Design of a Restaurant Kiosk Interface

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Introduction

Self-service technology (SST), defined as a technological interface that allows customers to produce and consume services without direct assistance from employees (Meuter et al., 2000), has been widely adopted by service oriented companies in different settings, such as hotel, restaurant, and airport. Although customers are less hesitant about using SST nowadays than before, how to increase customer satisfaction and repeat patronage remains an unresolved issue in this area. It has been suggested that the design, functionality, and perceived innovativeness of interfaces can enhance perceptions of quality, encourage repeat patronage and encourage repeat purchase (Curran and Meuter, 2007).

MATLAB is a widely used software environment for system designs. It is a powerful linear algebra tool, with a set of toolboxes that extend its basic functionality. It is available now in almost every university for research purpose. Using this tool, the present study will focus on interface design for self-service technology in restaurants. Additionally, this study employed the Medium Equation theory, also called Social responses to Communication Technologies Theory (SRCT), and a couple of basic design guidelines adopted from the literature.

The interface proposed in this study has a human figure as a virtual server. It can invoke social responses, which cannot be achieved by a standardized restaurant kiosk interface, from customers. Besides, making customers feel like interacting with a real person rather than a machine will enhance the enjoyment of purchasing experience. Based upon the combination of these two effects, customer satisfaction will be increased, which might have positive influence on their future buying behavior.

This paper is organized as follows: first, literature from communication, marketing, and information technology fields are reviewed to derive the guideline for interface design. It is followed by a detailed illustration of specific codes used in MATLAB. Last, we conclude by a discussion of limitations and directions for future research.

Literature Review

Social response

Social responses to communication technologies theory (SRCT) posits that people respond to interactive technologies with a host of behaviors and attitudes determined by the same social rules and expectations they apply to people (Eckles et al., 2009). This theory is also called Media Equation theory, which means that “individuals’ interactions with computers, TV, and new media are fundamentally social and natural, just like interaction in real life” (Reeves and
Nass, 1996). Nass and Moon (2000) reviewed a series of experimental studies demonstrate that individuals mindlessly apply social rules to computers. They predict that the more computers present characteristics associated with humans, the more likely they are to elicit social behavior. Specifically, computers with voice input and output should invoke more social behavior than their text-based counterparts, software agents with human features should be more likely to encourage social responses than software with animal features, and computers that express “emotions” should be socially compelling. Since MATLAB cannot play video clip with sound, the author decided to just use cartoon characteristics instead of videos. According to the theory, it can still be a salient cue for social responses, because to human minds, anything that seemed to be real was real and any object that seemed to possess human characteristics was a real human (Lee et al., 2006).

**Social presence**

Along with this research line, Lee and Nass (2003) identified people’s social responses to media as a set of variables that have influence on social presence. It has been demonstrated that social characteristics of artifacts would influence feelings of social presence. Social presence is the sense that other intelligent beings coexist and interact with you, even if those beings are non-human, which will be the kiosk in this study, and only seem intelligent (Lee and Nass, 2003). It is defined as the degree of salience of the other person in the interaction and the consequent salience of the interpersonal relationships (Short, Williams, and Christie, 1976). According to Lee (2004), social presence occurs when technology users do not notice either the mediated or the artificial (e.g., software agents) nature of objects that are being experience. Stronger social presence will be directly correlated with degree of interpersonal contact, feelings of connectedness, and satisfaction with the interaction (Gunawardena and Zittle, 1997; Walther, 1992, 1993).

**Enjoyment and fun**

SST interface with a human character is more fun and enjoyable compared with a standardized interface. Enjoyment has been established to be an important direct antecedent to intentions to return to an online retailer (Koufaris, 2002). Fun has received some attention in the technology adoption literature via constructs such as enjoyment (Davis et al. 1992; Venkatash, 2000) and playfulness (Webster and Martocchio, 1992). However, in SST literature, there is little agreement as to its place. For example, Wolfinbarger and Gilly (2001) provided qualitative evidence that fun was an important and desired outcome when choosing to use technology to shop. By contrast, Dabholkar and Bagozzi (2002) found that fun is an antecedent to attitudes toward an SST. Therefore, further research is needed to explore the concept of enjoyment and fun, which might be an important guideline for SST interface design in the future.

**Design**

The setting of the study is a restaurant where customers interact with SST interface. They follow the instruction and choose the bread, cheese, toppings, and sauce to make their own sandwiches. The interface, with a human figure, is designed by using MATLAB (for specific code, see Appendix A).
The actual programming is composed of four parts, two main programs and two callback functions. In the main program for the SST interface with a human character, MATLAB is asked to read all images first (images are downloaded from the Internet). Then text for greeting customers is added,

```matlab
image(img1); axis off;
x =3; y = 200;
text(80,y-30,'Welcome to','fontsize',24)
text(60,y,'Julie and Julia Restaurant','fontsize',16)
```

Figure 1 shows the interactive open environment of MATLAB and the first image of the interface we proposed.

Figure 1. MATLAB and the first image of the interface

The push button “next” that shows up on the right lower corner of the interface leads to next page, meaning participants will be navigated to a new page by clicking that button. This is achieved by using “uicontrol”, which is a build-in gui of MATLAB.

```matlab
flag=0;
next1 = uicontrol('Style','pushbutton'....
    'Position',[480,40,50,40]....
    'String','Next',....
    'Callback','next');
```

Whenever clicking the “next” button, the callback function named “next.m” will be executed, and a new page with images and texts will be displayed. (See Figure 2 for two images of our interface)

Figure 2. Images of our SST interface
To select the menu items on the right figure, participants can directly click the picture of those objects, which is actually a button. The function, “set(button1,'CData',imgf1)” is used to set up a button with an image. This design follows the guideline proposed by Maguire (1999), which suggests that an image is a good way to supplement text. By seeing the images (closely representing the real object), the user can quickly locate the item of information they are interesting in. For toppings and sauce selection, radio buttons are used to let participants choose multiple items (See Figure 3 for a demonstration of radio buttons).

![Figure 3. Radio buttons](image)

To complete the service procedure as well as make the interaction more personal, our virtual server will send off customers at the end. Figure 4 shows the last two images of the SST interface.

![Figure 4. The last two images of the SST interface](image)

**Limitations and Future research**

The current study uses pictures as a cue to invoke social response. It has been suggested by previous studies that video, which has both sound and image, is a stronger cue than pictures. However, due to the limitation of MATLAB that it cannot play video clips with sound. Therefore, picture is more applicable in the present study. Future researchers could compare the effects of pictures and videos on social presence and enjoyment.

Moreover, this study just focuses on design aspect, and do not take customer perspective into consideration. A quantitative study with an experimental design should be conducted to test consumers’ responses towards the SST interface we designed. For example, to test the social response theory empirically, participants will be exposed to both a standardized SST interface
and the interface proposed in the present study. Further, a questionnaire including constructs such as social presence, enjoyment and fun, customer satisfaction, and behavior intention would be useful to understanding specific consumer behaviors in this context.

It is also interesting to examine this new interface design in a service failure context. Since customers will respond socially to the SST with a human character on the interface, they will apply certain social rules to the interaction. Nass and Moon (2000) suggested that rules that are used frequently (e.g., conversational politeness norms) are more likely to be mindlessly elicited than rules that are used rarely (e.g., what to way when someone is exhibiting strong emotions). Based upon this statement, customers will be more polite and tolerable towards the mistakes made by the kiosk, which is mindlessly perceived as a real person.

Reference