

Development of "Jizai Hon-yaku-ki (At-will Translator)" connecting various minds based on brain and body functions

Project manager

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R&D institutions

Tohoku University

University of Tokyo

National Institute for Physiological Sciences

Tokyo Metropolitan University

Showa University

Leibniz Institute for Resilience Research

Summary of the project

This project aims to develop a *Jizai Hon-yaku-ki* (At-will Translator) to support communications in various situations, contributing to an inclusive society.

Neuroscientists, molecular biologists, and VR/AR and robotics engineers will collaborate to develop technologies to quantify states of mind and methods for perceptual, cognitive, and motor interventions. A *Jizai Hon-yaku-ki* will be produced by combining these technologies and methods, facilitating the communication of individuals and small groups.



Milestone by year 2032

- Establish a unified methodology of mind quantification based on physiological data from the brain, autonomous nervous system, and exosomes.
- Improve the functions of *Jizai Hon-yaku-ki* and establish a general method of user-led R&D.

Milestone by year 2027

- Establish methods of multi-dimension mind quantification.
- Develop a prototype of Jizai Hon-yaku-ki.

Project structure

Item 1 (Tsutsui, Sasaki, Kitajo) quantifies short-term states of mind based on the activity of brain and autonomic nervous sys-

tem. **Item 2** (Hoshino, Nasiri, Osumi) assesses long-term states of mind based on exosomes, small vesicles released from cells and found in body fluid.

Item 3 (Nagai, Inami, Saito, Homae, Hariyama) develops a *Jizai Hon-yaku-ki* system with two central components: (1) an *interpreter* that "reads" one's state of mind



through AI analysis of physiological and behavioral data; and (2) an *expresser* that "conveys" the interpreted states of mind to the user through sensory technologies like VR/AR and robotics. **Item 4** (Kumagaya, Nakamura) promotes the social implementation of *Jizai Hon-yaku-ki* initially targeting people with autistic spectrum disorders (ASD) and other developmental conditions. **Item 5** (Tsutsui) expands the usage of *Jizai Hon-yaku-ki* to the general population, specifically in early education.

Item 6 (Osumi, Hara) analyzes the ethical, legal, and social issues (ELSI) at every step of our R&D project to ensure *Jizai Hon-yakuki* is socially acceptable.

Acceleration item (Bergmann, Tuescher) aims to develop a method to identify the brain activity that serves as long-term neural indicators of mental well-going in real time.

