LunchCommunicator:
Communication Support System using a Lunchbox

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Abstract. We propose a lunchbox-type device, "LunchCommunicator", which supports communication between family members –the lunch-creator and the lunch-consumer– using automatic capturing/playing techniques during the preparation/consumption of the lunchbox. Here we present the concepts and implementation of the system.

Keywords: Lunchbox, Communication, Video

1   Introduction

Many people prepare lunchboxes for their partners or children every weekday. Moreover, some of them come to have concerns regarding the quality of the lunchboxes: health-conscious people carefully choose organic materials or people with children who like animation characters may create a "character lunchbox"[1]. Although these people (lunch-creators) make a special effort to prepare lunchboxes, their partners or children (lunch-consumers) often do not notice these efforts due to a lack of communication.

Meanwhile, although lunch-consumers often receive various impressions while eating lunch, they often fail to tell the lunch-creators, mostly because they forget these impressions before returning home. To solve these problems, we propose a lunchbox-type device, "LunchCommunicator", which supports communication between family members – lunch-creators and lunch-consumers– using automatic capturing/playing techniques during the preparation/consumption of the lunchboxes.
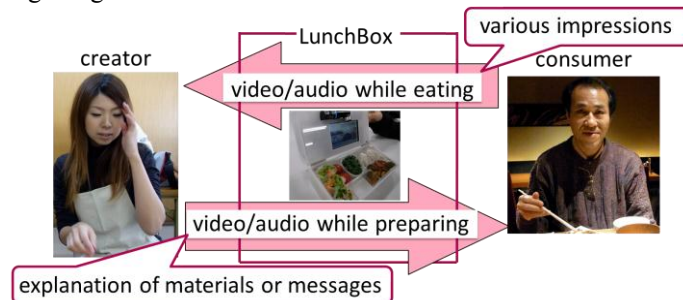
2   LunchCommunicator

Figure 1 illustrates the concepts behind the LunchCommunicator. There are three main features:

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[1] Designing an animation character (e.g., Mickey Mouse) using foodstuffs in the lunch box

1. Automatic video capture during the preparation/consumption of the lunchboxes.
2. Supporting communication between family members.
3. Integrating all devices into the lunchbox.

Fig. 1 Basic concepts behind the LunchCommunicator.

First, the LunchCommunicator can automatically record the processes of preparing/consuming the lunchbox using video and audio equipment. When a lunch-creator (e.g., a housewife) prepares a lunchbox, the system automatically captures video/audio of her activities, including explanations of the materials and messages to the lunch-consumer (e.g., her husband). Later, while eating the lunchbox, he can easily appreciate her efforts through the video automatically shown by the system. At the same time, the system also automatically captures video/audio of his activities, including impressions regarding the lunchbox and messages to the lunch-creator. Thus, the system does not require any special operations by users.

Second, the LunchCommunicator supports communication between family members. When a user eats a lunchbox away from home, he/she tends to have less opportunity to communicate with his family members (e.g., his wife). The LunchCommunicator helps the user enjoy these relationships more by presenting video messages while the lunchbox is consumed. Moreover, our system may trigger further communication between family members since it helps them share experiences of preparing/consuming the lunchbox with each other.

Third, we integrated all devices into the lunchbox. Both lunch-creators and lunch-consumers can use the system as simply as using a regular lunchbox.

3   Implementation

We have developed a lunchbox made from acrylic boards (Fig. 2). We attached a magnetic switch, a USB-camera with a mike (CREATIVE VFO310), and a small PC (BRULE Villiv S5) to the lid of the lunchbox. The magnetic switch is used to detect the opening and closing of the lid. It is connected to the PC via a USB-Parallel converter (Akizuki FT245RL module), and controlled by the ParallelServer[2]. The PC provides a built-in touch panel, a speaker and a GPS. The system detects the location

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[2] ParallelServer: middleware for easy control of the USB-Parallel Converter

using the GPS or a WiFi-based location service (e.g., PlaceEngine[3]). Based on this location information, we identify the likely user opening the lunchbox; that is, when a user opens the lunchbox at home, the system assumes him/her to be the lunch-creator. Moreover, since users can easily adjust the camera angle vertically, the system can capture both the lunchbox contents and user activities. Finally, we covered these devices and cables with a lid to maintain the natural appearance of the lunchbox. In addition, we attached an inner case as a food container. The inner case is made with acrylic boards and used to keep the above devices away from moisture from the contents. Users can wash the case easily since they can remove it from the lunchbox.
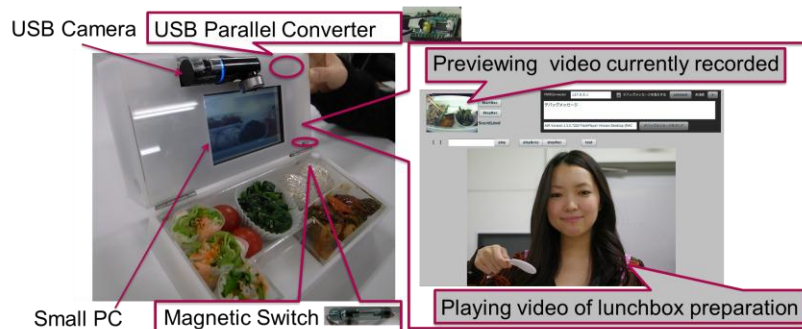
Fig. 2   The LunchCommunicator Prototype.
Left: Device Configuration, Right: Screenshot taken during consumption.

Next, we explain the working procedure of the LunchCommunicator.

1.   When a lunch-creator (e.g., a housewife) opens the lunchbox, the system detects the status using the magnetic sensor, and starts recording video/audio using the camera and mike.
2.   The system stops recording the video/audio when the lunchbox lid is closed.
3.   When a lunch-consumer (e.g., the husband) opens the lunchbox away from home, the system starts playing video/audio of the lunchbox preparation. Concurrently, the system starts recording another video/audio of the user eating the lunchbox. As mentioned above, the system identifies the likely user based on location information.
4.   The system again stops recording the video/audio when the lid is closed.
5.   When the lunch-creator opens the lunchbox for cleaning at home, the system starts playing video/audio of the lunchtime experience. The creator can observe how much the consumer enjoyed eating the lunchbox and can obtain feedback.

4   Related Work

There are several research projects related to dining environments. "pHotOluck"[1] is a table-top system for vitalizing mealtime communication by projecting photos taken

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[3] http://placeengine.com/en

by people who have a meal together. "DiningPresenter"[2] is an Augmented Reality system which enhances the visual appearance of food, dishes, and the table-top in a dining room. "Playful Tray"[3] proposes an interactive, persuasive game built into an ordinary lunch tray to assist parents in improving the dietary behavior of their young children. "CU-Later"[4] is a remote communication system which considers the time difference between two locations. The system connects two remote dining tables and lets users see and hear each other having dinner despite actually having done so at different times. Further, Ames et al. [5] investigates the use of video chat at home, and Gonzalez et al. [6] proposed a system for older adults to interchange messages and pictures through the internet with their family living abroad.

Our approach is unique that we focused on supporting communication between family members –lunch-creators and lunch-consumers– through a lunchbox.

5   Conclusion

We proposed a lunchbox-type device, "LunchCommunicator", which supports communication between family members through a lunchbox. The system gives opportunities for both lunch-creators and lunch-consumers to communicate each other easily. We have recently started preliminary evaluation of the LunchCommunicator to identify necessary improvements before its practical application.

Acknowledgements

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