GiantCutlery: Dining Table-Talk Tool that Bring Out Mutual-Aid Interactions among Tablemates around Large Platters

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Abstract

Interaction among tablemates is expected to arise when they serve food from platters during dinner. However, such interaction is actually restricted because the platter's potential for vitalizing dinner-table communications is not effectively exploited. We focus on "Oshaku", a Japanese custom where tablemates pour alcohol for each other to vitalize mutual communications. We incorporate "Oshaku" behavior into dinner platters and investigate whether it can be incorporated into such serving patterns. In addition, we developed GiantCutlery, which is a support medium for dining-table communications, and report the results of a pilot study that estimated its effectiveness.

1. Introduction

Large platters of food are common objects that are shared by tablemates who access them and serve food. In these processes, the act of eating around large platters advances.

Mukawa et al. [1] revealed that different styles of displaying foods on dishes, for example, small plates for individual helpings or large platters to be shared, produce different communication acts around dining tables. They stressed the importance of selecting a relevant style of displaying foods on dishes based on communication purposes. We don't believe that the potential interaction properties of large platters have been elicited.

All tablemates have access to large platters during a meal. If we serve foods mutually, we can communicate with each other when serving beings. But we usually serve ourselves and rarely offer food to others. Food on large platters is only shared by others during round-robin types of dining and can't spark interaction.

To solve this problem and bring out the potential interaction properties of serving foods from large platters, we focus on "Oshaku", which is a Japanese traditional custom where one pours alcohol for guests. "Oshaku" is based on consideration for others and maintains and facilitates communication by providing opportunities to talk to strangers, to join conversations, and to alleviate nervousness when conversations are beginning. "Oshaku" activates communication.

In this study, we bring out the potential of interaction when serving food from large platters to facilitate communication at dining tables by suggesting that tablemates serve foods mutually from large platters and activate interaction among them like "Oshaku". "Oshaku is deeply rooted in Japanese culture but not serving foods from large platters. We should not designate tablemates to serve food mutually but urge them to serve from large platters. We developed a system that discourages tablemates from serving themselves by encouraging them to serve others first.

In this paper, we report the preliminary experiment results of a table-talk situation in which we prohibit subjects from serving foods for themselves to check the validity of our proposed system. We explain our proposed system, which we call "GiantCutlery," based on preliminary experiment results, and explain the communication effects of mutually serving foods based on a pilot study with it.

2. Related work

Mukawa et al. [1] revealed that platters form common spaces on dining tables and that sharing meals by serving food by platters improves communication. They explained that eye crossing, which happens when a person drops her eyes to look at food, other tablemates, and the platters, actively encourages conversation. In this way, serving food from large platters creates more lively communication than individual plate style meals.

Similar studies have supported communication by introducing information technological media to dining tables. Amano et al. [2] developed a system called "Roku-No-Zen" that supplies topics by displaying photos prepared by tablemates on dishes to facilitate communication during meals. In our study, we increased the chances to serve foods mutually, although serving food only seldom occurs in the present state of large platters to activate communications in dining tables. Our study differs from Amano's study.

As our study, Nakano et al. [3] focused on "Oshaku" and used its communication functions. They developed a

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"Traveling-Café" system that facilitates communications by pouring coffee for others in personalized offices. The act of walking around an office to pour coffee creates occasions for conversations. This system only changes communication with others. The people themselves being offered a drink must decide whether to talk with others. This system's user study results revealed that the psychological barriers of talking are decreased. This system also effectively encourages occasions for talking with more senior co-workers and is derived from one-to-one communication to communication by many.

3. Preliminary experiment

We validated the appropriateness of our proposed method that prohibited subjects from serving themselves before we developed our proposed system.

3.1. Procedure of preliminary experiment

We developed a preliminary experiment with five groups that each consisted of five adults. Two groups consisted of acquaintances, the other three of strangers. We directed subjects not to serve themselves and to use the chopsticks prepared for serving food from large platters. We didn't arrange a time limit or starting or finishing times in this experiment. Before the experiment, we explained how we were planning to use the data and got consent from the participants. We recorded the images and voices from all the table scenes but we didn't record their eye and facial expressions.

3.2. Result of preliminary experiment

3.2.1. Basic structures of serving food By considering meals from the view of others, we categorized two patterns of serving food: (1) requesting to be served and (2) serving others.

Example 1: requesting to be served:
A: (A puts out her plate to B.) Can you serve me, please?
B: (B puts some food on A's plate.)
B: (B returns A's plate.) Here's your plate.
A: (A receives it from B.) Thank you!

Example 2: serving foods for others:
A: (A raises her hand to indicate that she wants some food.)
B: (B notices that A wants some food.) May I serve you?
A: (A passes her plate to B.) I pray you.
B: (B puts some food on A's plate and returns it.)
A: (A takes it from B) Thank you!

These two examples consist of only two conversation patterns of serving food and exchanging plates.

3.2.2. Structures of serving food In this experiment, the act of serving food occurs frequently because subjects cannot serve themselves. As a result, we see different patterns of serving from the basic structures explained in Section 3.3.1. Especially for example 2 we can examine some patterns of serving based on its reasons and aims (Table 1).

Table.1. Serving patterns (n: integer, α: turns)

Reasons	Aims	Constructions
a) empty plate	serving	Example 2
b) expectation	returning	(Example 2)*n
c) reducing foods	contribution for progress of meal	Example 2 (+ α)
d) topics of food on platters	contributions to conversations	(topic) + Example 2 (+ α)
e) following others	returns	(Example 2)*n
f) avoiding particular foods	self-defense	Example 2 (+ α)
g) taking a message using food	joke	Example 2 (+ α)

Looking at Table1, we can see case (a) is a basic construction like an Example2 in Section 3.3.1. Otherwise, we can find a type of repeating a basic construction like a case (b). For example, in case (b), we could see the following scene that a person served others with expecting returns of serving him/her. As expected, he/she served from people he served. In addition, we can find a type of continuing turns after a basic construction like a case (c), (d), (e) and (f). For instance, in case (d), we could see the following scene that tablemates talked about meat "Nikujaga (meat and potato stew)" which is one of menus in this meal. A person served "Nikujaga" affective by this talk. After this serving, they began to talk about potatoes contained in "Nikujaga". In case (e), we could see the following scene that a person served others to avoid unfavorite foods. Other people who was served by him/her were aware of a reason of his/hers serving and they talked about this action. In case (f), we could see the following scene that a person served "Tsuma of sashimi (sliced ram fish)", which is a typical appendage to a dish, to a person for a joke. After serving, served person talked about this action.

In normal meal situations, we serve ourselves because we aren't prohibited from doing so. We rarely serve others. But, in this experiment, the frequency of serving others increased as well as the serving patterns. We confirmed the extension of conversations due to the act of serving. Our proposed method that prohibited subjects from serving themselves is useful for developing conversations at dining tables.

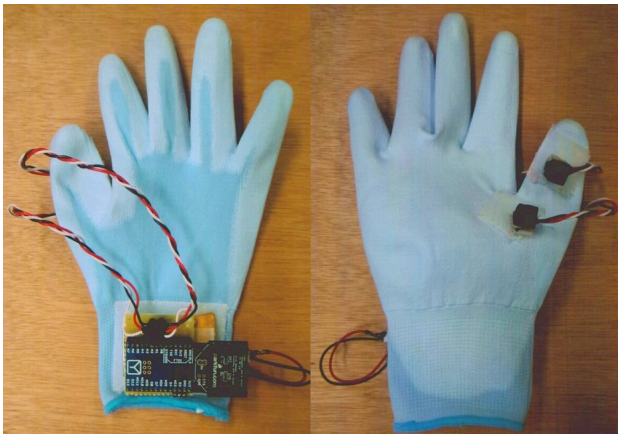

Fig. 1. A glove with magnetometric sensors and a microcomputer

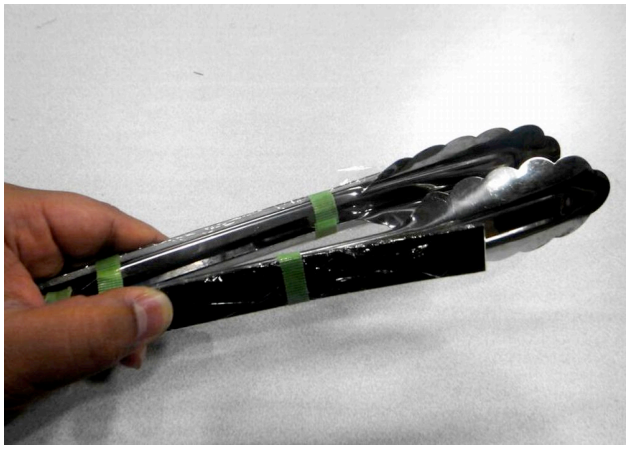

Fig. 2. A Tong with magnets

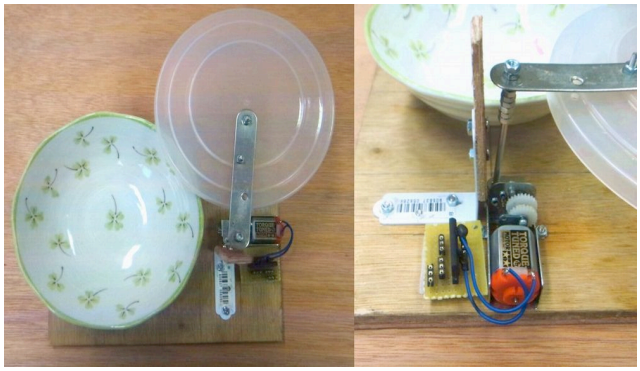

Fig. 3. A dish with a cover that automatically opens and closes

4. Proposed system: GiantCutlery

Based on a preliminary experiment of table talk during meals served on platters, we confirmed that we could expand mutual-aid interaction by restricting people from serving themselves without dampening conversation. Since it is difficult to have a meal under this rule, we solved this problem by proposing a table-talk medium named "GiantCutlery" that forces us to serve others. Our proposal consists of three parts: gloves with a magnetometric sensor (Fig. 1), tongs with a magnet (Fig. 2), and dishes with covers that open and close automatically (Fig. 3). All users wear these gloves and use this dish. In addition, they share these tongs for serving others.

4.1. Detecting serving

To identify eating actions on a table, we used cameras and image processing technologies. It is difficult to develop systems to robustly detect actions in daily spaces, which are mixed with many objects like dining tables. We regard grasping tongs as an action of serving food from platters and only detected this action. To find it, all users wore globes with a magnetometric DM-106B sensor and an ArduinoFIO microcomputer on their dominant hand (Fig. 1). We installed a magnetometric sensor on the cushion and the root of the thumb on the side of the palm on the gloves because this sensor makes contact with a magnet on the tongs (Fig. 2) when users naturally grasp them. When users wearing gloves grasp tongs that have a magnet, a magnetometric sensor detects the magnetic force from the permanent magnet and we can sense that tongs are being grasped to serve food.

4.2. Avoiding serving ourselves

To avoid serving ourselves, we adopted a method of automatically opening and shutting covers on dishes (Fig 3). The cover consists on a gearbox (general purpose universal gearbox), a DC motor (GP.134 torque tuned motor), and motor driver IC (ta7291sg) for automatic opening and shutting. These dishes are connected by gloves with a magnetometric sensor by a wired connection. When a user picks up tongs that are equipped with a magnet, a magnetometric sensor reacts, and a DC motor starts to drive and covers this dish by horizontally rotating its plastic cover on a driving shaft. As a result, we can't serve ourselves.

5. Pilot user study for our proposed system

Our pilot study examined the availability of our developed system by observing two points: (1) whether all users serve food on platters to each other and (2) whether the actions of mutual-aid serving facilitated communication.

5.1. Procedure of pilot user study

We performed a preliminary pilot user study for a group that consisted of four men and one woman who were acquainted. Such conditions as menu and the method of recording this pilot study were the same as in the preliminary experiment. We show an experimental scene in Fig. 4. We explained the actions of our developed system for users, for example, when they grasp tongs, their dishes are closed. Additionally, when serving food from platters, they have to use the tongs. We allowed the users to get used to using chopstick while wearing gloves. We also provided forks if they had difficulty with the chopsticks under such circumstances. After this study, we interviewed the participants about this system's usability.

Fig.4. Snapshot of pilot user study

5.2. Result

We examined mutual-aid serving among users with our developed system. In addition, we confirmed that kinds of mutual-aid serving consisted of such specific serving actions to contribute to conversations around the table.

On the other hand, our proposed system experienced some problems. For example, the covers didn't operate and close because sensors failed to work when users served food from the platters. However, the users continued to mutually serve the foods and ignored the covers.

The following are the post-experiment interview results:

- You should use another method to maintain mutual-aid serving, because swinging covers may spill cups on the table.
- It is not easy to handle the dishes with a cover.
- The noise from motors interfered with the conversations.

5.3. Discussion

We observed mutual-aid serving as a preliminary examination and the constructions of interactions based on serving patterns. We achieved our goal of encouraging mutual-aid serving food on platters. Users continued to serve each other, even though our proposed system requires some improvements. This result is associated with the friendly relations of the users. Once a custom of mutual-aid serving on a table with platters is established, we can naturally maintain this custom without rules and tools.

6. Conclusion

In this study, we applied "Oshaku" to serving food on platters to bring out the potential ability of facilitating communication at table-talk meals. In our preliminary experiments, when we prohibited users from serving themselves, two-way interaction rose and interaction patterns expanded. Based on this result, we developed a table-talk device named "GiantCutlery" to preserve the rule that users can't serve themselves. In a pilot user study with this system, we confirmed its effectiveness when we forced users not to serve themselves.

In future work, we will improve our developed system based on feedback from the pilot user study. In addition, we will verify that our proposed method brings out the potential capacities of facilitating communications at table-talk meals by analyzing the amount of conversation and the kinds of conversations to investigate the effects of serving foods on platters.

7. Acknowledgement

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8. References

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