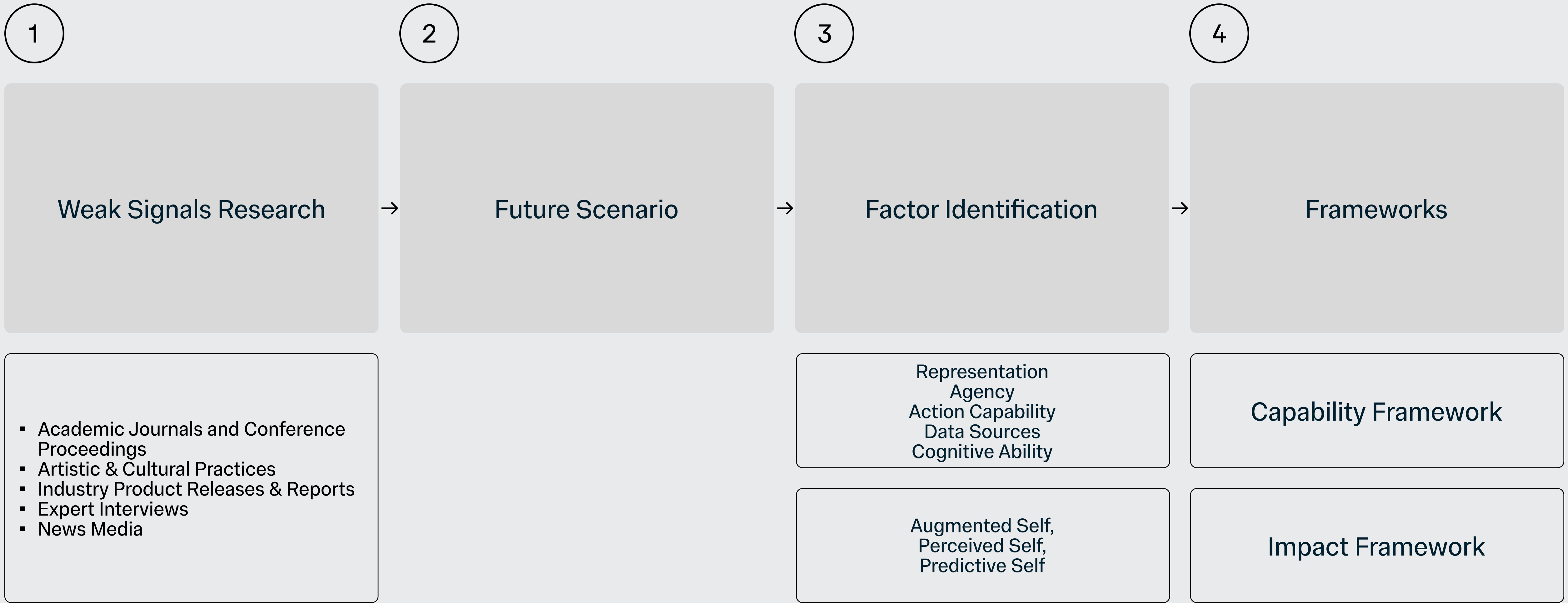
1. How can we define and categorize different levels of technical sophistication in digital doubles?
2. What are the key human-centric perspectives through which we can understand the impact of digital doubles on individuals and their interactions?
3. How do the technical capabilities of digital doubles relate to, enable, and constrain the human-centric perspectives?

02

Methodology & Scenarios

Overview

Mainly driven by speculative design (Dunne & Raby, 2013) approach.



10 Scenarios

- Inform the factor identification
- To have a common ground - like a color swatch - between researchers, designers, policy makers

Structure of Scenario

1. Intro
2. Problem statement
3. Deepdive + reference
4. Prompts

ChronoPresence

Human as a Sensor (HaaS)

Digital Afterlife

Universal Basic Compute
& Human Labour

Cognitive Atrophy

Sustainable Digital Being

Me-Simulator

Authentication & Ownership

Superintelligence Society

Synthetic Contact

ChronoPresence

Technology's role has been to overcome human limitations. "Telepresence," coined by Marvin Minsky in 1980, refers to overcoming spatial limitations and feeling present elsewhere. This concept has influenced the development of mobile phones, video conferencing, and, recently, virtual reality.

Now we will enter the space of “ChronoPresence”, which is actually present while overcoming time barriers, like using a Time Turner. Thanks to your digital double, you can do everything all at once. Several 'copies' of you can be present in different spacetime simultaneously - in London & Cambridge.

Human as a Sensor

I'd like to see people become proud data providers in a new economy - Jaron Lanier

As AI's reasoning and thinking capabilities skyrocket, research on human-AI ensembles suggests that humans can outperform AI when they have access to information that computers don't have or cannot collect, process, and interpret. The research also suggests that humans providing subtle, often contextual and cultural information to AIs as digestible, processable data will create the most productive ensemble between humans and AI.

The future of humans becoming sensors, sensing the real world to feed and train AI, with AIs making decisions, is approaching—or might already be here, having started with Reinforcement Learning from Human Feedback (RLHF).

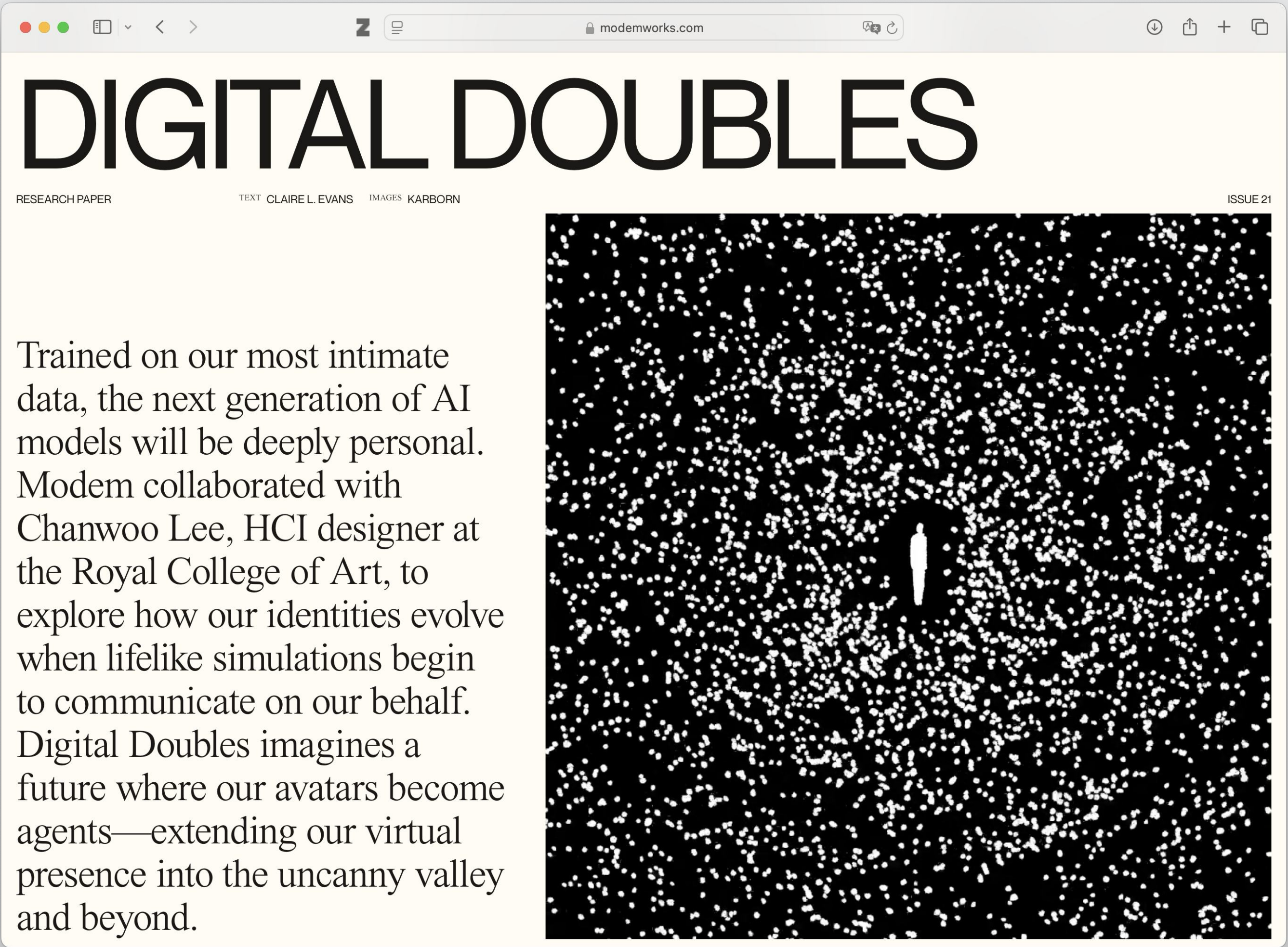
Superintelligence Society

Just like connecting knowledge as the web was a game changer, the social interaction of Digital Doubles could be a key factor in evolution towards superintelligence. This opens up possibility to **a new decision-making and reasoning mechanisms based on social interaction of Digital Doubles. Social systems integrating empathy, reputation, cooperation, and intimacy, just like humans, could serve as a novel reward-punishment framework for intelligence.**

OpenAI is already researching ways to make generated information more easy to evaluate for humans. How long might it take from this point for digital doubles to form their own community and society of superintelligence, one in which humans play no part?

In order to see how people - users and experts - react on these scenarios, we published a blog post as a design probe.

To make this more accessible, we concised the scenario into 3 main stories and created visuals, collaborating with Claire L. Evans and Karborn.



03

Frameworks

Capability Framework:

Digital doubles and technical capability scales

	Level 0 User Model	Level 1 Personalized Assistant	Level 2 Personal Agent
	Represents basic user preferences and patterns, primarily used for recommendation systems.	Understands natural language and performs simple tasks based on user data and instructions.	Mimics user decision-making in specific domains and possesses a rudimentary understanding of others' mental states.
Representation	Behaviour based representation	Prompt based representation	Mainly prompt based, with some behaviour understanding
Agency	Object	Low; User input and user approval	Mid; User intent and less user approval
Action Capability	-	Pre-set APIs	Pre-set APIs, MCP (Anthropic, 2024)
Data Sources	User behaviour data	User prompted data	Access to web, scattered data around user computer and behaviour data
Cognitive Ability	-	ASL-1 or above (Anthropic, 2023)	ASL-2 or above (Anthropic, 2023)

Capability Framework:

Digital doubles and technical capability scales

	Level 3 Cognitive Proxy	Level 4 Superself
	Autonomously manages the user's online presence with near-perfect emulation of behavior and social interactions.	Transcends human cognitive limitations while maintaining core traits, capable of unprecedented problem-solving and novel forms of communication.
Representation	Prompt + behaviour + neural understanding	Prompt + behaviour + neural understanding
Agency	High; User intent and few user approval	High; User intent and discussion
Action Capability	No need of API / Connecting API itself	No need of API / Connecting API itself
Data Sources	Level 2 + Neural Data	Level 3 + Other Cognitive Proxy
Cognitive Ability	Level 4 AGI (Deepmind, 2024)	Level 5 AGI (Deepmind, 2024)

Impact Framework:

Digital doubles and human implication perspective

The Augmented Self

The digital double enhances and extends the user's capabilities, working collaboratively.

- Attending meetings remotely via a digital double
- Managing multiple tasks simultaneously
- Accessing & processing information beyond single human capacity.

Risks

- Over-reliance, cognitive offloading, blurring of work-life boundaries.

Ethical Considerations

- Maintaining user autonomy and control, preventing deskilling, ensuring equitable access to augmentation capabilities

The Perceived Self

Others interact with the user's digital double, shaping their impressions of the user based on the double's behavior and appearance.

- Interactions on social media
- online meetings conducted by a digital avatar
- customer service interactions

Risks

- Misrepresentation, deception, erosion of trust, damage to reputation.

Ethical Considerations

- Transparency (making it clear when interactions are with a digital double), authenticity, accountability for the double's actions.

The Predictive Self

The digital double is used to anticipate and predict the user's behavior and decisions, often through simulations and data analysis.

- Personalized recommendations and Advertising
- Predictive policing
- "Future self" simulations.

Risks

- Manipulation, loss of privacy, reinforcement of biases, reduced autonomy and spontaneity.

Ethical Considerations

- Data privacy, informed consent, algorithmic transparency, preventing manipulation and coercion.

04

Discussions

Going beyond binary narratives—tools versus threats—and offering more ethically grounded dialogue about the design, development, and deployment of personalised agentic AIs.

Categorizing technical sophistication and identifying a lens to look at key human-centric impacts.

Inviting researchers, designers, and policymakers to engage with this technology proactively—anticipating risks, seizing opportunities, and fostering a future where digital doubles amplify, rather than erode, what it means to be human.

Thank you!

Levels of Digital Doubles:
Technological Capabilities and Human Implications

To understand and define personalised agentic AI -
Digital Double,
we propose frameworks for capability and impact
through speculative design approach, signals research
and future scenario development.

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