

R&D Theme

Management of Personal Data (PD)

Progress until FY2022

1. Outline of the project

We have developed PLR (Personal Life Repository) and apps embedding it, where PLR is a software tool for each individual to aggregate and manage her own personal data (PD). We will improve PLR and the apps to develop a personal AI (PAI) that continuously obtains PD from the user and provides services to her. We will also verify the legal and social validity and acceptability of this decentralized PD management (DPDM) and PAI, as well as the robustness, security, etc. of the developed systems, revising and improving the systems and services accordingly.

2. Outcome so far

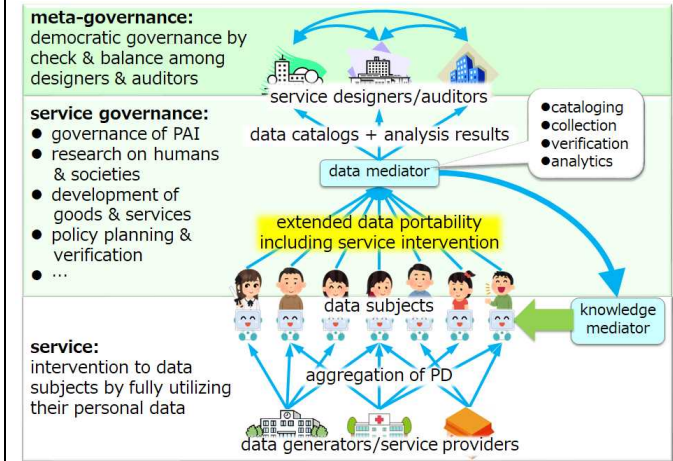
We have improved PLR and apps embedding it, and conducted a verification experiment of a decentralized service for healthcare, in which individuals manage their own PD on their own information devices and share it with service providers as needed. We explained the benefits of DPDM to PMs and other members of other research projects in Moonshot Goal 9, and obtained their understanding about the merit of DPDM reducing the cost and risk while facilitating data utilization by delegating the PD management to the data-subject individuals (their PAI).

Regarding the legal validity of DPDM, we (1) organized and selected research targets in preparation for research in the following fiscal year and beyond, and (2) organized ELSI issues, especially legal issues, regarding DPDM and PAI. As for (1), through interviews and workshops with domestic and overseas legal researchers, we were able

to generally establish the research framework necessary for the following fiscal year and beyond. Regarding point (2), we clarified issues to address in the rest of the project through workshops and conferences.

As for the social acceptability of DPDM, we (1) reviewed previous researches and carried out a qualitative survey and (2) did a preliminary quantitative survey of manufacturing companies in Japan and the Nordic countries, in order to understand the current state of awareness of companies and individuals regarding self-information control and the current gap with the ideal state of awareness. In (1), we were able to gain a better understanding of the differences between Japanese and Nordic individuals' perceptions of PD provision according to their cultural backgrounds (Japan has a high tendency toward uncertainty avoidance), as well as the Nordic success factors for digitalization and the legal system regarding PD handling. In (2), we gained insight into the differences in perceptions of the legal systems of Japanese and Nordic manufacturers.

The system shown in the figure is formulated for the governance of various services, including PAI-based services. Therefore, a system should be established in which the audit of services collects and analyzes the PD aggregated to the person by DPDM from time to time to identify the advantages and disadvantages that each service brings to the user. Since data on interventions from services to users are also needed for this analysis, the concept of data portability should be extended to encompass such data.



3. Future plans

In FY2023, we will realize actual operation of public services based on DPDM, and examine a decentralized matching scheme to search for administrative services that each individual can enjoy without disclosing her PD to others. By integrating legal and social considerations of DPDM, we will also clarify issues related to the legal and ethical validity of DPDM and PAI. Furthermore, we will launch an international standardization project on extended data portability, with the aim of achieving legalization.

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Decentralized Data Platform for Human Research

Progress until FY2022

1. Outline of the project

We will develop a method for low-cost, longitudinal developmental research with low attrition rates utilizing a decentralized PDS. Specifically, we will establish a research platform for conducting developmental research on social cognition while multiple independent research institutions share research participants.

We first establish a method of indirect collaboration among three or more research institutes based on decentralized data management, and show that it is possible to efficiently conduct research not only through collaboration among fixed research institutes, but also through dynamic changes in the collaboration structure as research progresses. In other words, a mechanism will be established whereby independent research institutes will operate data from their own perspectives based on decentralized management. This will not be a mere collaboration between two institutions, but will show that research can be developed efficiently while dynamically increasing the number of collaborating institutions as research progresses.

Since the decentralized management of PD (Personal Data) is to manage and operate personal data by the person (his/her PAI) with his/her name in his/her hands, it is especially important to generate new PD useful to him/her and to operate it flexibly under the decentralized management, especially in the field where there are few databases that aggregate PD useful to him/her. It is important to generate new PDs that are useful to the individual and to operate them flexibly under

decentralized management. Therefore, we will demonstrate that flexible control, such as preventing the disclosure of research methods and ideas that belong to the researcher, is possible under decentralized management by aggregating new PD to the person in question and limiting its disclosure to specific collaborators such as the experiment conductor. Furthermore, we will demonstrate the effectiveness of this method by conducting developmental research that would not be possible without decentralized control and achieving results.

2. Outcome so far

We focused on extending the functions of GO-E-MON, an online cognitive experiment platform we are developing, to help researchers in psychology and developmental sciences understand the benefits of decentralized PDS-based data collection. GO-E-MON is based on Personary App developed by Hasida PI. It is a platform for online experiments and online surveys. As a decentralized data platform for human research, it is necessary to maintain and operate the experiment platform over a long period of time. On the other hand, the progress of AI-related technologies such as Chat-GPT has been remarkable, and it is essential to link with various information services in circulation for the long-term maintenance and operation of the experimental platform. This fiscal year, we have strengthened linkage with online experiment libraries for psychological experiments such as jsPsych, and messaging applications such as Line.

Currently, GO-E-MON is operated by the University of Tokyo, Kyoto University, and Osaka University, and rules

are being established to utilize questionnaire survey data and laboratory experiment data in a form that is named for individual experiment participants.

In FY2022, we attempted to utilize the GO-E-MON in the following.

- research on social cognition of adults
- study on “procrastination behavior” and stress of adults (* Procrastination is defined as “the act of putting off a task even when one knows that doing so will have maladaptive consequences.”)

3. Future plans

In FY2023, long-term and longitudinal developmental studies will be conducted using decentralized PDS. For long-term, longitudinal developmental research, it is essential to operate long-term and securely with data that are named to individuals (children). This is best accomplished using a decentralized PDS. In addition, no previous studies have found a way to safely utilize decentralized data in developmental and cognitive sciences, and this is considered to be a world-leading study. For example, the relationship between parents' daily child-rearing behavior and developmental changes in their children's social cognition is an important issue in cognitive science, and it is expected that new research methods will clarify this relationship.

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