

RIKEN AIP-FUJITSU Collaboration Center

Fujitsu Is Aiming for Human-Centric AI

In recent years, along with globalization and digitization, social and economic systems have become diversified and complicated. It is almost impossible for humans as decision makers to clarify the scope of all social changes and take appropriate strategic measures. However, for social issues that are difficult to surmount, such as an aging population combined with the diminishing number of children and natural disasters, it is required to predict the future appropriately and make better judgments.

Under such circumstances, utilizing artificial intelligence (AI) is attracting increased attention these days. AI has the potential to dynamically transform industry and society by speedily supporting human judgments and activities.

Fujitsu has a vision to develop "human-centered AI that collaborates with people," with the aim of realizing the fulfillment of lives through the utilization of AI, putting people at the center. Fujitsu structured this human-centered AI as "Human Centric AI Zinrai" and is aiming to solve issues by combining people and its automatically evolving AI, and has also begun incorporating it into a variety of products and services.

Collaborating with RIKEN AIP and Appropriately Predicting the Future

The RIKEN Center for Advanced Intelligence Project (AIP Center) and Fujitsu have opened the "RIKEN AIP-FUJITSU Collaboration Center" and started operations in April 2017. By integrating AI technologies collected at the RIKEN AIP Center and Fujitsu's wide variety of ICT technologies and system development experiences, Fujitsu is working on R&D to create "AI that predicts the unpredictable."

"AI that predicts the unpredictable" is AI that supports better decision-making for people based on appropriate future predictions, even in the face of environmental uncertainties. Toward this realization, the RIKEN AIP-FUJITSU Collaboration Center will advance research on Robust Machine Learning, Fusing Simulation and AI, and Structuring Large-Scale Knowledge, forming a trinity.

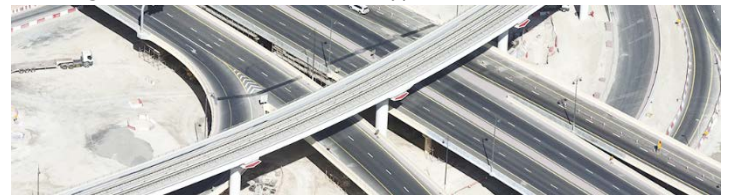
For example, conventional machine learning has a fundamental issue in that, without massive volumes of high quality data, it cannot provide sufficient predictive capabilities. In order to overcome this issue, the center aims to appropriately predict the future, even with limited amounts of or incomplete data.

Fields to be Applied

This AI technology is expected to be applied to many fields, with the following three fields as examples:

① Social Infrastructure

Ensuring both appropriate defense and continued operation of internal systems by not only detecting attacks but also anticipating the range of influence when a new type of virus is detected.



② Healthcare

It is said that a change occurs in the brain 10 years before the onset of dementia. AI that can detect a small change in the brain makes it possible to discover such subtle changes at an early stage to help prevent symptoms of dementia. It can also be applied to situations that are difficult to assess, such as intractable diseases, rare diseases and new kinds of influenza.

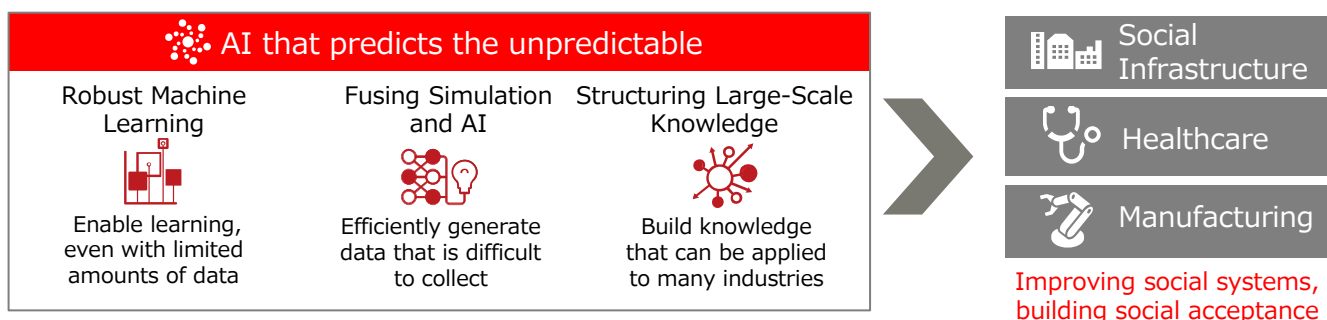


③ Manufacturing

AI will drive the discoveries of unprecedented highly functional materials that significantly exceed current energy conversion efficiencies such as solar cell materials or cost-effective magnetic materials that do not exploit rare earth.



Research agenda for the RIKEN AIP-FUJITSU Collaboration Center
Support better decision-making for people based on appropriate future predictions,
even in the face of environmental uncertainties



Research projects

The center will further joint research across two phases, with phase one extending for three years after the establishment of this center, while phase two consists of its fourth and fifth years. In the first phase, the center will move forward on the following three projects. In the second phase, the center will work on R&D for base technologies that integrate the results of these three research projects, aiming to create "AI that predicts the unpredictable."

① Robust Machine Learning: Accurate predictions of the future in any environment

The center will conduct R&D for robust machine learning to respond flexibly to environmental changes and properly predict the future. Existing machine learning has a fundamental issue in that, without massive volumes of high quality, complete data, it cannot provide sufficient predictive capability. In order to overcome this issue, the center will develop innovative core machine learning technology capable of making accurate predictions of the future, even with limited amounts of data or incomplete data.

In addition, the fact that it's not possible to clearly show the cause and effect relationship that leads to AI's prediction results in machine learning has been a significant barrier to promoting implementation in society. In response to this sort of issue, the project will be working to develop new principles and technology in causal estimation and inference, aiming to improve the explanatory ability of prediction results. Specifically, the center will be carrying out trials of technology using a variety of on-site data from the manufacturing and security fields.



② Fusing Simulation and AI: Fast and accurate predictions of the future

Using development experience from the world's top-class supercomputers, particularly the K computer, as well as supercomputer applications, the center will work on R&D for an AI that provides more accurate predictions of the future by creating the data using simulations for environments where data is difficult to collect.

In addition, the center will use AI to improve the validity and reliability of simulation models, to achieve high-speed estimation and automatic analysis of simulation results, as well as highly accurate results estimation when running a simulation based on insufficient data.

In terms of specific applicable fields, the center aims to develop simulators enhanced with AI for the manufacturing and healthcare fields, among others.



③ Structuring Large-Scale Knowledge: Formulating better policies

The center will work on R&D for structuring large-scale knowledge in order to enable effective formulation of policy for complex social and economic issues using AI.

The center will develop base technology to extract structured knowledge that can be used by AI from massive amounts of information that has not been structured for use by AI. Moreover, in order to create interdisciplinary and inter-industry open innovation and resolve complex issues, the center will develop core technology that enables the fusion and migration (application to other fields) of knowledge based in different industry fields and academic fields.

Specifically, the center aims to apply this technology to such industries as the chemical, pharmaceutical, and food processing industries, as well as to improve productivity and transform the ways people work.



Toward the Creation of "Japan First" and "World First" Innovations

Other than the above, Fujitsu and RIKEN will closely collaborate in the AI field, such as building the "Deep Learning System." Fujitsu and RIKEN will continue striving to create "Japan First" and "World First" innovation by conducting consistent research; from the development of basic technologies to their eventual implementation in society.

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