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創発的研究支援事業 年次報告書

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研究課題名	Design-Centered Governance for Human-Robot Co-Existence: From the Ethical Design Perspective 人間とロボット共存のためのデザイン中心ガバナンス：エシカルデザインの視点から
研究実施期間	2023 年 4 月 1 日～2024 年 3 月 31 日

研究成果の概要

The short-term prospect of my FOREST research project is to solve the regulatory gap of (hard) law from emerging AI robots by using AI ethics standards as a basis to develop a design-centered ecosystem for robot governance. Below are the achievements of the four research themes in AY2023.

(A) Soft Law-oriented HRI Governance:

Due to the above considerations of hard law, this project will focus on using soft law for HRI governance. From the figure below, the range of soft law covers the market, norms, and architecture. At this moment, norms are the most active ones in HRI governance among them. Hence, in A comparative analysis of recent European legislation (A-1), we have done with the publication – Yueh-Hsuan Weng (2024) Ethical Design and Standardization for Robot Governance. Woodrow Barfield, Yueh-Hsuan Weng, Ugo Pagallo (Eds), Cambridge Handbook on Law, Policy, and Regulations for Human-Robot Interaction, Cambridge University Press (in press). In this chapter, I made a comparative analysis on soft law in robot governance between Type A: Harmonized Standards, Type B: Soft Laws in the narrow sense, Type C: AI Ethics Standards.

(B) Smart Law-oriented HRI Governance:

“Code is Law” or the regulation via the architecture of Cyberspace is the argument by Lessig. Except for the internet, how to apply codes to HRI governance will be a critical challenge as well. With this consideration, my proposal is to use AI ethics standards as “Smart Laws” that can transfer ethical and legal norms into machine-readable formats to help robots behave ethically and safely. In this year, the focus is on ontology and its impact on modeling for legal compliance. A case study of using IEEE 7007-2021 ontological standard (B-2) has done with the publication – Yueh-Hsuan Weng, Enrico Francesconi (2023)

Ethical Design for Privacy-related Communication in Human-Robot Interaction, in Proceedings of the 32nd IEEE International Symposium on Robot and Human Interactive Communication (RO-MAN), Busan, August 28th to August 30th.

(C) Design-Centered Methodology and Empirical Study:

AI ethics standards can be used as either design guidelines for humans (Soft Law) or machine-readable rules for robots (Smart Law). This represents two aspects of Responsible Robots by Design. To establish an ecosystem for using AI ethics standards in HRI governance, we will also need to consider developing a design-centered methodology for guiding robot ethical design.

In create robot ethical design guidelines by assessing five types of social robots (C-1), we have completed a pilot study on social communication robots - LOVOT and their ethical issue on perceived privacy (C-1-3).

In empirical HRI study on Living Lab and its impacts to robot ethical design (C-2), we have established a new living lab at Inamori Frontier Program, Institute of Advanced Study, Kyushu University accompanying with my job transfer to new department in December 2023.

(D) International AI Ethics Standardization.

International standardization works via the IEEE P7017 working group (D-1) have organized IEEE P7017 working group meetings on 2023-05-25, 2023-06-29, 2023-08-31, 2023-09-28, 2023-10-31, 2023-12-14, 2023-12-22 (IEEE SSIT Progress Report), 2024-01-31, 2024-02-29, 2024-03-28, 10 meetings on ethics standardization for robot governance in total. We also chose three prioritized topics as (1) Privacy and Data Protection for Social Robots, (2) Zoomorphic Robots, (3) Religious Use Robots.

In Organize workshops and seminars (D-2), we have organized FRIS Symposium on Social Robots and Ethical Design between July 18-20, 2023 at Aobayama Campus, Tohoku University. About 60 people participated in this event, which includes invited talks given by experts from IEEE and ISO ethics standardization working groups, JST Moonshot R&D Program, practitioners in robotics and healthcare. This event also be considered as a crucial platform for promoting IEEE P7017 standardization.