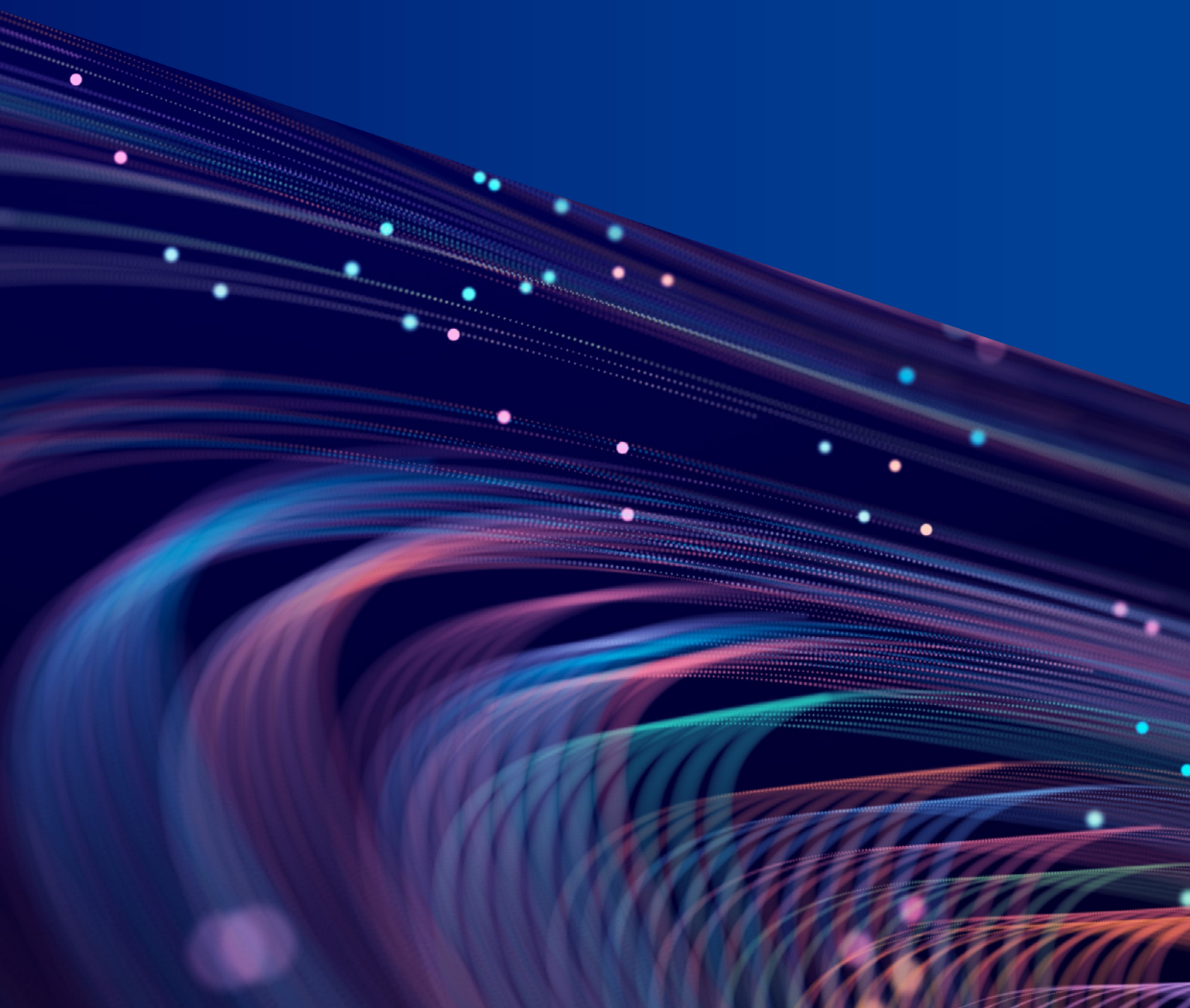
NRI

2024 Special Report

The Power of Generative AI in IT Departments



Advancement of intellectual labor through collaboration with generative AI

The continuing evolution of generative AI has the potential to transform the way we work, especially intellectual labor. In this article, we take the IT department's work as an example of intellectual labor and explain how generative AI could potentially transform it in the near future.

Human intellectual labor is formed through extremely complex processes, making it challenging to view it as a single model. In this report, we discuss how collaborative efforts with generative AI could enhance human intellectual labor in the near future. To simplify the process of human intellectual labor, we break it down into five phases: inspiration, hypothesis building, execution, evaluation, and improvement.

1. **Inspiration Phase: Brainstorming**
   Generative AI-generated content can enhance human cognition, leading to the creation of more ideas. Generative AI learns from vast data that humans cannot memorize. It supplements perspectives humans may overlook and offers new ideas and solutions.

2. **Hypothesis Building Phase: Generating business hypotheses**
   Generative AI can help refine ideas generated during the inspiration phase and develop specific business hypotheses. AI can learn from existing business models and the knowledge accumulated within the company, analyze the relationship between new ideas and existing business models and use this knowledge to materialize business hypotheses.

3. **Execution Phase: High volume and rapid prototyping**
   Generative AI can rapidly produce numerous prototypes based on business hypotheses, expediting the validation process by obtaining market feedback more quickly.

4. **Evaluation Phase: Simulation for accurate and flexible decision making**
   Geanerative AI enables rapid quantitative business analysis and optimization under tight restrictions, facilitating accurate decisions. Identifying potential business risks and implementing countermeasures before making decisions helps businesses stay agile.

5. **Improvement Phase: Accumulation and reuse of knowledge**
   When humans collaborate with generative AI, the resulting data can be stored as collective intelligence and reused within the AI for future tasks. This can lead to the development of an organizational system that is not reliant on an individual, potentially increasing productivity in intellectual labor.

Phase	Intellectual Labor scenario in the near future
Inspiration	Brainstorming with AI **Stimulates creativity and unlocks new ideas**
Hypothesis Building	Interacting with AI on idea comparison and desktop analysis, **Formulates business hypothesis**
Execution	By AI generating high volume and rapid prototyping, **Speeds up verification**
Evaluation	AI's simulation under specific constraints **Gathers additional information for decision-making**
Improvement	By promoting the collaboration with AI, **Improves organizational knowledge**

The use of generative AI in the IT department and its potential applications

According to a research report*, content generated by generative AI is expected to reach a practical level for business by 2025. This means that it will be possible to create high-quality documents that surpass the human average, generate almost complete software code from text, and produce finished designs for products and websites. If companies can establish a collaborative system between humans and generative AI in the future, the quality, cost, and delivery of intellectual work is likely to improve significantly.

We will discuss the potential for advancement of intellectual work within the IT department in the near future by categorizing tasks into five phases: planning, requirement definition, design development, testing, and operation.

1. **Planning**
   When developing strategies and plans for new digital services, collaborating with generative AI during the planning phase enables the creation of innovative concepts by combining various internal ideas. It can also help identify the service's differentiation points by conducting online research and comparing similar products with potential competitors.

2. **Requirement Definition**
   Clarifying the requirements for new digital services is referred to as the requirement definition phase. During this phase, generative AI facilitates the compilation of items to be defined and visualizes the defined requirements using system diagrams and flowcharts.

3. **Design Development**
   During the design and development phase of creating digital services based on specific requirements, generative AI can help generate HTML from hand-drawn sketches and images, or software code from natural language instructions or system design documents. In recent years, commercial AI tools for software code generation and code review have been released, and the design development phase has shown high potential for improving productivity in the short term.

4. **Test**
   During the testing phase, the aim is to assess whether the digital service meets the system requirements. Working with generative AI allows for comprehensive execution of tests based on system requirements, analysis of test results, and generation of detailed analyses of detected software bugs, along with suggestions for software code fixes. Recently, AI tools have been developed to automate unit test script generation, auto-repair, and creation of integration test cases, making the testing phase a high-potential area for short-term productivity improvements.

5. **Operation**
   In the operation phase, which involves back-office operations and system monitoring to provide digital services safely and reliably, collaborating

with generative AI allows for rapidly generating many FAQs based on user feedback. Also, predicting system performance degradation and security threats in digital services and generating alerts is possible.

Demonstration experiment of using generative AI in the IT department

NRI conducted a demonstration experiment to see how far the IT department's current intellectual labor could be advanced by collaborating with generative AI. Specifically, we used ChatGPT to define the requirements based on the assumption that we were building a new corporate e-commerce site.

First, we asked ChatGPT to create a system configuration diagram. Teaching ChatGPT how to create a system configuration diagram and conveying the requirements for the system configuration diagram to ChatGPT generated a system configuration diagram using HTML. The next step was to create a list of system functional requirements. We used ChatGPT again to check for missing features, generating a feature overview proposal. This eliminated the need to manually list each feature one by one, significantly reducing time.

As a result of collaboration with ChatGPT, we reduced the time by approximately 39% in the requirement definition phase. For example, when defining the purpose and system requirements of a new EC system, humans and ChatGPT collaboration saved approximately 43% of the time. Similarly, we achieved a time reduction effect of approximately 33% on explaining system overviews, creating project organization charts, and creating schedules.

In addition to saving time, we also experienced qualitative improvements in quality by collaborating with ChatGPT when writing down the directions and requirements for a new system. It has become clear that collaboration with AI not only improves work efficiency, but also contributes to improving the quality of requirement definition created. This verification result shows the possibility of improving the productivity of intellectual labor brought about by collaboration with generative AI. By collaborating with generative AI in requirement definition and other processes, the QCD of intellectual labor in the IT department can be greatly improved.

Summary

Generative AI has the ability to produce new ideas and solutions to problems, conduct simulations to solve complex issues, and quickly generate a large number of prototypes. It can also provide decision-making support and convert individual knowledge into organizational knowledge, which accelerates our intellectual labor.

Undoubtedly, generative AI will bring significant changes to the way we work and manage organizations. Although we have not fully utilized all the capabilities of generative AI, collaborating with AI holds the promise of a hopeful new future.

Source:
※Sequoia Capital Generative AI: A Creative New World
https://www.sequoiacap.com/article/generative-ai-a-creative-new-world/

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