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

Project manager

(selected in 2021)

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Leader's institution

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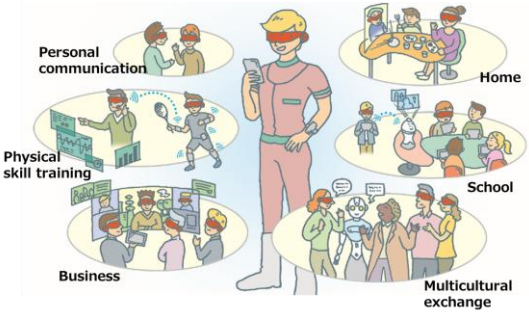
R&D institutions

Tohoku University
The University of Tokyo
National Institute for Physiological Sciences (NIPS)
Tokyo Metropolitan University
Showa Medical University
Leibniz Institute for Resilience Research (LIR)
University College London (UCL)

Summary of the project

This project aims to develop a *JIZAI (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 Translator* will be produced by combining these technologies and methods, facilitating the communication of individuals and small groups.



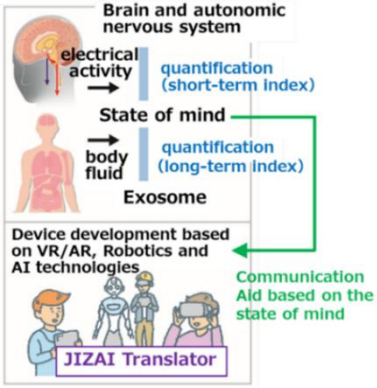
Milestone by 2032

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

Milestone by 2027

- Establish methods of multi-dimension mind quantification.
- Develop a prototype of *JIZAI Translator*.

Project structure



Item 1 (Tsutsui, Sasaki, Kitajo) quantifies short-term states of mind from brain and autonomic nervous system activity.
Item 2 (Hoshino, Nasiri, Osumi) assesses long-term states of mind using exosomes, small vesicles released from cells into body fluid.
Item 3 (Nagai, Inami, Saito, Homae, Hariyama) develops a *JIZAI Translator* with two core components: (1) an *interpreter* that "reads" states of mind through AI analysis of physiological and behavioral data, and (2) an *expresser* that "conveys" them via sensory technologies like VR/AR and robotics.
Item 4 (Kumagaya, Nakamura) promotes the social implementation of *JIZAI Translator* initially targeting people with autism spectrum disorders (ASD) and other developmental conditions.
Item 5 (Tsutsui) expands the usage of *JIZAI Translator* to the general population, particularly in early education.
Item 6 (Osumi, Hara, Nakazawa, Aketani) analyzes the ethical, legal, and social issues (ELSI) throughout the project to ensure the social acceptability of *JIZAI Translator*.
Item 7 (Kitajo, Bestmann) develops next-generation magnetic sensing technologies to read states of mind from brain activity.
Item 8 (Tsutsui) builds and deploys a database hub to develop common indicators and establish well-going metrics.
Acceleration Item (Bergmann, Tüscher) develops real-time methods to identify brain activity that serves as long-term neural indicators of mental well-going.