

## Awareness AI Robot System for leading proactive behavior improvement

### Project manager

(selected in 2022)

**SHIMODA Shingo**

Designated Professor, Graduate School  
of Medicine, Nagoya University,



### Leader's institution

Nagoya University

### R&D institutions

Nagoya University, RIKEN,  
AIST, University of Tokyo,  
Japan Women's University,  
TOYODA Gosei Co. LTD

### Summary of the project

How can people live their lives positively all the time? One keyword for that is 'awareness.' It's something everyone experiences when they lose motivation after being told, 'Study!' People find it difficult to approach things positively when they are told by others. However, we know that when we 'become aware' of the necessity and importance of studying, we can actively and positively engage in it, leading to significant achievements. Not only in studying but also in understanding 'what abilities we possess' and 'what areas we should focus on,' if we had a robot that could make us aware of such things, wouldn't our lives become more positive and vibrant than they are now? In this project, we aim to develop an AI that silently watches over us and provides appropriate support for awareness based on our abilities, striving to create a society where everyone can live positively.

### Milestone by year 2030

#### FY2030 Milestone

We aim to model the inner aspects of individuals, including insights and discomfort, in order to enhance the generalization of Awareness AI. This innovative model is designed to visualize physical conditions using digital technology and establish a groundbreaking medical field known as cognitive intervention therapy. Building on these achievements, we are developing a seamless system that offers assistance from artificial objects in everyday life, ensuring a comfortable experience for users. Additionally, we are tailoring this assistive system to cater to specific situations.

What exactly is 'awareness'? We believe that we have 'consciousness' within ourselves, and it is undoubtedly mainly generated by our brains. However, inside the brain, there are far more things that are unconscious and processed unconsciously than those we can be aware of. Consciousness is primarily responsible for logical thinking based on past experiences and memories, determining what we should do now. On the other hand, the unconscious plays a significant role in quickly and reflexively responding to and adapting to the surrounding situation. Consciousness, capable of logically thinking and arriving at appropriate conclusions, exhibits high intelligence. Now, let's consider the unconscious. While it reflexively responds to the surrounding situation, it has been discovered that this processing is not merely a simple and patterned process; instead, it possesses an extremely intelligent system that can swiftly and accurately adapt to unknown environmental changes. Therefore, we can say that we exist under the balance of intelligence between consciousness and the unconscious. In the processing of the unconscious, when a time-consuming and logical process is required, its content rises to consciousness. This is what we call 'awareness.' In other words, awareness can be described as the interaction between the intelligence of the unconscious and the consciousness. Our goal until 2030 is to utilize robots to influence the intelligence of the unconscious and generate appropriate awareness.

One thing is to elucidate the part of our brain that governs the intelligence of the unconscious and model it as a dynamic system, including the environment.

The other is to construct robots that can influence the intelligence of the unconscious. In recent years, advances in science and technology have enabled us to visualize how the brain is functioning, even in its deepest regions. By integrating brain activity with various biological signals and bodily movements into one system, we will continue to explore the intelligence of the unconscious.

### Milestone by year 2025

#### FY2025 Milestone

A system that enables individuals to proactively address issues they had resigned themselves to, such as chronic pain relief, developmental challenges in congenital neural anomalies, health caring, and aging—problems that seemed beyond their control by harnessing the assistance of robots is developed. To provide empirical evidence, we will establish an 'Awareness AI Lab' within a shopping mall, offering a platform for numerous people to experience the effectiveness of Awareness AI firsthand and propose Dynamic healthcare screening system.

There are various types of awareness. For example, when important information is obtained and explicitly stored in memory, it requires logical processing based on experience and memory, which cannot be fully handled by reflexive processing of unconscious intelligence. Other examples include cases where conscious intentions and reality significantly differ. Among them, due to the discrepancy between consciousness and the unconscious, awareness can generate premonitions of diseases. For instance, slight back pain or discomfort in the shoulder can create such awareness based on the misalignment of consciousness and the unconscious. By constructing a system that provides appropriate measures based on these types of awareness, we aim to achieve that goal by 2025. You may have heard words like 'frailty' or 'pre-illness' before. It is believed that some of these conditions are caused by the imbalance between the intelligence of consciousness and the unconscious. By resolving this issue, we will elucidate the mechanism of controlling awareness.

### Project structure

