

Projected Multitouchscreens on physical surfaces

Abstract

This master thesis is about projected interactive displays on tables. A multitouch interaction concept for tables of self-service restaurants was developed. Furthermore a prototype has been programmed. To investigate the practicability of the concept and the prototype a field study was conducted.

Situation

In a self-service restaurant choosing from a menu causes waiting times at the counter, especially in case of special requests. Individual requests mean individual waiting times at different counters. Additional orders result in additional waiting time and cueing.

Solution

To solve these problems on each table of the restaurant will be a projected interactive menu. The guests control the projected menu on the table with their fingers and order their desired drinks and food directly on the table. The menu offers a wide range of additional functionality:

- information about the ingredients of the food, the origin of the meat, the team and the history of the restaurant
- special information for diabetic and allergic persons
- games like a quiz and memory to bridge the waiting time
- rate the food and recommend the restaurant
- take a look at the departure times at the nearest bus station and order a taxi
- show the bill

Interaction

The gestures of known touchscreen devices were assigned to projected multitouch screens. They were selected after the functionality of the concept were defined. Thus, the projected interactive menu can be used with the following gestures: single-touch, swipe, pinch and drag.

Technique

A projector above the table and a Microsoft Kinect to detect individual fingers are used.

Evaluation and Findings

Based on this concept a fully functional prototype was realised and evaluated. 40 people (21 m/19 f; 7 to 60 years old; 5 of them solo, 13 couples, 3 trios) participated in a formal usability test (thinking aloud with video recording). The testers were asked to perform tasks while using the prototype in a restaurant like situation. Before and afterwards they got a questionnaire.

Initially users did not expect functional multi touch interaction with the prototype as known with smartphones, such as the "Swipe-gesture" to switch pages and the "Pinch-gesture" to scale the size of the projected menu.

It took in average only a few moments to become familiar with the system. All participants stated, that interacting directly on the table surface felt rather naturally.

Besides ordering directly on the table participants enjoyed very much the possibility to play together interactive games while waiting for the food.

Future work

A future field of work could be to adapt the projected interactive menu to other restaurant concepts, where guests can choose their meals individually. Multitouch gestures, such as pinch and drag-and-drop, are perfect to select various pizza sizes and ingredients.

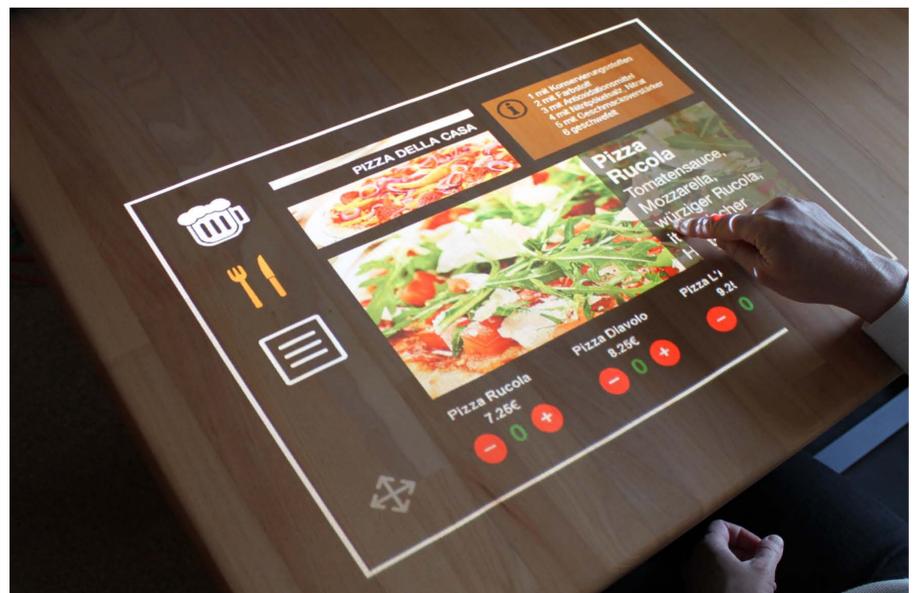
Furthermore, the projected multitouch screens could be connect with other electronic devices to transmit data. As an example "Mobile Payment" can be listed here. An NFC tag could be incorporated in the table where the guest place the smartphone to pay the bill.



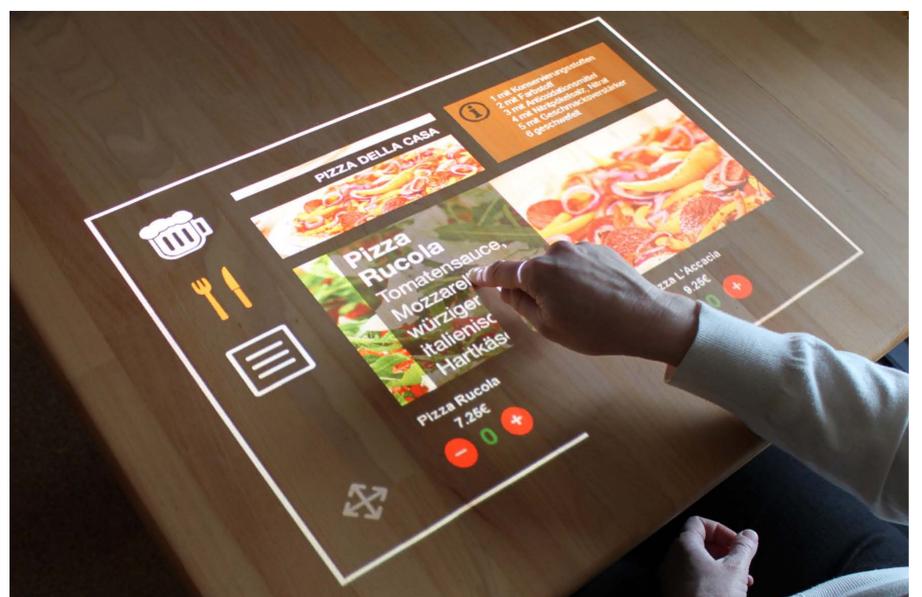
Selection of drinks and memory game.



Zoom in and out by using the "pinch"-gesture.



The "swipe"-gesture allows...



...to navigate between the pizzas.



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