

Designing a co-creative communication experience utilizing collaborative drawing system

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Abstract—The purpose of this research is to enable users to experience co-creative communication with a distant partner using multiple drawing systems. To share information in real-time is worth generating new ideas and stimulating communication, however, COVID-19 has made face-to-face communication difficult. Thus, it is necessary to realize an environment where people can communicate even at a distance. From these backgrounds, we developed a co-creative drawing system inspired by “performance calligraphy.” The performance calligraphy is a collaborative drawing with someone attending on body action. With this system, multiple users can draw together even when users are in different locations. This paper presents our developed system and evaluates the usability of this system.

Index Terms—Co-creative, Remote Assisting, Drawing System, Performance Calligraphy

I. INTRODUCTION

Co-creative interaction is a type of creative activity based on interaction with others. In general, this requires content creators to work in same place. However, this is often difficult at present due to the COVID-19 pandemic. Co-creative workspaces have been suggested as an approach to solve this problem. Along these lines, we developed a co-creative drawing system inspired by performance calligraphy. This collaborative drawing system was designed to enable multiple users to draw together, even if they are located in different places.

II. IMPLEMENTATION

In the proposed co-creative system, the users each stand in front of a display. To draw, the users point at the display with their smartphones, and their movements are reflected as lines of simulated brushstrokes on the display. Thus, handling the system is intuitive, and users can easily draw through simple physical motions. To enable pointing by smartphone, we adopted the methods described in the work “Bring Your Own Pointer” [1]. This technique performs real-time tracking of smartphone movements to acquire data that serves as a user’s drawing trajectory. It constantly records the user’s pointing coordinates and controls the presence or absence of lines with two buttons on the smartphone’s screen, labeled “Write” and “End.”

III. USER TESTING

We confirmed the practicality of collaborative drawing with a distant partner using the proposed system. This user testing

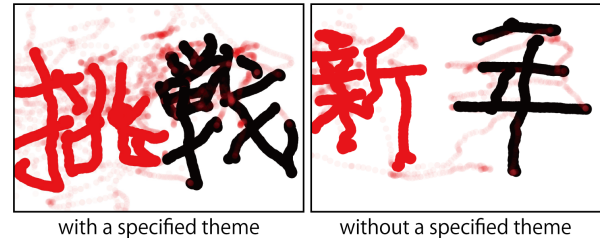


Fig. 1. The completed creations in user testing.

was conducted with 3 pairs participants. To compare varying levels of experience with performance calligraphy, we selected 3 out of 6 participants who had experience with it. The demonstration task required the participants to draw creations with and without a specified theme, as shown in Fig 1. We observed the behavior of the participants during the drawing, and subsequently interviewed them regarding the operability of the system and their experience with collaborative drawing.

IV. DISCUSSION

Participants were instructed to attempt to express a theme through their drawings when one was given. Moreover, some participant learn to control the drawing system more quickly than others. However, the participants did not seem to draw with exaggerated or gestural body movements, which is the main feature of performance calligraphy. One participant noted that “It is possible to create works together just by making voice calls.” Another stated that “I think that this system is relaxing and to enjoyable to use.” These are just a few among many positive comments. Overall, these comments suggested that the proposed system is an effective means of a co-creative communication with a distant partner. The approach of collaborative drawing with multiple people was evaluated in comparison with performance calligraphy. However, we did not observe participants drawing with body actions. Therefore, we plan to investigate expressive forms of drawing such as calligraphy, and also to develop a solution corresponding to the process of drawing with movements of the whole body.

REFERENCES

- [1] K. Sato, S. Kitamura, and M. Matsushita: Multiple Pointing Method with Smartphone Gyro Sensor, *Proc. Symposium on Spatial User Interaction*, p. 181 (2018).

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1. Introduction

Purpose

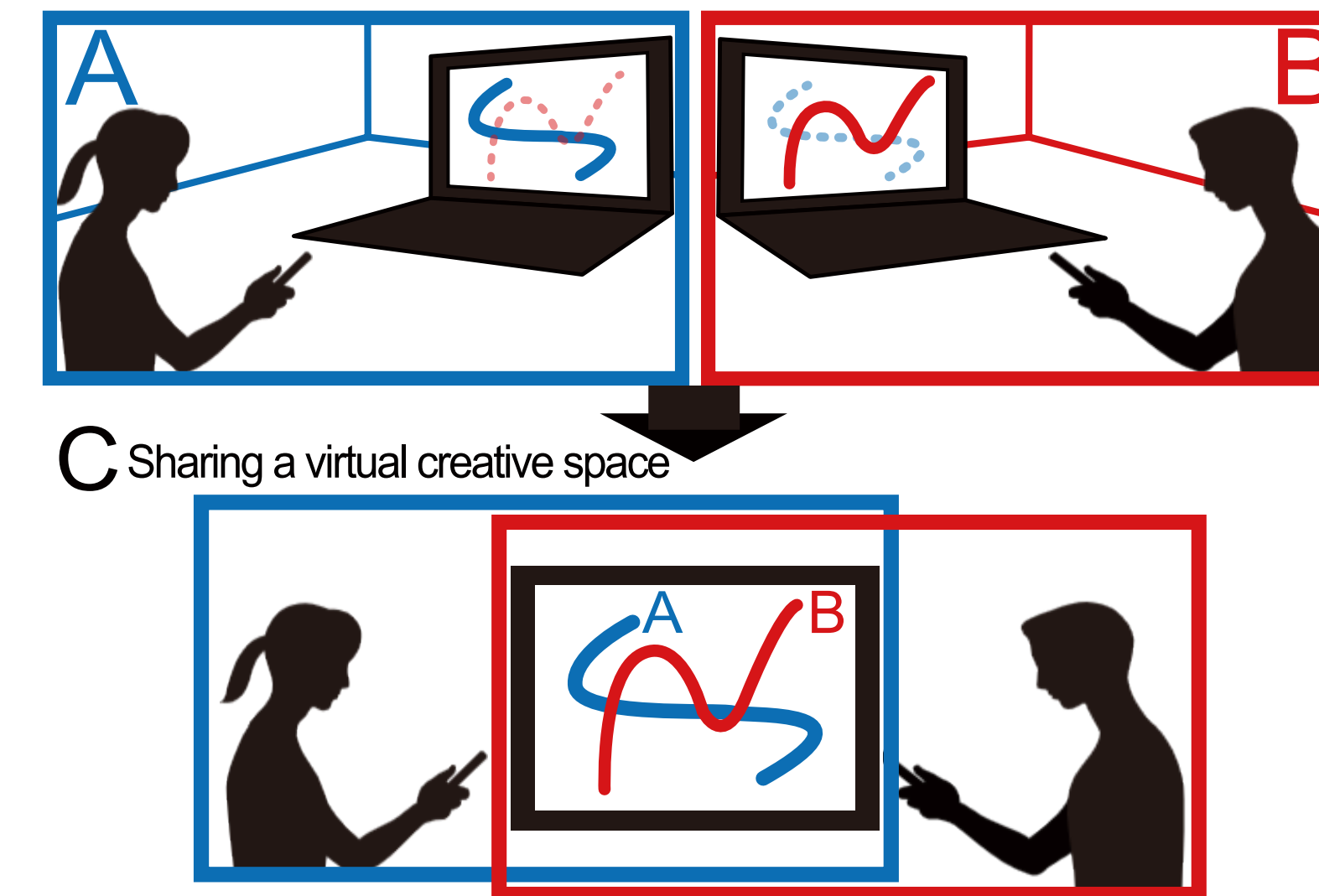
Aim of this study is to enable users to experience co-creative communication with a distant partner using multiple drawing systems.

Proposal

Designing a co-creative drawing system inspired by performance calligraphy. To enable multiple users to draw together, even if they are located in different places.



2. Designing a co-creative experience

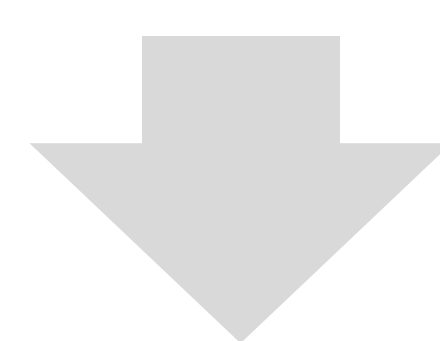


• The users each stand in front of a display. To draw, the users point at the display with their smartphones, and their movements are reflected as lines of simulated brushstrokes on the display.

We adopted the methods (BYOP[1]) real-time tracking of smartphone movements to acquire data that serves as a user's drawing trajectory.

3. User Testing • Discussion

We confirmed the practicality of collaborative drawing with a distant partner using the proposed system.
The demonstration task required the participants to draw creations with and without a specified theme.



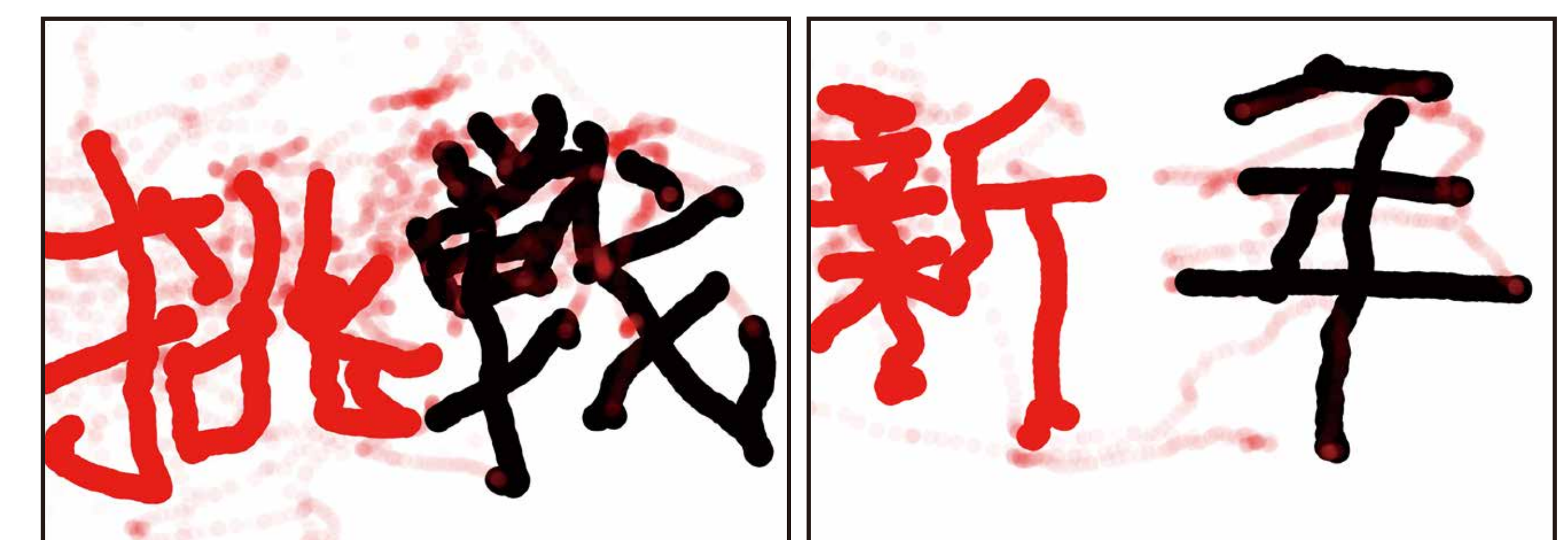
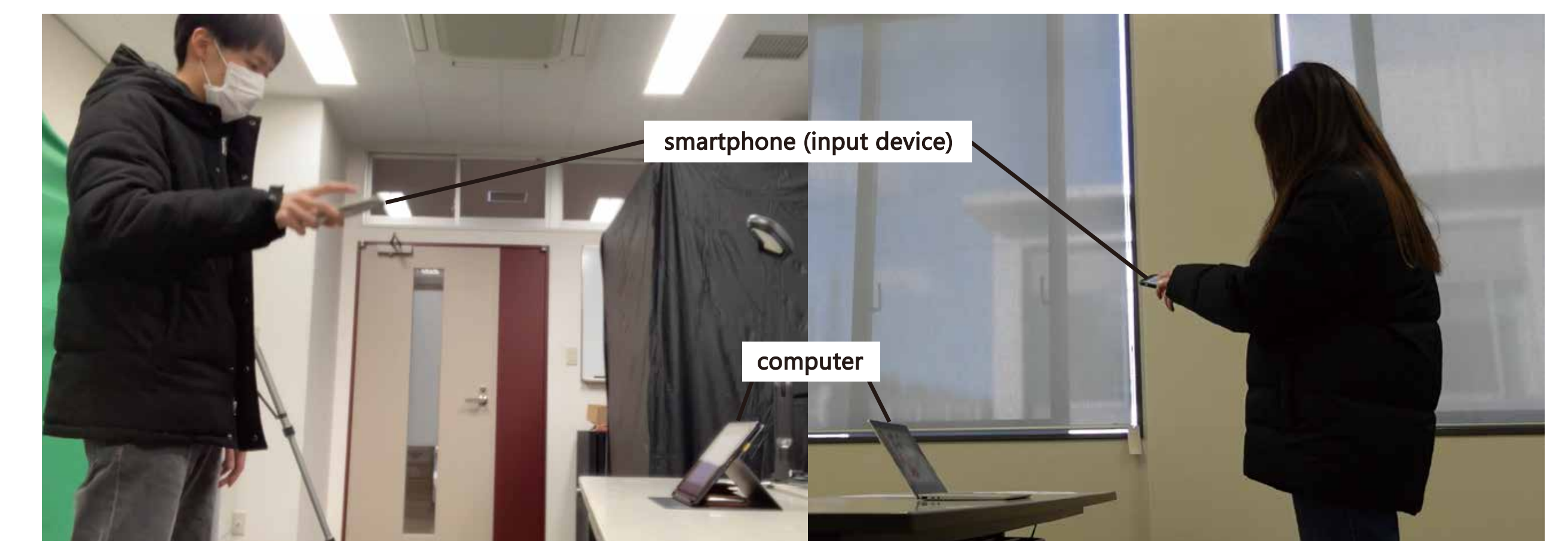
- Observe the behavior of the participants during the drawing
- Interview them regarding the operability of the system and their feelings

Findings

Observation – The participants did not seem to draw with exaggerated or gestural body movements.

- Interview**
- “I think that this system is relaxing and enjoyable to use.”
 - “It is closer to the feeling of treating a machine than calligraphy.”
 - “The strength of the lines cannot be reproduced as in calligraphy.”

- ▶ The proposed system is an effective means of a co-creative communication with a distant partner.
- ▶ Need to reexamine drawing expressions.



with a specified theme without a specified theme

▲ The completed creations in User Testing.

- Prospects**
- Investigating expressive forms of drawing such as calligraphy.
 - Developing a solution corresponding to the process of drawing with movements of the whole body.