Here begins our new MIRAI

Goal9 Realization of a mentally healthy and dynamic society by increasing peace of mind and vitality by 2050.

MOONSHOT
RESEARCH & DEVELOPMENT PROGRAM

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

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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.
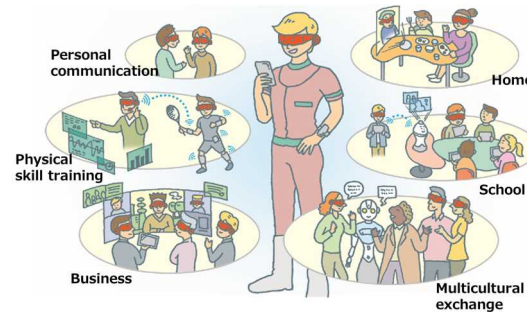
Milestone by year 2032

- 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*.

R&D theme structure of the project

R&D Themes 1 and 2 aim to establish a methodology for mind quantification through animal research as well as human application. **R&D Theme 1** (Tohoku U: K. Tsutsui, T. Sasaki & NIPS: K. Kitajo) quantifies one's short-term states of mind based on the activity of brain and autonomic nervous system. **R&D Theme 2** (Tokyo U: A. Hoshino) assesses one's long-term states of mind based on exosomes, extracellular small vesicles released from cells and found in body fluid.

R&D Theme 3 (Tokyo U: Y. Nagai, M. Inami, H. Saito & Tokyo Met. U: F. Homae) develops a *Jizai Hon-yaku-ki* system. It consists of two central components: (1) an *interpreter* that "reads" one's state of mind through AI's 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.

R&D Theme 4 (Tokyo U: S. Kumagaya & Showa U: M. Nakamura) promotes the social implementation of *Jizai Hon-yaku-ki* targeting people with autistic spectrum disorders (ASD) and other developmental conditions as initial users. **R&D Theme 5** (Tohoku U: K. Tsutsui) broadens the usage of *Jizai Hon-yaku-ki* to the general population, specifically in early education. Finally, **R&D Theme 6** (Tohoku U: N. Osumi) analyzes the ethical, legal, and social issues (ELSI) accompanied by every step of our R&D project, making *Jizai Hon-yaku-ki* socially acceptable.