AI Agents At Work

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Colophon

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To the machine, the work of the machine;
to humankind the thrill of unfettered creativity.

Kazuma Tateishi, 1989

Table of Contents

Prologue

It was a sunny, crisp morning in the winter of 2030. The sun was low, casting long shadows over the Rotterdam skyline. Sarah, an employee at Synapse Solutions Ltd., grabbed her first cup of coffee. Her gaze wandered over the digital dashboard on her wall, displaying the status of Synapse Solutions' dozens of projects in real-time. Small, color-coded icons next to each project represented AI Agents. They blinked, a silent confirmation of their constant activity.

Synapse Solutions was no ordinary company. Over the past five years, it had transformed from a traditional software consultancy into a pioneer in custom, AI-driven solutions for societal challenges. The projects they undertook were ambitious: accelerating the transition to sustainable energy, optimizing logistics chains for humanitarian aid, and developing personalized educational programs for millions of students worldwide. Tasks that once seemed impossible were now routinely tackled, thanks to a revolutionary collaboration between humans and AI Agents. Sarah still remembered the early days when the implementation of the first agents was met with skepticism. Now, they were as indispensable as the servers or laptops they ran on.

Operations: A Symphony of Human and Machine

The core of Synapse Solutions' success lay in their ability to break down complex problems into manageable, agent-compatible tasks. Every function, every responsibility, was defined as a

clear, autonomous role, complete with goals, domains, and responsibilities. This made it possible to seamlessly integrate not only human employees but also AI Agents into the organization. It was an architecture that combined human intuition and creativity with the tireless precision and speed of machines, resulting in enormous productivity.

Sarah's day did not begin with sifting through hundreds of emails or attending endless, often inefficient meetings. Those tasks were largely handled by the 'Operational Agents'. They filtered the noise, prioritized action points, and generated concise summaries for the human team members. Her primary focus was on strategic overviews, resolving exceptions that the agents could not handle independently, and shaping new projects that pushed the boundaries of what was possible.

"Good morning, Sarah," a soft, synthetic voice sounded from the speakers of her computer in her home office. It was 'Nexus', the central coordination agent of the "Sustainable Urban Development" project, one of Sarah's main responsibilities. Nexus was one of the oldest and most advanced agents within Synapse Solutions, trained on billions of data points about urban development, regulations, and sustainability models. "The weekly progress report has been generated and is ready in your dashboard. One critical bottleneck has been identified regarding the permit application for the 'Green Port' project in Amsterdam."

Sarah nodded, her gaze already focused on the dashboard. "Thank you, Nexus. Give me a summary of the situation and the proposed

actions."

A concise yet complete analysis appeared on her screen. Nexus had scanned thousands of documents overnight—local regulations, communications with the municipality, previous permit applications, and even news reports on similar projects. It had identified the specific clause causing the delay—an unexpected interpretation of an environmental standard by a new official—and had already formulated three possible solutions, each with a detailed risk analysis and an estimate of the required time and resources. This was the power of the agent's long-term memory, fueled by Synapse Solutions' documented knowledge base. Nexus had not only found the clause but also mapped out the context, historical precedents, and potential consequences.

"The 'Legal Agent' has advised rephrasing clause 4.b, focusing on the societal impact of the project rather than just the technical specifications," Nexus explained, its voice unwavering. "This could address the official's objections by providing a broader perspective on the sustainability goals. The 'Communication Agent' has already drafted a concept press release to proactively respond to potential negative publicity should the delay become public."

Sarah smiled. This was the big difference. Five years ago, this would have meant spending hours figuring out the legal details, consulting with the legal team, and manually drafting a communication plan. She would have had to sift through piles of documents, make phone calls, and send emails back and forth.

Now, the work was already prepared, analyzed, and ready by her digital colleagues. Her role had shifted from executor to strategist and decision-maker. She only needed to choose the best option and authorize the agents to proceed. It was a liberation from everyday bureaucracy, allowing her to focus her energy on the truly complex, human aspects of her work.

Agents as Colleagues: The New Dynamic

At Synapse Solutions, agents were not seen as tools but as a new kind of employee with their own unique traits and limitations. They even had names, just like people, and their personalities—though synthetic—were tailored to their roles. The 'Legal Agent' was 'Lex', known for its accuracy and formal language. The 'Data Analyst' was 'Astra', always factual and efficient. And the 'Creative Content Agent' was called 'Muse', with a subtler, more evocative voice suited to its generative tasks. These names were not just a gimmick; they helped human employees build a mental connection and see the agents as individual entities within the team, each with their own specialization and contribution. It was a conscious choice to foster acceptance and collaboration [1].

"Lex, can you forward the rephrasing of clause 4.b to the municipality, with a cc to me and the municipal project manager?" Sarah asked, as she reviewed the proposed text once more. She felt comfortable delegating this task; Lex's track record was impeccable.

"Confirmed, Sarah. The dispatch is scheduled for 09:00, after a final check by the 'Compliance Agent'," Lex's voice replied, without hesitation. The 'Compliance Agent' was another specialized AI ensuring that all outgoing communication complied with internal guidelines and external regulations, an extra layer of assurance that minimized human errors. The Compliance Agent simply said "yes" or "no".

The agents were fully integrated into daily communication via the 'Synapse Flow' platform, a more advanced version of what was once Slack or Teams. This platform was the digital 'workplace' of Synapse Solutions, where all asynchronous communication took place: 'async' and 'online first'. The agents participated in project channels, responded to questions, and proactively provided updates. If a human employee got stuck on a task, they could directly ask an agent for help, just as they would approach a human colleague. The difference was that the agent was available 24/7, never tired, and had access to the company's entire documented knowledge base, allowing it to generate an answer or take action almost immediately. This was a significant efficiency boost that also ensured that vacations, evenings, and weekends of human employees could be respected.

"Astra, can you analyze the impact of the recent changes in CO2 emission standards on our 'Green Port' projects and make a forecast for the next three years?" Sarah asked later that morning, as she read the new government guidelines that had just been published. She knew this was a complex task that would take days to manually search all relevant data sources and run models.

"Of course, Sarah. I'll start collecting data from the relevant government databases and project plans right away. Expected delivery of the analysis: 14:00," Astra replied, its voice slightly faster and more factual than Nexus's, as if it was already busy with the calculations. Sarah smiled; Astra's efficiency was legendary within the company.

It was clear that agents had different qualities than humans. They were tireless, objective, and extremely efficient at processing large amounts of data. They had no need for breaks, vacations, or emotional support. This made them perfect for tasks requiring precision, speed, and consistency. But they also lacked human intuition, the creative leap into the unknown, the ability to think outside defined frameworks, and the subtle empathy needed for complex human interactions. That was why the collaboration was so powerful. Humans brought strategic vision, empathy for clients, and the ability to navigate ambiguous, unstructured situations, while agents handled the heavy, repetitive, and data-intensive tasks. It was a strong symbiosis, where the weaknesses of one were compensated by the strengths of the other.

Doing More Than Ever

Through this seamless integration, Synapse Solutions could do much more than would have been possible without agents. Where a traditional consultancy with a small team might manage a handful of projects simultaneously, Synapse Solutions managed hundreds. The impact had grown, and their reputation as problem solvers was unparalleled.

Take, for example, the personalized education project. Previously, it was unthinkable to create individual learning plans for millions of students worldwide, taking into account their learning pace, preferences, cultural background, and even their daily mood. Now it was daily practice. The 'Education Agents' analyzed students' performance in real-time, identified weaknesses, and dynamically adjusted the curriculum. If a student struggled with a particular concept, the agent immediately generated additional explanations, exercises, or even interactive simulations. The 'Content Creation Agents' not only generated personalized exercises and explanatory videos but also narrative elements and gamified modules that made the learning experience more engaging. And the 'Feedback Agents' provided direct and constructive feedback on submitted work, with suggestions for improvement that went beyond just right/wrong. This allowed human teachers to focus on mentorship, guiding students with complex emotional needs, fostering critical thinking, and developing innovative pedagogical methods. They were no longer burdened with administrative tasks or grading homework; their expertise was deployed where it mattered most: the human connection and deep guidance.

Another example was the 'Global Aid Logistics' project, aimed at optimizing the distribution of humanitarian aid in crisis areas. This was previously a logistical nightmare, plagued by unpredictable circumstances, bureaucracy, and lack of real-time information. Now, 'Logistics Agents' coordinated the entire chain. They monitored weather, political instability, and traffic situations in real-time. They calculated the most efficient routes, considering

the safety of convoys and the perishability of goods. ‘Inventory Management Agents’ anticipated shortages and surpluses and automatically placed orders with suppliers worldwide. The human aid workers on the ground could fully focus on providing direct assistance to people in need, knowing that the logistical backbone was invisibly and tirelessly managed by agents.

The impact was not only quantitative but also qualitative. The error margin in projects had drastically decreased, lead times were shortened, and customer and beneficiary satisfaction had significantly increased. The agents ensured consistency and accuracy in all processes, from the smallest administrative task to the most complex strategic analysis. This meant that human teams could focus on innovation and creating new value, rather than solving errors or catching up on backlogs.

Later that day, Sarah had a virtual brainstorming session with her team, including the relevant agents. They discussed a new project proposal for optimizing water management in drought-prone areas. The ‘Research Agent’ had already conducted an extensive literature review and summarized the key scientific breakthroughs and best practices, complete with references to the latest publications. The ‘Risk Analysis Agent’ had mapped potential bottlenecks and unforeseen circumstances, based on historical weather data, geopolitical analyses, and even climate models. It presented various scenarios, each with the probability of that scenario and its potential impact.

“What are the biggest uncertainties in this project, ‘Forecast’?”

Sarah asked the forecast agent, which specialized in predictive models.

"The biggest uncertainty lies in the political stability of the region, Sarah," Forecast replied, its voice calm and factual, free from the human tendency to exaggerate or underestimate. "My models predict a 30% chance of significant disruptions within the first two years, which could significantly impact project planning and budgeting. Additionally, there is a 15% chance of extreme weather conditions that could strain the infrastructure, based on the most recent climate models."

These in-depth, data-driven insights were previously unattainable for a software consultancy like Synapse Solutions. They enabled Sarah and her team to plan proactively, mitigate risks, and design much more effective solutions. It was a form of augmented intelligence, where human creativity and strategic thinking were enhanced by the tireless analytical capabilities of the agents. The brainstorming session was dynamic and efficient; human ideas were immediately tested against the data and models of the agents, leading to faster and better-informed decisions. The agents were not passive assistants; they were active participants in the discussion, providing facts, pointing out inconsistencies, and offering new perspectives.

A Sunny Future

By the end of the day, as the sun slowly set and bathed the city in a golden glow, Sarah looked at her dashboard once more. The

icons of the agents continued to blink tirelessly, each engaged in its own task, contributing to the bigger picture. She felt no fear of automation, but a deep satisfaction with the synergy she experienced every day. The time she used to spend on routine tasks could now be devoted to devising new strategies, deepening client relationships, and inspiring her human team members.

The agents were not a threat; they were an extension of human capacity. They had freed humans from the repetitive, the mundane, and the overwhelming, allowing people to focus on the uniquely human: creation, innovation, connection, and solving the truly complex, unstructured problems that required a deep understanding of human emotions and societal dynamics. Jobs had not disappeared but evolved. The focus had shifted from "doing" to "thinking" and "leading."

Synapse Solutions had become a place where technology was not only used to automate but to maximize human potential. And Sarah knew this was just the beginning. The future, with AI Agents as an integral part of working life, was no longer a distant dream but a dynamic, collaborative reality that unlocked new possibilities every day. The boundary between human and machine was blurring, not in a frightening way, but as a celebration of complementary forces that could achieve more together than each could alone.

Beyond the Hype

This book is about the AI Agents that, for example, at Synapse Solutions, can take over a large part of daily work. The term AI Agent refers to relatively autonomous systems that use Artificial Intelligence (AI). The term agent has been used for several decades for (digital) systems that interact with their environment, possess a form of perception, and try to achieve goals. However, the term AI Agent specifically refers to agents that utilize the modern capabilities of the latest, very large AI models [2]. The use of the term AI Agent has exploded over the past year—we are writing this book in the fall of 2025: AI Agents, or simply Agents, are everywhere. Or well, the promise of AI Agents is everywhere.

The story of Synapse Solutions Ltd. is purely, somewhat informed, speculation. We try to provide an image of "how it could be" when agents are fully embraced and support us in our daily work. This is a fairly positive and idealized picture: whether we will get there, no one knows, and there is much debate about the possible outcomes (with some voices being much more negative). In this book, we try to go beyond the hype and describe what AI Agents are, where they come from, and what they can be used for. We will be the first to admit that this book will likely have a short lifespan: the technology is developing very quickly, and the ecosystem of tools, platforms, and standards related to the development and use of AI Agents is still evolving. What was "the next big thing" last month is already forgotten this month.

But, precisely because developments are moving so fast, and

because the potential impact of AI Agents is so great, it is good to stay informed. The goal of this book is to get you up-to-date with the development of AI Agents and to outline where the risks and opportunities lie. Since AI Agents build on decades of developments in Machine Learning, AI, data management, software design, and organizational design, some of the trends visible now will likely continue in the coming years. Perhaps one tool or standard will be replaced by another, and perhaps one AI model will prevail over another model. However, this book aims to present the major trends, indicate where we stand, and where we are practically headed. This book is a guide for managers, leaders, CEOs, board members, and anyone else interested in this new technology. A technology that, in our view, everyone should be interested in: it is very likely that AI Agents will drastically change our current way of working.

To start with an example of this: a company like Zapier, which provides integrations between various online platforms, recently announced publicly that, for the first time in its history, it had more AI Agents "employed" than people. The team of 800 people has been expanded with a team of over 800 AI Agents that, relatively autonomously, perform tasks such as scheduling appointments, writing and testing software, and answering customer support questions. Not every AI Agent replaces a full previously human function, but every AI Agent undeniably performs tasks that were previously done by a human. The execution of these tasks by agents allows the company to innovate faster, adapt more quickly, and grow more rapidly. And this is just the beginning: Sequoia

Capital, one of the most renowned venture capital (VC) firms in Silicon Valley, indicates that they expect to see the first "one-man unicorn" in the short term: a company where only one person works and yet is worth more than a billion [3].

Alright, enough of the hype. The other side, of course—as with any hype—is the list of disappointing results. AI Agents that give the most nonsensical answers to customer questions or that—just in the customer service chat—can be lured into sharing company secrets. AI Agents also often hallucinate: they present information with great confidence, although it is sometimes completely fabricated [4]. And, of course, the data privacy risks: how does the AI Agent obtain its information, and what does it do with the information entrusted to it? Due to the combination of some extremely impressive success stories and disappointing results when people try it themselves, AI Agents seem to be heading towards the "peak of inflated expectations" in the jargon of the Gartner hype-cycle. Expectations are too high, and the technology does not (yet) deliver [5].

We, Maurits and Joris, met in 2008 at Stanford University, where we worked on our PhD research in AI. Since then, we have actively contributed to the development of AI—both in academia and in applications for e-commerce, healthcare, and video security [6]. After selling our companies last year—Scailable (AI infrastructure for cameras) and Luscii (digital platform enabling hospitals to monitor patients at home)—we have further delved into AI Agents. We started reading, experimenting, and especially building ourselves. And yes, the hype is big. But behind the

hype lies a core of value that—in our view—will have a gigantic impact on how we work, and perhaps even on what we think work is. This value comes from a combination of two recent developments: first, our AI models (or foundation models) have become much better in recent years. Where reasonably handling text, sound, and images was previously very difficult, we are now all familiar with ChatGPT (or its competitors, Claude, Gemini, etc.). Through a combination of increasingly larger and faster computers and more data, we have been able to create models with very impressive results. Second, in the last 2 to 3 years, we have realized that the value of just the model is limited. In addition to the model, instructions are needed: What should the model do? What knowledge is essential? With whom does the model collaborate? Therefore, many tools have been developed that make it possible to provide the model with assignments, rules, knowledge, and boundaries. This surprisingly powerful combination of a good foundation model and enough contextual knowledge and planning leads to AI Agents that can automate tasks we previously thought impossible.

In our recent work, we ourselves use AI Agents extensively: every software development or data analysis project we have worked on in recent years has come about in collaboration with an AI Agent. Even Maurits' recent scientific articles have been corrected by an AI Agent he specifically created for that purpose. And Joris recently had an AI Agent autonomously present his company's strategy in Japanese at the headquarters of the parent company in Kyoto. And yes, of course, this book is also a collaboration with