Interaction for remote collaboration with tabletop system

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Abstract

This demonstration shows the tabletop and Projector-Camera(ProCam) system in a remote collaboration. In that case, we propose the method improving the usability with the proposal method. This paper describes the implemented tabletop system and the proposal method.

Index Terms: H.5.1 [Information Interfaces and presentation]: User Interfaces—Screen design, Input devices and strategies;

1 Introduction

Works conducted by a local worker under instructions of a remote instructor is called the remote collaboration. With using telecommunication terminal, the remote instructor and the local worker transmit and receive sounds and videos to accomplish their work since they cannot share voices and views directly. On the other hand, a worker and an instructor sometimes communicate regarding objects and places in real work spaces in local collaborative works. Especially, this study focuses on an interaction to make a communication comfatable in a collaborative work. The goal of our research is to achieve an interaction which allows the worker to realize the situation of the work field, and allows the instructor to instruct the field worker accurately.

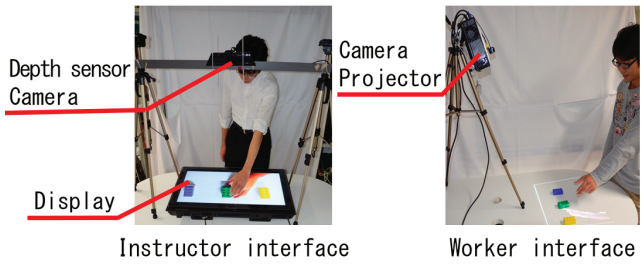

Figure 1: System appearance

2 Configuration

Our implemented system has two interfaces(Figure 1). One is the ProCam system at the work field consisting of a projector and a camera. The other is the tabletop system at the instructor field consisting of a display, a camera and a depth sensor. The process of this system goes as follows. The image captured by the ProCam system on the work field is displayed on the tabletop display at the remote location. Next, the instructor's arm is extracted from the image of the instruction field by the depth sensor. Then, overlapping the image to the work field allows communicating with keeping information of the embodiment which consists of the moving arms and the pointing. Some research have realized the interaction of a tabletop system for remote collaboration [1] [2]. However, these research only consider the person to person situation. In the case of multi-instructor, for example, a worker's watches several arms instructing by pointing or gesture. However, several arms moves at same time, then it is difficult for the worker to realize the instruction. To solve these problem, we propose the "scaling" method. Figure 2 and Figure 3 show this method.

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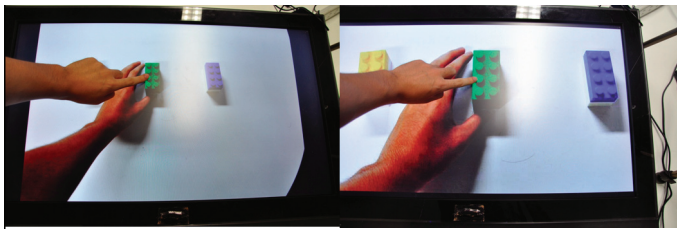

Figure 2: Tabletop display in instructor interface (left:original view, right:magnified view)

The left of Figure 2 shows the display without the method on the instructor interface. As shown in the left of Figure 2, it is difficult for the instructor to point precisely. Therefore, the proposal method magnifies the image(right of Figure 2).

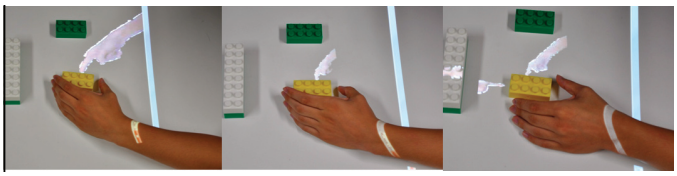

Figure 3: Projected instructor's arm in worker interface (left:original view, center:diminished view, right:multi-instructor)

The left image of Figure 3 shows the projected instructor's arm and worker's arm without the method. In this case, it is difficult for the instructor to point accurately because of the arm's size. The proposal method diminishes the image (center of Figure 3). Therefore, the method allows the worker to realize the instruction. Even in the case of multi-instructor, the projected image is easy to realize (right of Figure 3).

3 Demonstration

The demonstration shows the interaction between the worker interface and the instructor interface. The system allow to communicate each other easily by our proposal method, "scaling" method.

References

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