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Smile like Hollywood Star: Face Components as Game Input

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Abstract. Most of the commercialized games have used controller by manipulated hands or feet. Recently, some studies tried to facial expressions or emotion as game input, but it didn't directly manipulate a game. It adjusted the difficulty of game. In this study, we suggest a new type of game input interface using face components as input, directly, and present one offline game and two online games by using this method.

Keywords: Game interface, Face components, Smile.

1 Introduction

Many offline games use joystick as game input and most of the online games use a keyboard and a mouse as game input. Some researches tried to adopt facial expression as game input indirectly [1-3]. Those studies measured the emotional state from the facial expressions and adjusted the level of difficulty in game. It is not the direct input for game.

In this study, we present the face component recognition (FCR) interface. In addition to the interface, we suggest one offline game, *Smile like Hollywood Star*, controlled by FCR, and apply FCR to two online games, Tetris and Kart-Rider.

2 Face Component Recognition Interface

FCR interface consists of one webcam, one normal PC, and one keyboard signal generation board. Most of the online games require the keyboard signal in hardware level because of security. Therefore, we implemented the signal generation board to occur the real key-code signal in Figure 1.

The working process of FCR interface has five steps. At first, it detects the face region by Haarcascade method from the captured frames. At second, it detects face components, eyes and mouth. At third, it sets up the face components as the region of interest (ROI). At fourth, it tracks the ROI and recognizes the input states, the smile, the Ho, the wink with right eye, and the wink with left eye in Figure 2. At fifth, PC sends the recognized input state to the keyboard signal generation board by RS-232C.

Finally, the board enters the keyboard signal according to the received command into PC.



Fig. 1. Keyboard Signal Generation Board

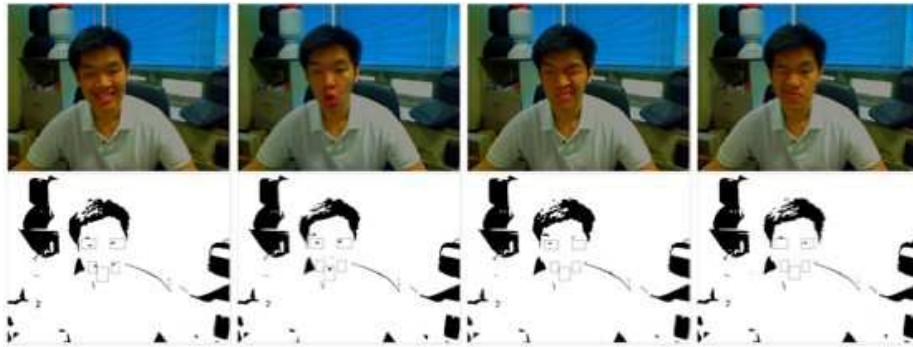


Fig. 2. Face Components as game input
(a) Smile, (b) Ho, (c) Wink with left eye, and (d) Wink with right eye.

3 Game Description

We have suggested one offline game, *Smile like a Hollywood Star*. It uses face components as game input, directly. Figure 3-(a) shows the screen shot of *Smile like Hollywood Star*. The game is very simple and intuitive. Hollywood star's photo is displayed and a user mimics the face expression of the displayed photo like the Hollywood star. When the feature points, face components, are similar between the player and the star, the player gets the game score. The game score is proportional to the completion time.

Besides offline game, we have applied FCR interface to two commercialized online games in Korea. One is Tetris [4] in Figure 3-(b) and the other is Kart-Rider [5] in Figure 3-(c). In Tetris, the smile rotates a block, the Ho fast drops a block, the wink with right eye moves a block to the right, and the wink with left eye moves a block to the left. In Kart-Rider, the smile drives the Kart to forward, the Ho drives the Kart to backward, the wink with right eye turns right the Kart, and the wink with left eye turns left the Kart.



Fig. 3. Games with Face Components Recognition (FCR) Interface
 (a) *Smile like Hollywood star* (b) *Kart-Rider* serviced by NEXON, and (c) *Tetris* by NHN

3 Conclusion

In this study, we suggest new game interface that uses face components as game input, directly. By adopting the suggested FCR interface, we have presented one new types of game, *Smile like Hollywood Star*, and FCR interface has applied to two online games.

FCR interface and three games have three purposes. One is that the users have more natural smiling face. Usually, the East Asian is impassive than the Westerner, because they feel awkward to express an emotion [6]. By iteratively playing the game with FCR interface, we expect that the user feels more comfortable to reveal an emotion and have dynamic facial expression including a smiling face. Another purpose is reducing the level of stress and promoting a positive emotion by smile, even though it is artificially smile. The other is the game input style for mobility impaired people and hand impaired people.

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