Surface-Poker: Multimodality in Tabletop Games

Chi Tai Dang, Elisabeth André
Augsburg University, Institute of Computer Science, Human Centered Multimedia
Universitaetsstr. 6a, 86159 Augsburg, Germany
{last name}@informatik.uni-augsburg.de

ABSTRACT
Multimodal interaction and face-to-face communication between players are aspects of traditional board games which contribute to their popularity. Such aspects are also typical of digital tabletop games. But in addition to that, digital systems allow for a higher level of multimodality through utilizing novel interaction devices or physiological input data. In this paper, we describe a multimodal tabletop Poker game which makes use of both: additional interaction devices and physiological input data. We outline the tabletop game, the interaction modalities involved, and observations of players.

ACM Classification: H5.2 [Information interfaces and presentation]: User Interfaces - input devices and strategies

General terms: Tabletop, Games, Input Devices

Keywords: Surface Games, Multimodal Interaction

Figure 1: Players performing the shielding gesture.

INTRODUCTION

Multi-touch tabletop settings are conducive to co-located game play and foster interaction between players. People sit together face-to-face and interact not only with a computer system but also with each other via body or hand gesture, gaze, speech or alouds or the combination of those. Thereby interaction happens either directly through addressing digital objects or collaborators or indirectly by one being observed through each other while interacting. Research has identified such qualities in traditional board games and has shown them to be beneficial for tabletop games [5] [3]. Hence, there is indication that humans are familiar with interacting with different modalities at playing board games. For that reason considering social interaction between players and combining appropriate interaction modalities in digital tabletop games promise for novel and engaging experiences [5].

In comparison to traditional board games, digital tabletop games benefit from computational capabilities to support visualization, game-management or to act as a referee [1]. Moreover, digital tabletops also allow us to connect and use a multitude of input devices to enhance game experience. Examples include accelerator sensors (WiiMote) or physiological inputs that stem from ECG (electrocardiogram) sensors or GSR (skin conductance) sensors. Interaction with these input devices can take the form of explicit commands such as performing gestures with a mobile phone or implicit game state adoptions in virtue of human body reactions. Literature exists for multimodal tabletop games with gesture-based interaction by means of mobile phones [4] or the combination of speech and gestures [5]. There is also research on explicit and implicit biofeedback in the context of desktop computer games [2] or commercial applications in therapy games[1]. However, no one has yet considered physiological inputs for digital tabletop games.

We have started to integrate ECG sensors and accelerator sensors as interaction modalities for a multimodal, multiplayer tabletop game, where players interact via direct touch, gesture and acceleration sensor. The ECG sensor is employed to add an affective component to games. Poker players usually try to hide their feelings and set up a so-called poker face. We were interested in the question of whether the visualization of the players' level of nervousness would affect their game play. In the remainder of this paper, we outline the digital tabletop game, the interaction modalities and devices involved, and report on first observations of players.

SURFACE-POKER

Surface-Poker is a digital tabletop game played with digital objects on the Microsoft Surface table[2]. We recreated a classical Poker game in the digital domain with digital coun-

[1]http://www.wilddivine.com
[2]http://www.surface.com

Figure 2: Alive heart monitor and Nintendo WiiMote.

terparts which support different kinds of interaction modalities. Interaction was designed to exploit known gestures from traditional Poker games. The game rules of Surface-Poker follow the Poker variant *Texas Hold'em Poker* where players choose between the commands *check*, *call*, *raise* or *fold* in a turn-based manner. Instead of just emulating a classical Poker game, Surface-Poker seeks to exploit the qualities of tabletop games such as computer-mediated game management or a combination of different interaction modalities or devices. Therefore game state, allowed actions or the rules that apply are mediated by a game logic which leads players through each round. Furthermore, game logic and game objects, such as playing cards, coins or the bank, assist players through appropriate animations and show meaningful advice, thus help adhere to game rules. For example, the bank object automatically animates jumps from one player to another and displays the remaining amount of cash that has to be deposited for a *call* command.

INTERACTION MODALITIES

Players mainly have to use touch interaction with their fingers to interact with game objects. Beside typical rotate and translate interactions, Surface-Poker provides more complex gestures such as a special gesture to uncover playing cards as depicted in Figure 1. This gesture comprises of a mandatory hand shielding placement of both hands around the playing cards and thereby establishes a physical barrier for preventing the cards' visibility to other players. Akin to the *check* gesture in traditional Poker games, the digital *check* command is triggered by tapping twice on the player's cards. Surface-Poker also leverages the $1 recognizer [7] to facilitate gestures such as drawing a circle around multiple coins to select a group of coins.

Physiological input of players is measured through heart monitor sensors from Alive Technologies[3] and mapped onto a so-called *nervousness level* by means of the SSI-framework [6]. Within Surface-Poker, the *nervousness levels* are displayed on the Poker desk next to each player's cards. Thereby good players have the chance to baffle opposing players. In turn, unexperienced players may inadvertently expose their nervousness. Furthermore, Surface-Poker supports the WiiMote from Nintendo which accommodates acceleration sensors and have to be attached to a player's leg as shown in Figure 2. Thereby the sensors serve to detect whether a player is sitting or standing which is used to submit a *fold* command by standing up. As an alternative to standing up, the *fold* command can also be submitted by moving the playing cards to the middle of the Poker desk.

[3]http://www.alivetec.com

DISCUSSION

During first observations of students playing Surface-Poker, we found that all players interacted simultaneously from the beginning even though the turns were guided by the game. For example, they uncovered their playing cards and moved the coins independent of other players' actions just as they would do at a real Poker desk. They also quickly understood the uncover cards gesture and experimented with appropriate hand shields. All players chose to move their cards into the middle of the Poker desk for the *fold* command. Here, standing up to *fold* may be too inconvenient to perform. Some players stated that the heart sensors were disturbing while others were so much focused on the game that they did not even realize the heart sensors. Regarding the *nervousness level*, players commented that their chosen strategy was not influenced much by that indicator. This could be due to the short experience of players with the indicator and may change once they build up sufficient trust in the correct mapping of the indicator to the players' nervousness.

ACKNOWLEDGMENTS

The authors want to thank the following students: Mossner Franziska, Klose Philipp, Leipold Martin, Schultz Matias, Hrzek Benjamin, Rueschenbaum Kai, Qiao Han. The work described in this paper is partially funded by the EU under research grant eCUTE (Reference: 257666).

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