

Sketch2Bento: Sketch-based Arrangement Guidance for Lunch Boxes

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Abstract—In recent years, sharing the images of the meals has been popular on social media as an artwork. In terms of the food culture in Japan, the lunch box is especially prevalent because of the lovely looking, such as character-bento. However, it is challenging and difficult to arrange a lunch box for common users without experiences and delicate skills. In this work, we propose Sketch2Bento, a sketch-based arrangement guidance system of food ingredients using spatial augmented reality technology. The proposed sketch interface allows users to design the blueprint of a desired lunch box. We then utilize the projection mapping to guide users with the projected arrangement hints in the boxes accordingly. Finally, we conduct a user study to verify the system usage and user experiences.

Keywords—Spatial augmented reality; lunch box; user sketch; interactive projection;

I. INTRODUCTION

In Japanese culture, a decorated lunch box with comic or anime characters, called character bento (chara-ben), has become particularly popular. However, the arrangement of a character lunch box usually requires the delicate skills, because the placement of the food ingredients is nontrivial for inexperienced users. Previous works adopted interactive projection techniques for the block arrangement [1] and fabrication elements placement [2]. Inspired by these approaches, we aim to help the arrangement of lunch boxes with projector-camera system. In this study, we propose Sketch2Bento, a support system of food ingredient placement for lunch boxes based on the user hand-drawn sketches as shown in Figure 1. The proposed system uses spatial augmented reality technology to interactively indicate the placement of ingredients in the lunch box according to the user’s working progress. We conducted a simple evaluation study to verify the usefulness of Sketch2Bento.

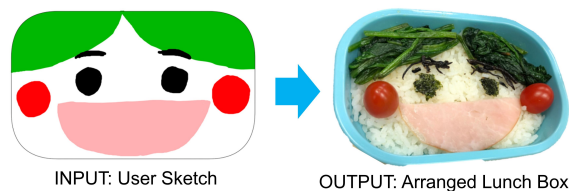


Fig. 1: Arrangement guidance for lunch boxes.

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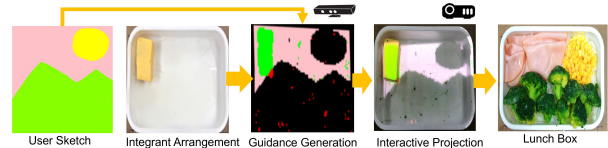


Fig. 2: The proposed framework of Sketch2Bento.

II. SKETCH2BENTO SYSTEM

The framework of the proposed system is illustrated in Figure 2. The user can sketch the desired image with a drawing interface. Then, the system converts the sketch input into the projected guidance to lunch box. Following the arrangement guidance, the user can complete the ingredient placement for the desired lunch box. The real-time guidance is achieved based on the current working progress.

We conducted a comparison study to verify the effectiveness of Sketch2Bento. 12 participants were recruited into two groups: with and without the proposed system. All the participants were asked to arrange a lunch box with or without the guidance. We evaluated the time cost and the degree of completion with a question in five-point scale. We found that the proposed system can decrease the production time cost and achieve adequate degree of completion.

III. CONCLUSION

In this study, we proposed a lunch box arrangement support system from the user hand-drawn sketches. By using the projector-camera system, the proposed system can provide interactive guidance for the placement support. In our evaluation study, we verified the effectiveness of the proposed system. As future work, we plan to improve the recognition accuracy of food ingredients and handle user’s complex sketches. In addition, we consider the recommendation system to help make lunch box with good designs and nutritious values.

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