Abstract

Human Computer Interaction (HCI) is an emerging technology. Eye gaze technique is one of the very significant techniques of HCI and can be used as hands free pointing tool enabling hands-free operation of the display for the user. The important advantage in using eye gaze systems is that the user can communicate from a distance, and there is no requirement of physical contact with the computer. Investigation of eye gaze helps to understand various aspects of the user like attention, intention, desire and area of interest etc. The eye gaze detection techniques can be classified on the basis of direct eye detection, appearance, template, shape, feature, motion, hybrid, regression, 3D methods etc. There are significant factors like shape and size of the object, distance from the subject, texture, light conditions, colour, orientation, head movement, calibration which may influence and affect the efficiency and effectiveness of the eye gaze detection. The use of the gaze as a human computer interface in different fields is an example of high end applications of these techniques. Eye detection is being used in many real time and interactive high end applications. These include the tracking and analyzing of driver's behaviour with the head pose detection. It is being used for assessing consumer's shopping behaviour, pointing and selection, activating commands and combinations with other pointing devices, in surgical and medical applications. Moreover eye gaze techniques are also useful for designing and development of various
Eye Gaze Techniques for Human Computer Interaction: A Research Survey

devices especially for differently abled users. In this paper an extensive research survey has been carried out to understand and analyze the study of various eye gaze techniques, algorithms and models. On the basis of survey of various techniques of eye gaze, a general overview of different phases of eye gaze processing has been presented. Certain technical factors have been identified that are significant and relevant for the working of the models. In the literature survey a number of parameters that are significant for estimation, detection, better efficiency and accuracy of eye gaze techniques have been studied and analysed. A comparison and analytical discussion of different eye gaze techniques and models have been presented. The analysis and classification of the models shall be helpful for further improvement and optimization in the performance and accuracy of eye gaze techniques.

References

- Kinoshita, K., Ma, Y., Lao, S., and Kawade, M. 2006. A Fast and Robust 3D Head Pose and Gaze Estimation System. ICMI, ACM.
by Elsevier Inc.
- Yagi, T. 2010. Eye-gaze Interfaces using Electro-oculography (EOG), EGIHMI, ACM.
- Buscher, G., Biedert, R., Heinesch, D., and Dengel, R. 2010. Eye Tracking Analysis of Preferred Reading Regions on the Screen. CHI, ACM.


Index Terms

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**Keywords**

Eye gaze techniques and models   feature based classification and comparison phases
gaze detection and estimation