Investigating the use of eye-tracking for View Management

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Abstract

This work in progress is investigating new ways to manage visual clutter in Augmented Reality (AR) applications through the use of eye tracking.

CR Categories: I.3.3 [Computer Graphics]: Three-Dimensional Graphics and Realism—Display Algorithms

Keywords: eye tracking, view management, augmented reality

1 Introduction

he goal of this work is to develop new view management algorithms based on where the user is looking, and deliver content based on gaze location. Not only that, but the algorithms will deliver that information to an area of the screen in a manner that will not obstruct image features that are (or will become) important to the user. A fundamental problem is to display the most pertinent information without overwhelming the limited screen real estate. Existing algorithms typically ignore information regarding the viewers gaze when placing augmented elements such as labels. AR applications use factors such as location and navigation direction to deliver contextual information to the user. Augmented elements can quickly over-populate the augmented display leading to confusion and clutter. Attempts have been made to regulate the delivery of AR elements to ensure they are visible and understood. None of these attempts factor in where the user is actually looking in the scene when making placement decisions. An inventive solution would take where the user is looking and place information in that location only.

2 Method

Our strategy is to organize labels into screen positions based on where the viewer is looking. We are developing a new methods based on proximity to the gaze point. We are using the Unity Game engine to dynamically allocate label placement based on eye gaze. This is illustrated in Figure 1. The top image shows label placement with no view management strategy. The middle image shows a temporal placement strategy based on the eye point, and the bottom image is based purely on the gaze point. The resolution of the area around the gaze-point will depend on the visual clutter in the real scene; in homogenous scenes where there is little variability, there may be need increase the size of the gaze radius. In visually rich scenes a smaller radii may work better.

Figure 1: *Figure 1: The top images shows all available labels. Where the bottom two images show labels based on user gaze.*

3 Conclusion

This work is in its infancy but represents an important first step to evaluating the use of eye-tracking for view management. Our next step is to evaluate the strategies outlined above. We have planned a user study to reveal the most acceptable strategy. The goal of this work is to develop view management models to present more informed content which does not distract from the users task

Acknowledgements

This work is funded through NSF Grant CAREER-02-466451: Advancing Interaction Paradigms in Mobile Augmented Reality using Eye Tracking.

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SIGGRAPH 2014, August 10 – 14, 2014, Vancouver, British Columbia, Canada.

ACM 978-1-4503-2958-3/14/08