MGAZE: GAZE ENABLED MOBILE ACCESSIBILITY

H. L. Sanduni Chamika

A dissertation submitted in partial fulfillment for the requirement for
Bachelor of Engineering (Honors) degree in Software Engineering

Department of Computing

Informatics Institute of Technology, Sri Lanka
in Collaboration with
University of Westminster, UK

2021

Abstract

Gaze based interaction is a growing research avenue in today's world. It is popularly utilized in assistive technologies and authentication purposes. Owing to this, gaze as an input modality has gained attention over time along with the advancement of computation and associated fields. However, the findings of gaze-based interaction are yet to be incorporated into the general use of computing devices. With the aim of bridging this gap in gaze-based interaction, this paper presents an environmental illumination invariant, single-application approach using which mobile developers can integrate gaze-based assistance to their applications. Hence, it includes the findings of the work carried out in testing gaze-based interaction alongside the varying environmental illuminations and distance between the user and the computing device. This illumination invariant approach can be made use for diverse purposes including the assistance for differently abled, gaming and the day-to-day activities of a person.The proposed solution (mgaze) was tested with 22 volunteers who went through a structured testing procedure which included a pre and a post questionnaire to take feedback. The testing data was analysed using the Fitt's law and the results were highly satisfactory. This application was further evaluated by 2 domain experts and 6 technical experts who validated the proposed solution based on well defined evaluation criteria. These experts and the participants of the user study have suggested multiple usability platforms for the solution such as facilitating differently abled persons for easy access to devices, security and navigation, gaming, banking and ease of day to day activities.

Key Words:
Accessibility, Eye Gaze, Assistive Technology