

## COMPARISON OF INTERACTIVE COMMUNICATION WITH AND WITHOUT A SPECIFIED THEME DURING CO-CREATIVE DRAWING

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### 1. Introduction

Real-time communication helps makes more creative activities for co-creative. However, the COVID-19 pandemic has made face-to-face communication difficult. For this situation, it is necessary to enable distant users to execute co-creative activities and communication in real-time. To meet this requirement, we developed a co-creative drawing system that enables to draw calligraphy through physical motions (Morioka, Takemura, & Matsushita, 2022). In this system, the user holds the smartphone and makes a drawing motion. The continuous motion is reflected on the display as a handwritten line drawing (see Figure 1). To enable pointing by smartphone, we adopted the BYOP (Bring Your Own Pointer) method (Sato, Kitamura, & Matsushita, 2018), which allows users to use their smartphones as spatial pointers. The BYOP calculates the coordinates on each display based on the pointing direction and sequentially adds the rotation angle obtained from the gyro sensor to these values to calculate the real-time pointing coordinates pointed to by the smartphone.

When producing artwork together, users should be able to immediately communicate how they are thinking and behaving with each other. On the other hand, in improvisational work production, adaptive decision-making based on the situation at any time is also indispensable. In a distant co-creation environment, information channels to know each other's status are limited, making it difficult to determine how this communication should be carried out. This paper addresses this issue by conducting experiments under two conditions, with and without themes, and observing the differences in user behavior for each condition.

### 2. User Testing

To observe the users' communication behavior during co-creation, we conducted user testing with three pairs of participants. Participants were placed in separate rooms and co-created an artwork with the proposed system. The zoom.us was used

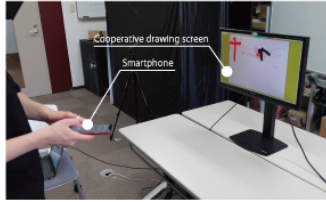


Figure 1. The proposed system



Figure 2. The generated artworks

to share the screen, with the audio function turned on. In the user testing, participants were asked to draw works with and without a specified theme to see how sharing a theme affects communication in a collaborative drawing. Figure 2 shows the artworks created during the user testing. We recorded each examination with video cameras to observe their behavior during the drawing, then subsequently interviewed them regarding this experience.

### 3. Results

In user testing, the communication tended to be more active without a specified theme. During the testing, drawing at the same time while communicating with each other was observed in the two pairs. It was also observed to take turns drawing one by one after confirming each other's writing parts in one pair. In the latter, in addition to their own opinions and advice, they communicated by saying "I'm going to start here," "Got it," and "Let's go on." One participant in the interview noted, "Even though they could not see the other person, they were able to cooperate in drawing the creation using only voice communication." Another stated, "this system is relaxing and enjoyable to use."

### 4. Discussion

This experiment confirmed that drawing creation in different places is possible using only voice communication. During drawing, communication took place through shouting and signaling. From these findings, It is confirmed that interactive communication by voice information is established in this experience. In addition, the communication would be more active without a specified theme, and the opinion was expressed that the content functioned as informal content that encouraged communication in the interviews. It was suggested that this system was not only interactive communication but also spontaneous informal communication. The importance of communication and the participants' first experience of co-creative drawing through body movements were highly evaluated. Inspired by performance calligraphy, this system would be a collaborative means of co-creative communication for any user.

## References

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