JAIST Repository
https://dspace.jaist.ac.jp/

Title	大規模言語モデルを活用した現場知識共有支援
Author(s)	小川, 陸
Citation	
Issue Date	2025-03
Type	Thesis or Dissertation
Text version	author
URL	http://hdl.handle.net/10119/19765
Rights	
Description	Supervisor: 内平 直志, 先端科学技術研究科, 修士 (知識科学)

JAIST
JAPAN
ADVANCED INSTITUTE OF
SCIENCE AND TECHNOLOGY

Japan Advanced Institute of Science and Technology

Abstract

This study proposes and evaluates a knowledge management method utilizing Large Language Models (LLMs) to effectively share the knowledge of field workers.

While AI advancement has enabled the automation of various tasks, field operations requiring workers' experiential judgment remain challenging to automate. Particularly, the transfer of tacit knowledge from experienced workers to newcomers is a critical issue. However, effective knowledge sharing has been hindered by the difficulty of operating digital devices during physical work and the lack of common experiences among workers in different locations.

Gen-Ba knowledge refers to knowledge that exists at the boundary between tacit and explicit knowledge, which is difficult to externalize outside the actual work environment. The term "Gen" means "actual" or "real" in Japanese, while "Ba" means "field" collectively referring to the specific location where workers perform their actual tasks. This unique form of knowledge emerges and can only be captured in the actual work environment.

This research proposes two LLM-based approaches to effectively share Gen-Ba knowledge collected through a voice memo system. The first approach automates the classification and organization of awareness messages, replacing manual preparation work with LLM-based text classification. The second approach facilitates discussion by extracting related awareness messages through LLM-based similarity search, which serve as triggers for knowledge sharing.

To validate the proposed methods, experiments used data from electrical safety operations. The results demonstrated that LLM-based text classification could efficiently organize awareness messages. Furthermore, knowledge-sharing workshops utilizing similarity search confirmed that referencing related messages stimulated discussions, enabling deeper sharing of Gen-Ba knowledge in similar situations.

The academic significance of this study is that it proposed a method to support Gen-Ba knowledge sharing by selecting and presenting examples similar to those discussed in the workshop and modeled the potential expression of Gen-Ba knowledge by the proposed method. As a practical contribution, the proposed method reduces the cost

of knowledge sharing in the field and contributes to the establishment of knowledge sharing initiatives by showing a concrete method to realize effective knowledge sharing while reducing the burden on the field.

Future challenges include validation in diverse field settings, exploration of advanced AI technologies like GPT, and further research on knowledge utilization methods, such as knowledge structuring and integration with work processes.

The proposed LLM-based knowledge management approach contributes to the advancement of knowledge management as a novel methodology for knowledge transfer among field workers.