News Release

Konica Minolta's Data Scientist Wins the Gold Medal in the World's Largest AI Competition Hosted by Kaggle

Harnessing Optimization Technology Used in Production DX

Tokyo (March 13, 2025) – Konica Minolta, Inc. (Konica Minolta) announced that its data scientist won the 13th prize in Santa 2024 - The Perplexity Permutation Puzzle - hosted by the world's largest AI competition platform, Kaggle, and received the gold medal together with other winners.

In the Kaggle competition, many world-leading data scientists and machine learning engineers vie to prove their skills. Being among the winners of this prestigious competition has raised international awareness of the Company's design and technical prowess in data science and AI engineering.

A data scientist of Konica Minolta and members of the University of Electro-Communications, including Professor Kei Harada (Department of Informatics), formed a joint team to participate in the competition and won the gold medal.

Gold Medal Winner

Konica Minolta, Inc.
Go Yamaguchi
Data Science Center, Technology Development
Headquarters

"It is a great honor to win the gold medal with faculty members of the University of Electro-Communications, who gave generous support. Kaggle is one of the few platforms where global data scientists can work on the same task and share various approaches, making it a very useful learning space," said Yamaguchi. "I will use the knowledge gained through the competition in my work and will keep deepening my knowledge with the aim of winning the higher title of Kaggle Master."

Outline and Results of the Competition

The task of the competition, which was called "Santa 2024 - The Perplexity Permutation Puzzle," was to rearrange texts consisting of up to 100 English words to create the most natural texts for a Large Language Models (LLM). This required efficiently searching for solutions from the huge number of combinations of words, making the competition extremely difficult.

The team comprising Konica Minolta's data scientist and three members from the University of Electro-Communications achieved high scores by combining various techniques, such as Simulated Annealing,[1] Genetic Algorithm,[2] and Iterated Local Search.[3] Notably, the team succeeded in efficiently finding optimal solutions by introducing multiple neighborhood operations, which are also used for the Traveling Salesman Problem (TSP),[4] and by properly adjusting hyperparameters for the experiment to avoid local optimal solutions. Consequently, the team was able to produce good results.

Some of the techniques used in the competition have been applied to Konica Minolta's "Production DX" and have helped optimize production conditions, logistics routes, and production plans while considering various constraints.

Konica Minolta's Production DX

Konica Minolta aims to improve the productivity of all its operations through DX, including using generative AI, as a measure to foster human resources and enhance the labor productivity to attain the Medium-term Business Plan and thereby achieve sustainable growth into the future. For example, the Company has been working to establish a production system to improve efficiency and reduce environmental impact based on the concept of Production DX by combining on-site capabilities honed through improvement activities at production sites, with digital manufacturing, which takes full advantage of advanced ICT.

Production DX specialists with high engineering capabilities, including the data scientist who participated in the competition, are part of Konica Minolta's initiative to reinforce its production and procurement foundation.

[1] An algorithm in which results also change for the worse with a certain probability to calculate an optimal solution
[2] An algorithm which aims to achieve optimization through operations, such as selection, crossover, and mutation, based on an optimization technique inspired by the evolution of organisms
[3] An algorithm which derives a better solution from a neighboring solution while deriving a local optimal solution
[4] A problem involving searching for a route that visits all cities in the minimum time based on a set of cities and traveling times between them

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