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Watanabe Memorial Foundation for The Advancement of New Technology
Fiscal 2023 Second-Term Grants-in-Aids for Scientific and Technological Research

Research on Social Implementation and Risk Management of Advanced AI —Strategy for Utilizing AI in 5G/6G-Communication Era—
Progress Report

February 2025

The Engineering Academy of Japan
Research Project for "Research on Social Implementation and Risk Management of Advanced AI —Strategy for Utilizing AI in 5G/6G-Communication Era—"
(Project Leader: Kensaku Mori)

February 13, 2025

The Engineering Academy of Japan

The Engineering Academy of Japan (EAJ) is a non-profit, non-governmental organization established for the purpose of contributing to the advancement of engineering and technological sciences in Japan. Its members are engineering leaders in industry, academia, and government. EAJ has several project teams that lead to the solutions for various issues with fully utilizing its broad network and abundant experience and knowledge of EAJ members. With these project teams playing the core roles, EAJ promotes investigation and proposal activities, also with the cooperation of external people and organizations. EAJ summarizes the outcome of its activities, proposes leading-edge and creative policies to public agencies, legislative bodies, industry, academic societies, research institutions, etc., in terms of the directions society should take, and supports the social implementation of the proposed policies.

EAJ's research project for **"Research on Social Implementation and Risk Management of Advanced AI —Strategy for Utilizing AI in 5G/6G-Communication Era—"** aims to develop strategies for artificial intelligence (AI) utilization in the era of high-speed, high-capacity information networks. Through discussions with experts from leading domestic and international research and development institutions and companies in the fields of information and communication technology and AI, we identified the latest trends in research, development, and social implementation of AI, as well as current challenges. We also clarified the necessary measures for the appropriate development and social implementation of next-generation AI technologies. As a result, we have complied key issues and recommendations for Japan to address in order to ensure that the country does not fall behind global standards in the creation and dissemination of next-generation AI technologies. Our team drafted a report summarizing the results, which was reviewed by the Policy Proposal Committee, examined by the Council, and finalized. Only then did the Council of EAJ decide to release the final version of this report. We hope you find it informative and useful.

This report summarizes and publishes the results of the research project, “Research on Social Implementation and Risk Management of Advanced AI ―Strategy for Utilizing AI in 5G/6G-Communication Era―,” conducted with support from Watanabe Memorial Foundation for The Advancement of New Technology. Table 1 lists the members of these projects.

Table 1 Members of EAJ’s research project for “Research on Social Implementation and Risk Management of Advanced AI ―Strategy for Utilizing AI in 5G/6G-Communication Era―”

Role	Name	Organization/Post (as of December 31, 2024)
Leader	Kensaku Mori	Professor, Nagoya University / Director, Research Center for Medical Big Data, National Institute of Information
Subleader	Hajime Asama	Professor, Tokyo College, The University of Tokyo
Organizer	Yoshihiro Shiroishi	Representative Director and Senior Executive Director, EAJ
Organizer	Yoshikazu Nakajima	Professor, Institute of Science Tokyo
Organizer	Michiharu Nakamura	Advisor, EAJ
Organizer	Koichi Morimoto	Executive Director, EAJ
Secretary	Takaaki Sugino	Assistant Professor, Institute of Science Tokyo
Member	Shigeo Urushidani	Professor / Vice Director-General, National Institute of Informatics
Member	Kei Okada	Professor, The University of Tokyo
Member	Masaru Kitsuregawa	President, Research Organization of Information and Systems / University Professor, The University of Tokyo
Member	Taichi Kin	Project Professor, The University of Tokyo
Member	Yuta Kochi	Professor, Institute of Science Tokyo
Member	Fumio Shimpo	Professor, Keio University
Member	Osamu Sudo	Professor, Chuo University
Member	Tadahiro Taniguchi	Professor, Ritsumeikan University
Member	Tsutomu Terada	Professor, Kobe University
Member	Norihiro Hagita	Professor, Osaka University of Arts
Member	Yuko Harayama	Professor emeritus, Tohoku University
Member	Susumu Hirano	Professor, Chuo University
Member	Kenji Mase	Professor emeritus, Nagoya University
Member	Yutaka Matsuo	Professor, The University of Tokyo
Member	Naoko Matsuda	CEO, bestat Inc.

Summary

The evolution and development of AI over the past few decades have been remarkable, making AI an indispensable presence in our lives and an essential infrastructure. Moving forward, it is anticipated that AI will continue to advance in reliability, generalization, and commoditization, enabling humans and AI to collaborate across various aspects of daily life and shaping society together. However, as AI becomes more integrated into society, concerns surrounding its adoption are also becoming increasingly apparent. To create a prosperous future society where humans and AI coexist harmoniously, a society free from disparities based on region, race, gender, or other factors, and a safe and peaceful society without the threats of war or invasion, it is imperative to proactively and promptly address these issues. This requires proposing balanced options that contribute to both international and national interests, facilitating their translation into policies, and implementing proactive and appropriate measures.

In this context, this project aims to contribute to the recovery of Japan as a technology-driven nation and the realization of societal well-being. To achieve this, the project conducted surveys and analyses on the future of AI technologies, their applications, and the expectations and challenges for policies. This included interviews and discussions with domestic and international research and development facilities involved in communication and AI technologies, organizations implementing AI in society, institutions studying the societal transformations and sociological impacts of AI, and legislative and administrative bodies considering AI regulations. Through these effects, the project sought to accurately understand the societal transformations brought about by the rapid proliferation and development of AI technologies, even in the absence of comprehensive legal regulations, as well as the risk management strategies that have been or are being implemented. Based on these findings, the project aimed to identify the inherent challenges in AI's societal implementation, Japan's strengths, and the optimal strategies moving forward. The ultimate goal was to develop strategies and policy scenarios for the development and utilization of AI technologies, including generative AI, and to compile these findings into a report that is accessible to the public, serving as a policy proposal.

This report and policy proposal summarize the results of the research conducted under the aforementioned background, awareness of the issues, and objectives. It begins with an overview of the current state of AI, the motivations behind the creation of this report, and its purpose and positioning. It then provides an outline of the foundational and applied technologies supporting AI's development to date, including trends in research and development in information and communication technologies and AI. Furthermore, the report organizes the technical, ethical, and legal challenges and risks associated with next-generation AI technologies. Based on these challenges and risks, it discusses the directions for technological innovation, ethical

considerations, and legal regulations required for next-generation AI. Finally, as a comprehensive policy proposal derived from the research project, "Research on Social Implementation and Risk Management of Advanced AI —Strategy for Utilizing AI in 5G/6G-Communication Era—," the report emphasizes the importance of advancing AI research, development, and societal implementation from the following four perspectives to achieve a prosperous society through the evolution and deepening of AI:

1. Transparency and high reliability of AI
2. Generalization of AI
3. Multimodal human-AI interfaces, evolution of AI interfaces, and Zero UI
4. Development of social systems, including legal regulations and industrial education promotion, and addressing the diversification of ethics and values