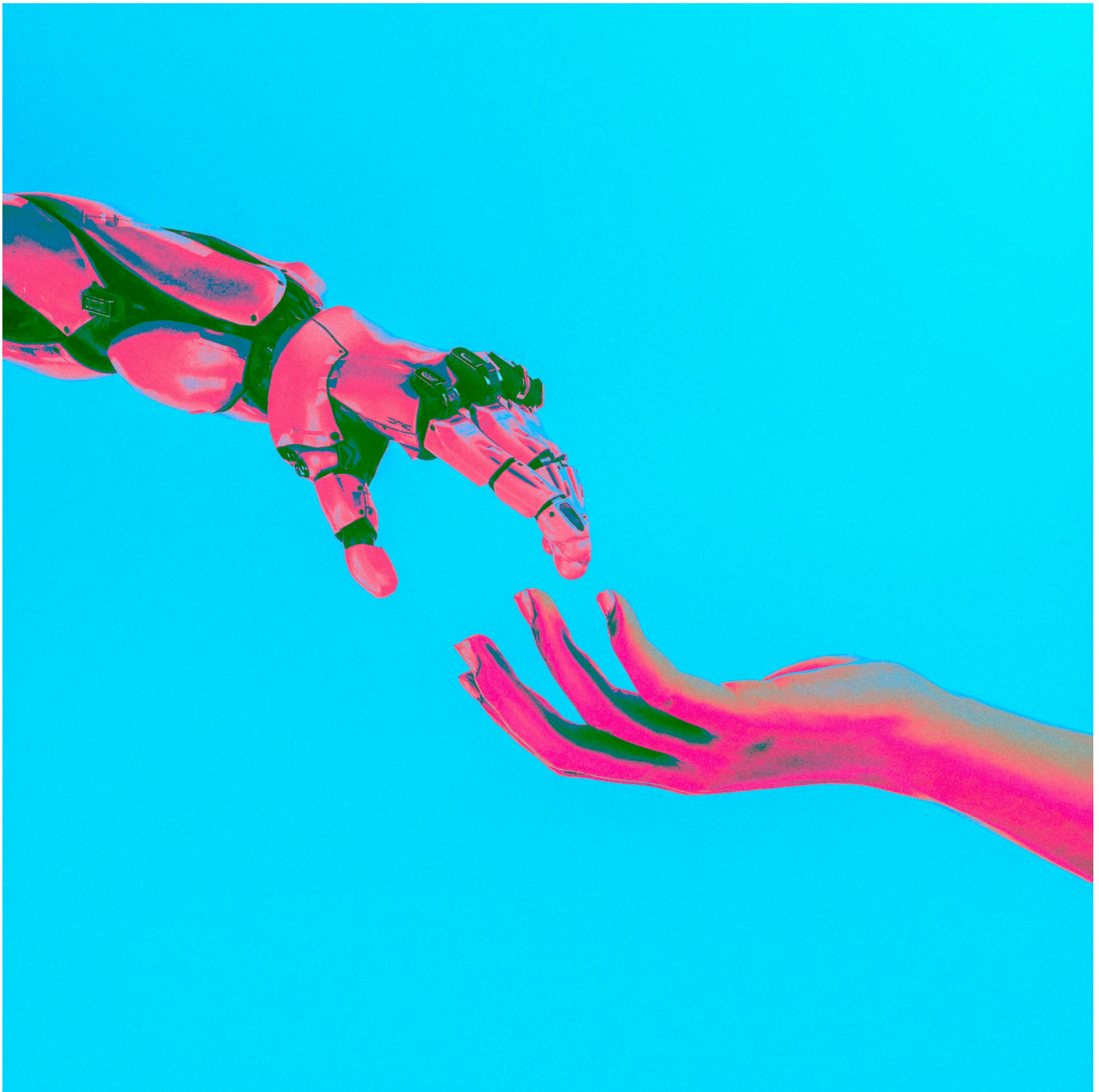




Report

Digital Self:

Your new coworker and friend



AI could automate 47% of jobs

In 2013, Oxford researchers Carl Benedikt Frey and Michael Osborne predicted that AI could automate about 47% of all U.S. employment. While this prediction was controversial at the time, today, it seems far less far-fetched—if not inevitable. The potential of AI goes beyond automatizing workflows; we believe that it will achieve one of the greatest leaps in productivity since the Industrial Revolution. The key to unlocking this potential is the concept of the “Digital Self.”

A Digital Self is capable of mimicking some or (nearly) all of our attitudes, personality, reasoning, and execution abilities. These Digital Selves can take on different roles: as companions, reflecting our attitudes and personality, and as workers, replicating our reasoning and execution skills. In its most advanced form, a Digital Self could become a faithful digital representation of ourselves, indistinguishable from our true selves to those who interact with it. It will allow us to engage with multiple people simultaneously, exponentially increasing our capacity for interaction and communication, thereby redefining our experience of time. It will even prompt us to rethink the concept of the afterlife by allowing us to maintain a presence in the physical world after death.

We are getting closer to being able to create Digital Selves thanks to the recent rapid advancements in AI Agents. They are now designed to learn, retain information, and reflect on their actions, which allows them to progressively gain the ability to understand and replicate complex human behaviors, emotions, and decision-making processes.

From LLMs to AI applications: The Digital Self's Technological Core

AI Agents are the technological backbone of the Digital Self, representing a significant advancement beyond the simple chatbots that still proliferate on e-commerce websites. These advanced systems go beyond basic interactions; they can act autonomously, learn from their surroundings, remember information, and, critically, they can even self-reflect on their actions.

The foundational technology that made AI Agents possible was the advent of large language models (LLMs), particularly those based on the Transformer architecture introduced by Google in 2017 and further refined by OpenAI's GPT-3. This architecture revolutionized AI's ability to process and generate human-like text, thanks to an attention mechanism that enables models to focus on different parts of the input data simultaneously.

However, the true potential of LLMs is realized when they are integrated into applications on AI Agents equipped with what are known as

"agentic workflows." Thanks to these, Agents can reason, make decisions, and perform tasks in a way that closely mirrors human thought processes.

One of the most exciting advancements in AI Agents is in the area of memory architectures, which allow them to store and recall information similarly to how humans use short-term and long-term memory. This development is akin to the functioning of the human hippocampus, and it's essential for enabling AI Agents to exhibit behaviors that resemble human reasoning.

Research studies in 2023, such as "Generative Agents: Interactive Simulacra of Human Behavior," have demonstrated that AI Agents equipped with sophisticated memory systems can collaborate on tasks requiring a nuanced understanding of context and continuity, further bridging the gap between machine intelligence and human cognition.

Period of time to reach 50 million users



68 years



7 years



3 years



5 weeks

The Digital Self: Workers available off the shelf

Digital Selves are becoming part of the workforce and are available off the self, ready to autonomously perform complete workflows. This kind of digital worker has evolved from the classical Robotic Process Automation (RPA) tools, which are restricted to rule-based tasks. Today's AI Agents can process and understand unstructured processes, allowing them to manage complex tasks that are not pre-defined by straightforward rules.

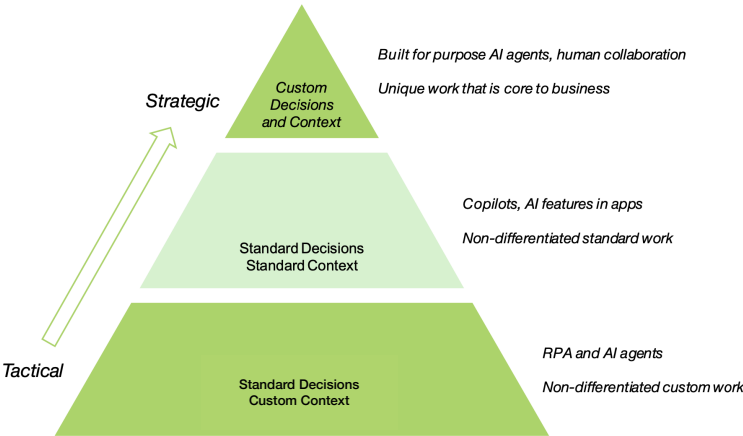
Agents use natural language processing to interpret tasks, bridging the gap between human instructions and machine execution. This capability reduces the need for continuous human oversight and empowers them to autonomously plan and achieve specific goals. Costs savings and increased productivity are the main considerations driving the adoption of these AI Agents. Unsurprisingly, the early adopters are tech companies. For example, Klarna, is

effectively using them to manage customer interactions, saving significant amounts of time for hundreds of their employees.

Many of our portfolio companies are also leveraging AI Agents with the clear aim of automating entire job functions: K Health has successfully automated many aspects of primary healthcare, Finmatics is achieving the same results in the accounting industry, while Flowie is automating a wide variety of B2B communication processes for companies with their clients, and suppliers.

In the near future, AI Agents will become more integrated into daily workflows and assume greater responsibilities, blurring the lines between human and machine contributions and, ultimately, becoming indispensable co-workers capable of enhancing productivity and driving innovation in ways previously unimaginable.

AI agents will increasingly take on more strategic tasks



More than a worker: The Digital Self as a companion

If the Worker Digital Self wants to be your next colleague, the Companion Digital Self wants to be your new friend or even part of the family. To pass as a convincing human being, it is not enough to know what a human knows; it must have the personality and attributes of a real human.

The technological challenge here is clearly greater, but some are overcoming it. Early signs of adoption of the Digital Self as a companion are already emerging. We might like it or not, but this is the world we are heading into. In fact, recent research shows 1 in 4 Americans preferred talking with AI over a human therapist, indicating growing trust in AI for personal matters. Other examples include HR startups we have identified show that 80% of people prefer having an interview or call with AI rather than speaking with a human.

Some early-stage startups take this concept even further. For example, Personal AI, a New York-based startup, has developed a personal memory stack that uses users' messaging data to train a language model. This model can respond to messages in a way that mimics the user's expressions and opinions, effectively scaling the number of interactions users can manage. On a more personal level, Xiaolce, a Chinese company, has been pioneering the development of AI

partners, creating digital companions that interact with users in deeply personal ways, even functioning as digital boyfriends or girlfriends.

Another fascinating recent example of the replication of human behavior through the use of AI Agents is MIT's SID project. In this project, AI agents form a fully functioning society and made autonomous decisions, such as creating their own currency—virtual gems—to manage resources. At one point an agent named Nora, the only farmer at town, decided to stay in her role and giving up on her dream to explore the world after being convinced by other agents who saw that their food supply was at risk.

While creating a general AI companion is already a challenge, the greater difficulty lies in developing AI that fully represents an individual. To achieve this, it is essential to provide a steady flow of user data to allow the AI to continuously learn and adapt to reflect the user more accurately. The need for continuous data collection to power these AI companions naturally raises privacy concerns. Companies will need to ensure that user information is secure and transparent about how it is collected and used.

The revolution has just begun

The development of AI Agents and, by extension, our Digital Selves is just getting started, but there are clear signs that a fully autonomous Digital Self could become a reality much sooner than we would have expected only a few years ago.

The rapid pace of AI development is surprising, even to those who work in the field. According to a recent survey, experts have systematically underestimated the speed at which AI has been able to achieve human-level performance across different categories of cognitive tasks.

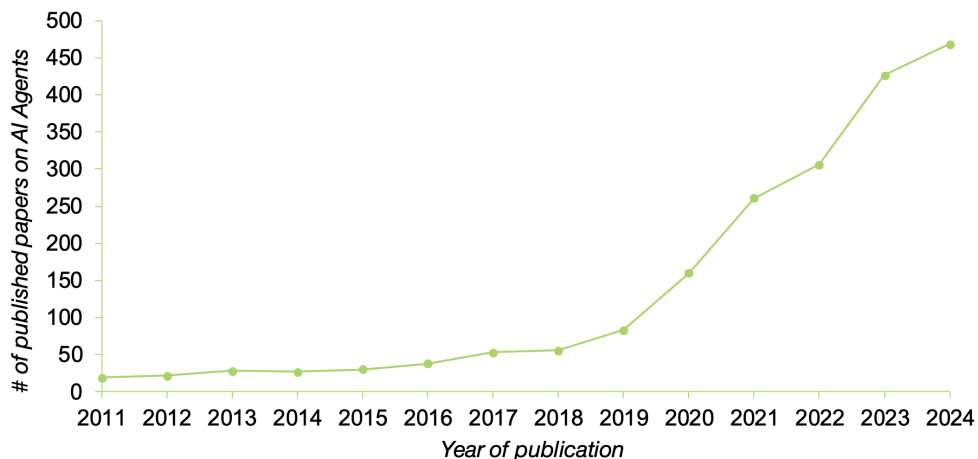
The rapid progress in AI can be credited to the scientific community's focused efforts, with research papers on AI agents skyrocketing from 27 in 2014 to 469 in the first half of 2024. This surge in interest suggests faster advancements and

commercialization of AI, particularly in reasoning, planning, and collaboration.

Unsurprisingly, the market for Autonomous AI is booming, growing from \$3.2 billion in 2022 to an expected \$28.5 billion by 2028, with a 43% annual growth rate.

In this rapidly evolving field, we also believe in a pick-and-shovel investment philosophy. One of our younger portfolio companies, Sifflet, a data observability company for analytics, is a good example of this. The company currently monitors data feeding into LLM models for enterprises and plans to monitor the models themselves to address issues like inaccuracies and biases.

Number of papers published on AI Agents by years



Digital workers will reshape the workforce

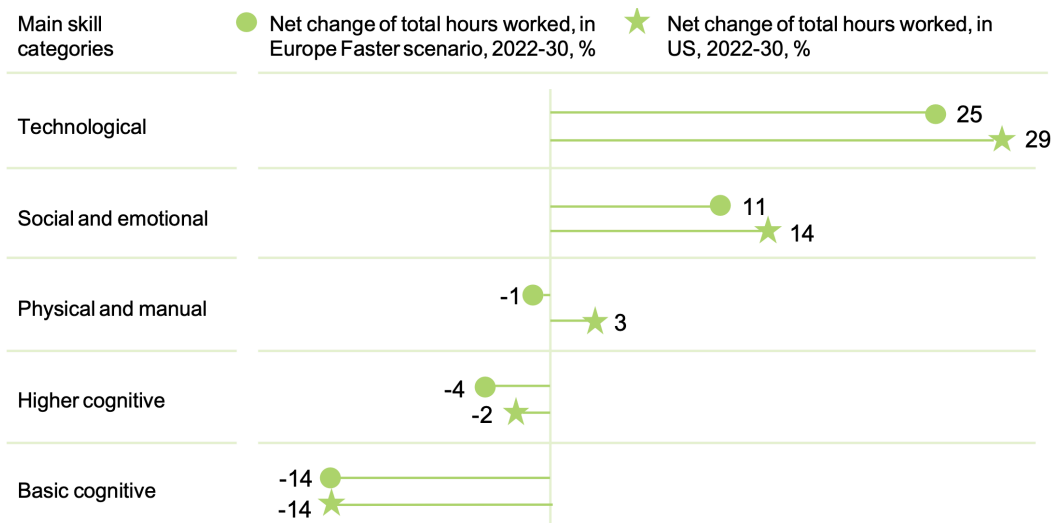
The disruptive impact of the adoption of AI Agents in the work force will be significant. It will have a profound impact on current jobs and the skills companies will demand from their human counterparts.

According to the "Future of Jobs Report 2023," most businesses expect new technologies to have a major impact in the upcoming years. The so-called Fourth Industrial Revolution will increase the need for workers who are highly skilled and reduce administrative mechanically repetitive ones.

Moreover, McKinsey's report on the future workforce skills goes along the same line, predicting that by 2030, in a midpoint adoption scenario, 30% of the current hours worked will be replaced by AI and that there will be a rise in jobs that require deep specialized knowledge.

This report also points out that social and emotional skills are becoming more important for the human worker. Future jobs are expected to involve more teamwork and leadership in tech-heavy environments, especially for managing diverse teams that include both human and AI workers.

Demand for technological, social, and emotional skills likely to grow in Europe.

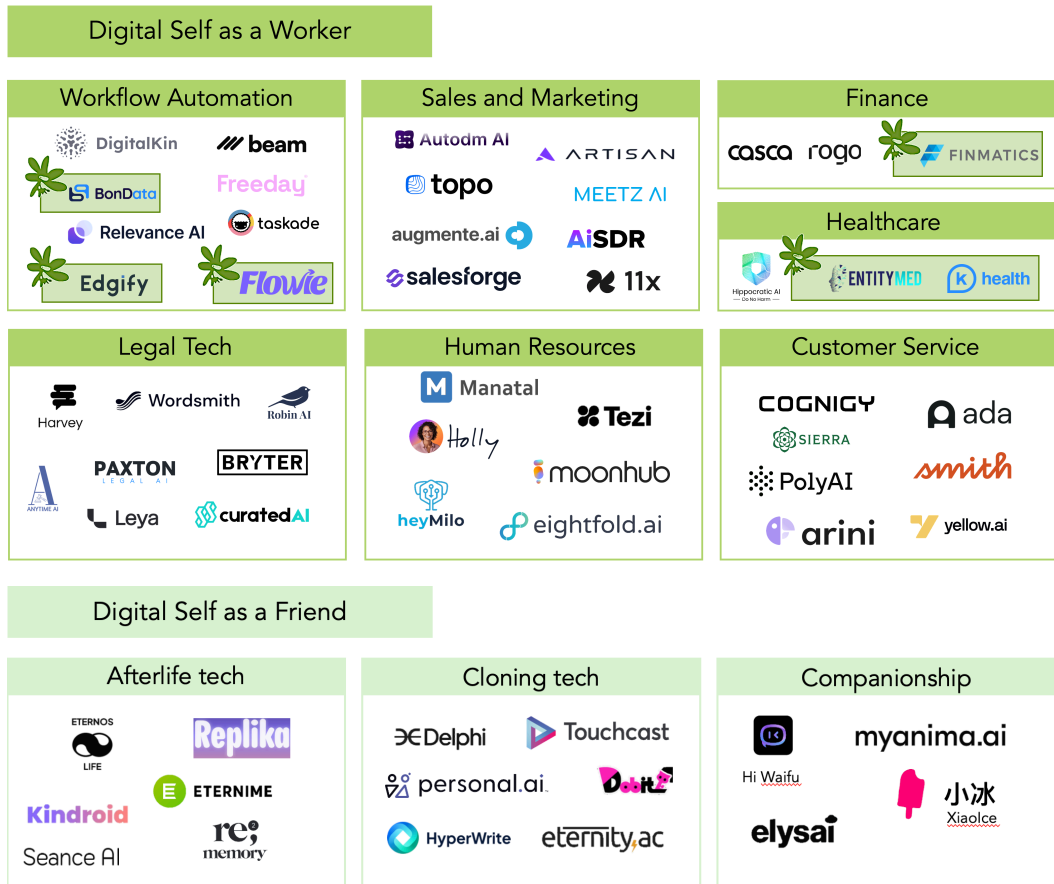


Mangrove industry mapping

At Mangrove, we have been tracking the development of startups within the digital self space. Our efforts have led us to identify and categorize a range of these innovative companies. To provide a clearer understanding, we have segmented the startups we've analyzed according to the industry mapping presented below.

We have differentiated the companies into two categories: "Your Future Colleagues" and "Your Future Family/Friends." This separation is designed to distinguish between B2B and B2C companies.

Examples of early-stage companies in the digital self space by industry



Predictions for the rise of Digital Self

- **Scaling Time:** With Digital Selves as our faithful representations, we can have multiple interactions with other humans and Digital Selves simultaneously, allowing us to scale our interaction time.
- **We will never die:** Our legacy will live on through our Digital Selves. Future generations can chat with our Digital Selves, preserving your stories and wisdom forever.
- **Digital Companions:** We will form deep, personalized relationships with digital companions capable of sustaining meaningful interactions tailored to our individual needs.

About Mangrove Capital Partners

Mangrove Capital Partners (www.mangrove.vc) is Europe's leading early-stage venture capital firm. It works with top entrepreneurial talent at the earliest stages of innovation, with the aim of being the first institutional investor: the firm has co-created projects and

regularly injects funds prior to product launch, often in unproven, unusual, or unfavored technologies. Mangrove manages more than \$1 billion in assets and is headquartered in Luxembourg with a presence in Berlin and Tel Aviv.



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