

ReAR Surface: AR-Based Exchanging System Using Handheld Devices

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1 Introduction

This paper proposes a novel method for file exchange between personal handheld devices. Currently, we can overlay virtual objects onto the real world using Augmented Reality (AR). This means that we can realize a novel method for visualizing information that we can see on a PC screen or tablet-type device. We focus on the interaction between multiple users, each with a personal tablet-type device when working face-to-face. In this case, we sometimes show our own tablet-type device to other people in order to share data (e.g., pictures). If a user's tablet-type device has both public and private information, such user only needs to show public information selectively. Kai *et al.* proposed a system that allows data sharing between facing personal devices[Kai et al. 2013]. In this system, an additional display is attached to the rear of a personal device in order to separate public and personal data. We take a method for visualizing public data as virtual objects arranged in the real world using AR. This paper proposes a system called “ReAR Surface” to realize such selective visualization.

2 Proposed System

ReAR Surface allows users to selectively share the data shown by handheld devices. Figure 1 shows a diagram of users employing this system. Two users face each other holding handheld devices. If one user captures the marker attached to the rear of the partner's device through the device's camera, the system can recognize the partner's device. This system does not use an additional marker attached to the handheld device, but a cover of the handheld device as marker for recognition of the individual handheld device and its position. If a user chooses to send some data to the partner, the chosen data are arranged on the rear of the user's device. A partner can see the data as virtual objects through the partner's device (Figure 2). Therefore, data can be visualized on the rear of handheld devices without additional displays. This system uses Vuforia (developed by Qualcomm, Inc.) as the AR SDK. Two devices are paired by Bluetooth to send gesture input data to each other. The data visualized on the rear of a device to be shared are sent to a partner's device using data communication through the server by Node.

3 Interaction

We implemented an application for exchanging images using the proposed system. Figure 3 shows an interface for this application. If a user starts the application, the camera installed on the device also starts. The user's handheld device recognizes the partner's de-

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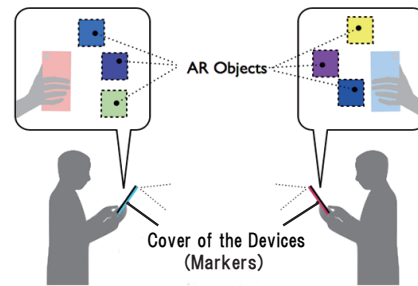


Figure 1: Diagram of Proposed System



Figure 2: Visualized Data

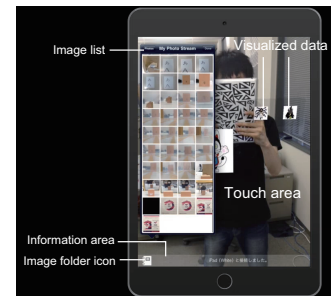


Figure 3: Interface

vice, and both devices perform “pairing.” If the user taps the image folder icon, the device shows an image list in the display. If the user chooses images from the image list to share, the images are visualized to the partner onto the rear of the user's device as virtual objects. The user can also operate the images visualized by the partner. Dragging the images shown in the display allows moving the images. Pinching-in and pinching-out the images allow enlarging and reducing the images. A long tap of the images allows showing Remove and Save buttons.

4 Future Work

This paper proposed a ReAR Surface system, and the interaction of the application that allows users to visualize data onto the rear of the each other's handheld devices in order to share data. For future work, we plan to design an application that expands card games. Therefore, our challenge is to expand such games to be played with AR by using this system.

References

KAI, T., UEDA, K., FUSHIKI, H., AND NAEMURA, T. Proposal of a system “SHelective plus” for selective window mirroring and information sharing by touch interaction. In *Proceedings of the 2013 IEICE General Conference*, p. 142. 2013.