GESTURE RECOGNITION SYSTEM USING REGISTRATION OF RGB IMAGE AND DEPTH IMAGE

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ABSTRACT - Gesture recognition is one of the major research topics in HCI. In this paper, we propose gesture recognition system to control web browser through registered image of RGB image and depth image from Kinect. Libfreenect2 is used to bring the images from Kinect. With depth image and registered image, hand region image is extracted by performing bit operation. Using LBP and Adaboost classifier, gesture is recognized with an accuracy of 90% or more. A gesture recognition system can be used to control the web browser.

Keywords: Kinect, Gesture Recognition, HCI, Adaboost, Libfreenect2

1. INTRODUCTION

Gesture is one of important means of communication. Gesture can also play an important role in computer-to-human communication. Since the advent of Kinect, HCI research has become more active. Libfreenect2[1] is an open source library with fewer features than the Microsoft SDK, but it is available on many operating systems such as Linux, macOS. We use Libfreenect2 to obtain image data and process them to recognize the gesture. We construct a gesture recognition system that can detect and recognize it using LBP[2] and Adaboost[3] classifier and control web browser through gesture recognition.

2. GESTURE RECOGNITION SYSTEM

The hand region image is extracted using RGB, depth image. The image is used to detect hand with Adaboost classifier and to classify gesture by comparing contour.

2.1. Extraction Hand

To extract skin region, it needs to convert RGB image into HSV image [4]. Grayscale image in the skin region is obtained by performing bit operation with grayscale image and binary image which is obtained by thresholding. After that, it performs bit operation with depth image to erase noise in the skin area.

2.2. Classification

The trained Adaboost classifier is used to find the gesture, and the gesture area found is cut and stored. The extracted image is binarized to extract the contour, and the gesture is classified by comparing with the predefined contours. To extract and compare contours, We use findContour, matchshapes functions in OpenCV.

3. RESULT

An accuracy of gesture recognition is 90% or more shown table 1. Figure 1, 2 show that through gesture recognition we can control web browser on macOS.
4. CONCLUSION

We proposed gesture recognition system using registration of RGB image and depth image. It shows that all gestures recognition accuracy is more than 90%. In addition, it shows a system that can be used in various operating systems such as macOS, Ubuntu or Windows.

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REFERENCES