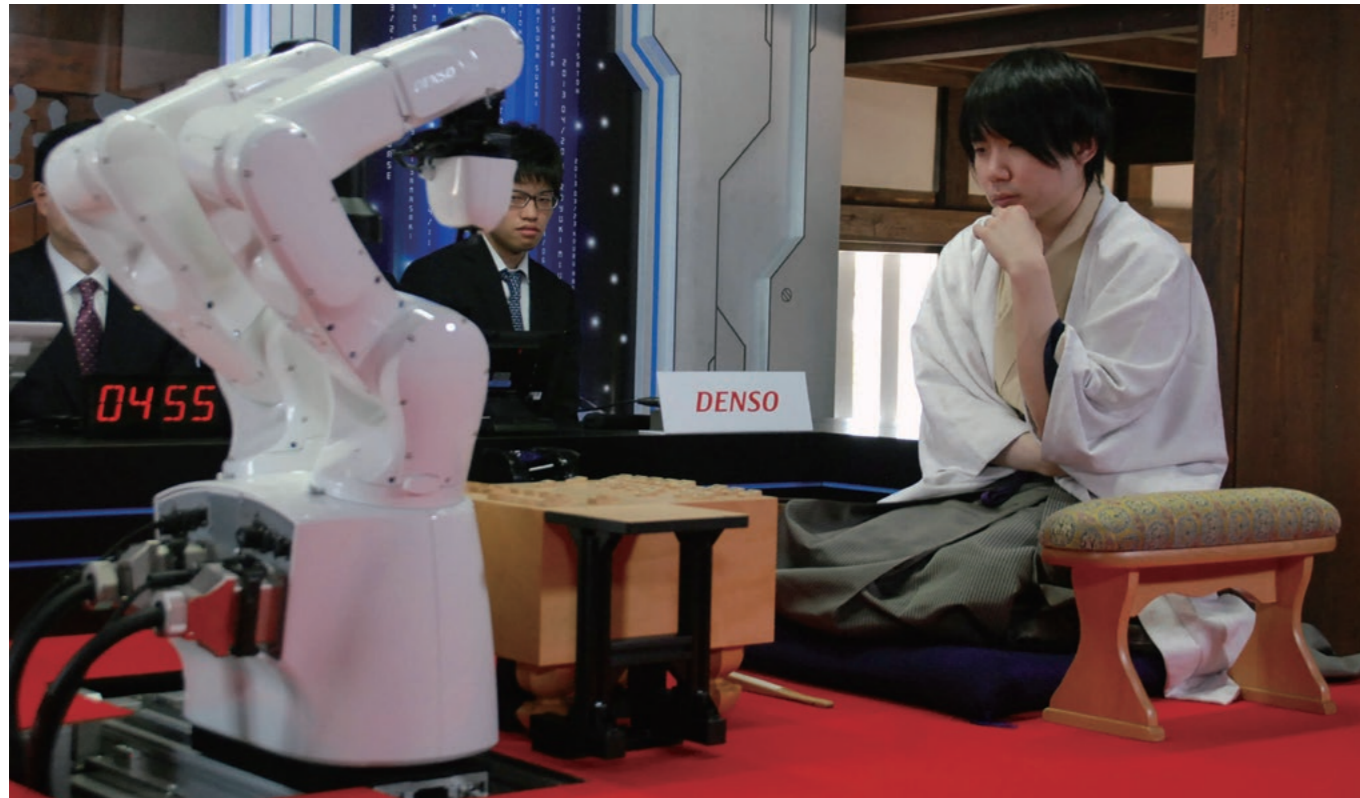


# Artificial Intelligence: A Rival for Humans, or a Partner?



Amahiko Sato (right), the current *Meijin* title holder, in a match with shogi AI at the Shogi Denou Tournament, in which professional shogi players play against various kinds of shogi AI.

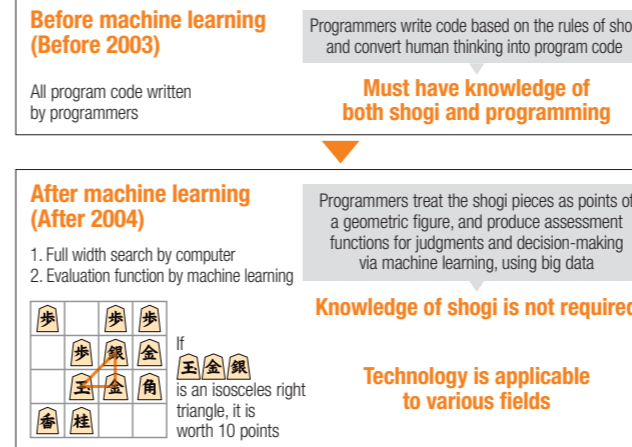
A “technological singularity,” when artificial intelligence, or “AI,” surpasses human intelligence, is coming closer to reality. In 2017, AI software named “Ponanza” that plays shogi—a Japanese game similar to chess—defeated the holder of the *Meijin* title, one of the most prestigious titles in professional shogi, for the first time ever. Because shogi allows players to use captured pieces as their own, the number of potential moves is 10 raised to the power of 100 times more than in chess, making the game substantially more complex.

HEROZ, Inc., founded in 2009 by Takahiro Hayashi and Tomohiro Takahashi, is the AI tech company whose engineers developed the Ponanza software. The company’s online application “Shogi Wars” has a feature by which, at the touch of a button, a player not sure of the best move to make can have the AI select the best possible strategy on his or her behalf for the next five moves. The player can thereby learn new tactics through

the AI software. Currently, over 250,000 shogi matches are played on Shogi Wars daily, and the company has accumulated game data on a total of more than 320 million matches during the five years since the app was first launched. Moreover, even professional shogi players are playing games on Shogi Wars to learn the moves used by Ponanza and other AI shogi software. Hayashi says of this relationship, “AI is not a rival of human beings, but a partner for learning together.”

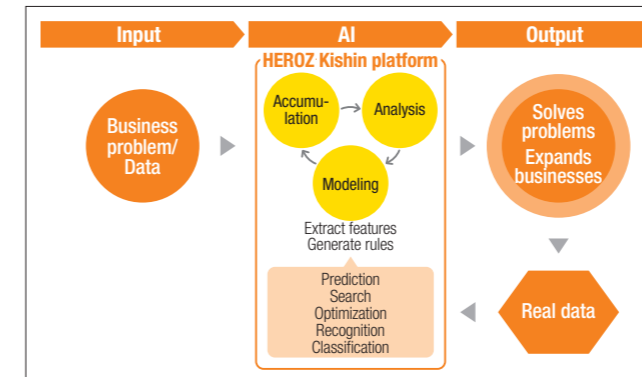
A unique feature of HEROZ is that it develops and provides the AI platform “HEROZ Kishin,” which can be used by various industries, including finance. This platform applies machine learning, including deep learning, accumulated through the development of its AI shogi software to evolve AI-related techniques. For example, together with a stock brokerage firm, it has developed a system for institutional investors that studies past share price and transaction data and forecasts share

## Innovation through machine learning



The shogi AI can think of moves outside the range of human thinking. These moves are based on computed evaluation scores which the AI has learned from big data. This method does not rely on shogi’s rules, and can be applied to various fields.

## HEROZ Kishin platform



HEROZ Kishin solves various types of problems by accumulating real data as big data, and analyzing and modeling it. It also improves the accuracy through continuous learning.

prices several minutes into the future based on the current share price and trading volume. Similarly, in the construction industry, together with a general contractor, the company is now developing an AI system by which the AI studies structural design data of the past as well as design know-how, rules, and the like, and then assists with the structural design process by producing multiple structural design proposals in a short time. The result will be that designers will be able to concentrate on more creative tasks and spend more time creating new design proposals. Takahashi says, “We have a mission of creating services that amaze the world. In light of that, we will contribute to resolving our clients’ problems and expanding their operations by making HEROZ Kishin available to all industries, including the finance, construction, automotive, and transport and logistics industries, and push ahead with an AI revolution. We want to foster companies that make use of AI in every aspect of their

operations, to the point that in the future, we’ll be saying that necessary infrastructure is electricity, gas, water, and AI.”

Nomura Research Institute, Ltd. estimates that over the next decade or two, approximately 49% of Japan’s working population will be able to be replaced by AI or robots. However, Hayashi’s analysis is that, “Many are under the false impression that people will be deprived of jobs because of the emergence of AI. But what AI does best is tasks that can be represented by numerical data. The expansion of services using AI in the future will lead to an increase in jobs in design and other creative domains in which human beings have always excelled. Looking back at history, the advent of the automobile caused a marked decrease in jobs related to horses and horse-drawn carriages, but the automotive industry and its related industries developed dramatically, to a scale several times larger than what they replaced.”

In 2016, Japan positioned AI as one of the technological foundations for bringing about a super-smart society, often referred to in Japan as “Society 5.0.” And, with a view to supporting AI research and development, Prime Minister Abe gave instructions for the launch of the Artificial Intelligence Technology Strategy Council, under which industry, academia, and government come together and pursue cooperation in research and development. Hayashi underscores Japan’s strong position, saying, “Although AI engineers are in short supply throughout the world, Japan has a solid number of highly capable AI engineers.” Takahashi agrees, adding, “Right now, Japan has a great opportunity. Japan should press forward boldly with forward-looking AI policies at the national level, not only at the level of individual companies.”



HEROZ, Inc. COO Tomohiro Takahashi (left) and CEO Takahiro Hayashi (right). HEROZ has more than 10 employees with amateur shogi rankings at the *dan* level, for which only high-level players qualify. Hayashi says, “We found out later that people we knew through playing shogi were superb programmers.” Takahashi adds, “It’s clear that shogi and programming are highly in tune with each other.”