Study on Input Interface by Eye Gazing Area Determination using Multiple Cameras
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Abstract— This paper proposes eye gaze area determination using multiple cameras without calibration for improving usability of ICT products. In our method, one camera identify whether the user gaze at left side or right side of the camera. By combing two cameras, the gazing area can be determined as left edge, right edge or other area of the display. From the experiments, proposed method was proved to be effective for extending application of eye gaze input interface.

I. INTRODUCTION

Eye gaze input has been studied as useful man-machine interface [1]. For example, “My tobii p10 [2]” was realized to provide communication method for handicapped person. Generally such eye gaze input device needs calibration before use. If calibration less method is realized, usability will be improved. In this paper, we describe calibration less method to determine eye gaze area and the experiment evaluating identification rate.

II. EYE GAZE AREA DETERMINATION METHOD

Past study [3] could get corresponding value of gaze direction, but its method needs calibration. We propose the different method to reduce this process. One camera identify whether the user gazes at left side or right side of the camera by gaze direction value. This method requires only low precision, so the calibration is unnecessary. Two cameras are installed on the top of the display. By combing the result of each camera, the gazing area can be determined as left edge, right edge or other area of the display.

This value calculated as distance from midpoint of both iris centers and midpoint of both eyes corners, based on Miyake’s method [3]. Eye corner and iris center is detected from around eye area. Eye corner position is determined as the edges of eyelid area detected by Flood fill processing. Iris center is determined as the widest heights position of iris area by same way. Eye gaze area determination is performed based on the average of the latest three gaze direction value. Processing flow for eye gaze area determination and image processing is shown in Fig.1.

III. EYE GAZE AREA DETERMINATION METHOD

We developed the application for evaluation, to scroll a panoramic image based on eye gaze area determination method. When the subject gazes left or right side area of display, the panoramic image scrolls to the corresponding direction. To achieve this function, the application judges the user is gazing at either side, when the same identified result

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REFERENCES