NotiFade

Minimizing OHMD Notification Distractions Using Fading

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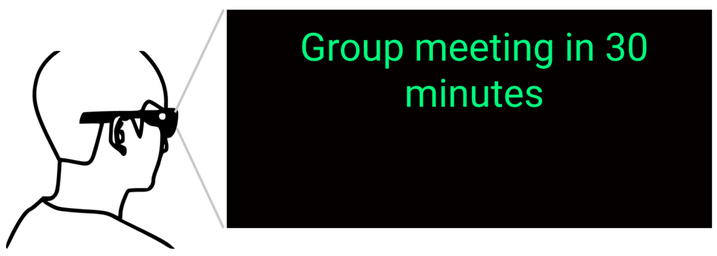
INTRODUCTION

Optical see-through Head-Mounted Displays (OST HMDs, OHMDs, **AR smart glasses**) facilitate situational awareness while accessing secondary information. However, the information displayed on OHMDs can cause attention shifts, distracting users from their primary tasks. In particular, the **instant appearance** of OHMD notifications can cause higher distraction than phone notifications as users are unable to ignore notifications in front of their eyes. To reduce such distraction, we explore **fading animation** and understand the **factors** that affect the effective use of fading animation on OHMD notifications by comparing them with prevalent scrolling and blast animations.



RESEARCH QUESTIONS

1. How does the fading animation compare to scrolling and blast animations in terms of task performance and perceived interruption when multitasking?
2. Does the effect of fading animations depend on the location of the primary task?

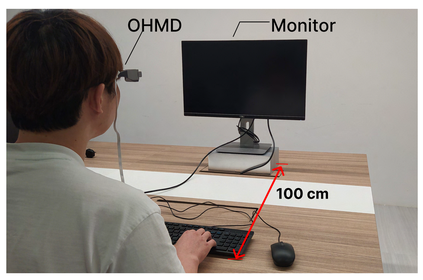
TAKEAWAYS

- Fading animations reduce interference with the primary task.
- The effective use of fading depends on the fade duration and the location of the primary task.
- The interruption of OHMD notifications will be lower when the notifications are presented at the same depth as the primary task.
- **Future work:** Design an adaptive notification system for OHMD where animation and its properties are dynamically changed based on user context, primary task, and user goals.

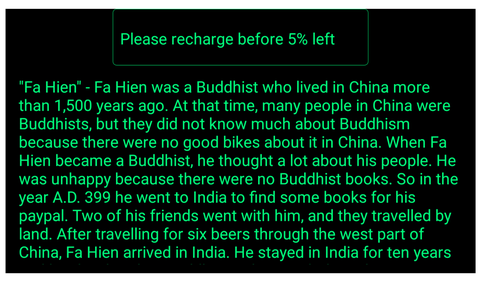
STUDY

Same Depth

Primary task and secondary task are on OHMD



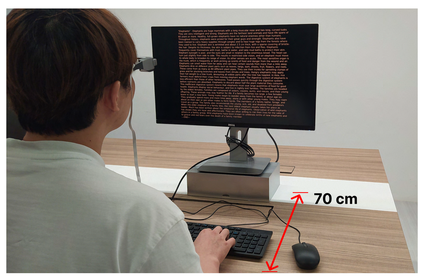
Reading for *Same Depth*



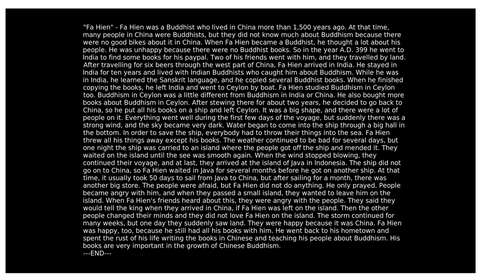
Passage and notification on OHMD

Different Depth

Primary task is NOT on OHMD and secondary task is on OHMD



Reading for *Different Depth*



Passage on desktop

- **Primary task**: Proofread a passage as accurately and quickly as possible
  - Location: Same Depth, Different Depth
- **Secondary task**: Attend to notifications at participants' convenience.
  - fd (fade duration) = time taken by notification to become fully visible
  - Animation: Scroll (**VS**), Blast (**IN**, fd = 0s), Fast-Fade (**FF**, fd = 2s), Slow Fade (**SF**, fd = 4s)
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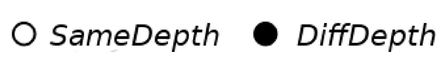
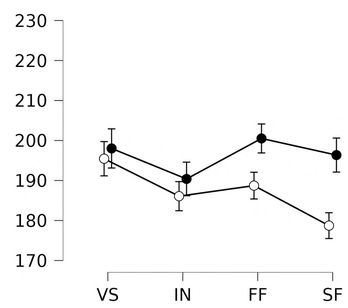
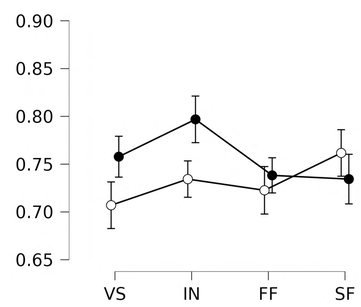
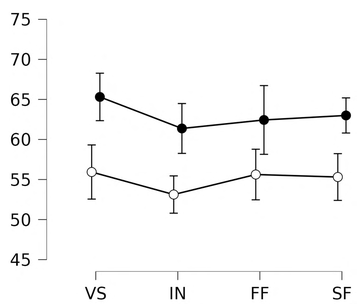




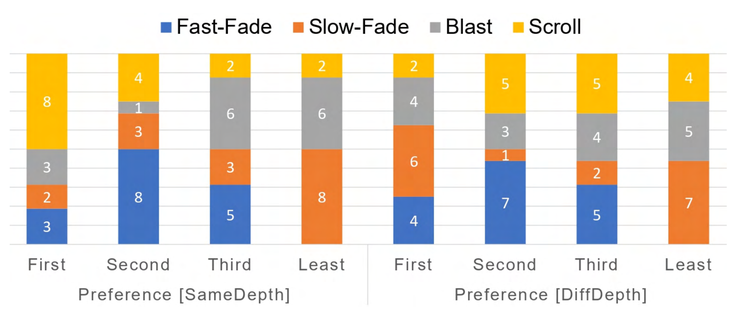
Reading Time



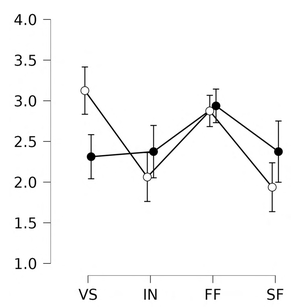
Notification Accuracy



Perceived Interruption



Individual Preference



Weighted Preference

- Fading animation increased multitasking performance (i.e., reduced reading time while maintaining notification accuracy).
- The Different Depth condition caused higher interruption than the Same Depth condition, but there were no interactions between animation types.
- The majority preferred Scroll for Same Depth and fading for Different Depth as their first preference, yet there was an overall tendency towards fading according to weighted preference.
- Fading provided sufficient time to 'prepare for notification'

https://github.com/NUS-HCILab/FadingNotifications

www.nus-hci.org

Funding