A Survey Report on 2025 B

Honoka Kawanami
Doshisha University
Faculty of Sociology / Department of Sociology
Fujimoto Laboratory

This study describes the development of a system that reproduces the very thought processes of experts as AI, along with the underlying philosophy and practices. The developer aimed to model the thought processes humans perform mentally as AI, spending approximately ten years developing a unique AI system. While artificial intelligence fundamentally means “artificial intelligence,” in practice, many AI systems mimic observable actions or outcomes. Reproducing the thought process itself—how humans think, judge, and arrive at actions—is not easy. For example, in manufacturing, AI can detect product defects through image analysis, but it remains unclear how skilled workers make such judgments. Therefore, the developer adopted a new approach of “artificial intelligence for thought itself” and decided to pursue it as a business.

The central concept of this initiative is “generalization.” This refers to organizing the knowledge and thinking possessed by experts not into fixed, specific formats, but as insights that can be utilized in a more general and flexible manner. While the concept of “formalizing tacit knowledge” is often used in manufacturing, simple formalization risks losing the original background and context. Therefore, the term “generalization” is used, aiming to organize knowledge in a way that can be flexibly passed on to the next generation. The AI system's algorithms were designed by the developers themselves and built using deep learning-based techniques that vectorize linguistic relationships. Implemented in Python, it combines with graph databases to create a mechanism for expressing relational thinking. The developer previously worked on software for lens polishing simulations at a company, gaining experience in mathematically modeling and reproducing the thinking of skilled technicians. This experience formed the foundation for AI development. While initially considering applications across multiple fields like agriculture, education, and sports, the focus ultimately narrowed to manufacturing. The reason was the high sophistication of intellectual activities on the shop floor and the significant reliance on individual experience and judgment.

The developer envisioned creating not a large system, but an “AI like capillaries” that permeates the workplace. This philosophy stems from the experience of the Great East Japan Earthquake. Hailing from Iwate Prefecture, the developer volunteered in the disaster zone and realized that what many people truly sought wasn't just aid, but “work they could take pride in.” This experience led to the decision to start a business to create jobs locally, establishing the company in 2016. Subsequently, experience working with a local mold manufacturer led to the concrete development of the AI business. In small and medium-sized enterprises, a single skilled worker often shoulders many responsibilities, including sales, quoting, and process management. At a company in Yamagata, the factory manager fulfilled this role. Attempts to systematize this thinking revealed a complex thought structure that couldn't be captured by simple manuals. This led to the idea that if the relationships within this thinking could be directly reproduced as AI, the knowledge would remain within the company even if the skilled worker left. Furthermore, while researching

regional industries, attention was drawn to the relationship between traditional crafts and university research. Regional industries, such as the casting techniques for Nanbu ironware in Iwate Prefecture, are closely intertwined with academic research. Since manufacturing relies on the combination of materials and processing methods, we considered the possibility of systematizing this knowledge using AI. We actually conducted joint research with a Nanbu ironware manufacturer and a university, advancing efforts to digitize the craftsmen's thought processes into AI. Through interviews with skilled artisans, we elicited their thought processes at each manufacturing stage and modeled these cognitive relationships. Interviews were primarily conducted with a single expert artisan. Having multiple participants tends to result in general statements rather than deep, specific thinking. The insights gained through this process were then integrated into an AI system.

The image generated by AI.