

R&D Theme

Building a foundational CA platform for co-creation (CA-Cloud Platform Research Group)

Progress until FY2022

1. Outline of the project



Building a CA Platform for "Digital Twin of the Body" which allows people to freely share experiences and co-create.

By unraveling the interactions between the body, mind, and social abilities, we construct a design theory of cybernetic avatars (CAs) that enables CA users to realize their full potential beyond the single individual, or to gain different experiences and values through bodies different from their own. The creation of a CA platform enabling physical co-creation through the integration and utilization of people's experiences and skills in cyber-physical spaces, contributes to the Goal 1 aim of a society where people are free from bodily limitations.



Construction and application of the CA infrastructure technology for embodied co-creation

Kouta MINAMIZAWA (Keio Media Design)



Construction of next-generation CA cloud and promotion of international standardization

Akira FUKABORI (avatarin Inc.)



Development of digital neural technology for realizing Cybernetic Human-Link

Masaaki SATO (Tokai University)

2. Outcome so far

- (1) "MxN" CA platform to connect multiple people with multiple CAs: Implementation of a system that can be operated by 2 operators x 3 CAs
- (2) Development of bodily sensation and emotion sharing technology through CA
- (3) Establishment and operation of the Cybernetic being consortium
- (4) CA operation experiments in public spaces for social implementation of CA

In (1), a system in which two operators can operate three CAs was developed by integrating the knowledge gained through the collaboration with the Parallel Agency Research Group (1 operator x N CAs) and the Collective Ability Research Group (M operators x 1 CA). We will increase the number of operators and CAs, working to expand the possibility of the body beyond the conventional assumption that links one person with one body.

In (2), we developed technologies for experience-sharing CAs which allow users to incorporate others' experiences into their own bodies by transmitting intrinsic physical sensations through the sense of touch. In addition,, we aim to realize more empathetic communication by measuring users biometric information in the virtual CA environment, estimating emotional changes, which are reflected in the CA.

A key outcome of (3) is the establishment in October 2021 of the Cybernetic being consortium, currently featuring of 32 companies and 6 organizations. The consortium promotes industry-academia collaboration for the development and social implementation of physical co-creation through CA. As part of these collaborations we are working with the Japan Craftsmen's Association toward leveraging the use of CA as a means for sharing craftsmen's skills and experience.



(1) 2x3 CA system: two people control three robots



(2-1) Sharing bodily sensations through the sense of touch



(2-2) Virtual CA reflecting operator's emotion to its appearance



(4) CA operation experiments in public spaces

In (4), we are continuing to conduct demonstration experiments in public spaces to identify various issues in the utilization of CA in the real world and to clarify the requirements for communication and operating environments.

3. Future plans

We are working on the construction of a CA infrastructure that enables people to treat CA as a natural extension of their own bodies, through a network environment with ultra-high speed and low latency, in order to design the communication infrastructure required for the coming CA society. We aim to build a CA infrastructure that enables people to physically incorporate experiences and skills transmitted from other people and other environments with their own experiences and skills.