Exploring Form Factors of Ambient Light Displays for Event Reminders

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Abstract

In this paper, we report an initial exploratory study into displaying reminders for upcoming calendar events with ambient light displays. We asked ten participants to test four different ambient light displays in their offices for one day. Of the four systems used participants preferred a small form factor table lamp over all other systems.

Author Keywords

Ambient Timer, Ambient Light Display

ACM Classification Keywords

H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

Introduction

In previous work, we introduced "Ambient Timer", an ambient light display to keep office-workers up-to-date on their upcoming appointments without distracting them from working on their computer [3]. Ambient Timer uses LEDs to illuminate the wall behind a monitor to display the advent of a meeting (Figure 1). One of the major limitations of this system is that it is fixed to the work monitor. But what if people are away from their computers? What if they are in their office but do not work on the screen?

Figure 2: Table lamp

Figure 3: Ambient Timer

Figure 4: Floor lamp

To overcome this limitation, we created a set of displays to be able to remind people of their upcoming appointments and calendar events, when they are away from their computer. In our study, we tested four types of displays in an exploratory design-study with ten colleagues

Related Work

Ishii et al. introduced their ambientROOM in 1997 featuring a number of ambient displays to present information on the ambient room's environment [2]. AuroOrb an illuminated sphere that informed users about incoming e-mail was presented by Altosaar et al. [1]. In their attempt to create a taxonomy for ambient Displays, Pousman an Stasko introduced a number of classification dimensions for ambient displays, such as Information Capacity, Notification Level, Representational Fidelity and Aesthetic Emphasis [4]. Müller et al. presented an ambient light display to inform people of upcoming appointments and events [3].

Study

In order to gain more insights into displaying information in the office with various ambient light displays, we used four different devices:

1. A spherical table lamp (Figure 2)

2. The Ambient Timer prototype we used before in other experiments to display information behind a person's monitor (Figure 3)

3. A floor lamp (Figure 4)

4. An uplight, aimed at the ceiling (Figure 6)

Figure 1: Ambient Timer

We conducted an exploratory study in the wild with ten participants (8m, 2f, between 27 and 41 years old, M=30.1, SD=4.2). Before we installed the lights in the participants' offices, we conducted an interview. We asked the participants about the number and level of interruptions they experience on average in their daily work and if they had experiences with reminder systems.

We created four different light patterns to inform the participants of the upcoming events.

1. 5 min. exponential brightness change starting at "off" to 100% while exponentially changing colour from green to red as well

2. 10 min. exponential brightness change starting at "off" to 100% while exponentially changing colour from green to red as well

Figure 6: Uplight

3. 5 min. exponential brightness change from off to 100% brightness, colour red

4. 10 min. exponential brightness change from off to 100% brightness, colour red

Each participant used the system with all four ambient light displays for one work-day (Figure 5). We programmed a controller to display a total of 16 events throughout the day to show each pattern once on every ambient light display. The order of patterns and used displays was randomized. For each time an event was displayed, we asked participants to rate the combination of display and pattern for *ease of following the progress of time, level of distraction, acceptability* and *aesthetic impression*. To allow seamless answering this rating was done using physical sliders on a midi-sequencer which we installed on the participants' desks. Each slider ranged from "do not agree at all" to "totally agree". We recorded the settings by the participants for later evaluation.

We conducted a post-hoc interview to collect further insights and comments.

Results

Overall, participants preferred the table lamp over all other displays. The prospect of being able to see upcoming events when at the desk (and not necessarily being on the computer) resulted in best marks for acceptability. Larger displays such as the floor lamp or the uplight were not well accepted.

Participants preferred the 10 minute pattern with colour change from green to red over all other patterns,

stating that the level of distraction was lowest and it was easy to follow the progress of time.
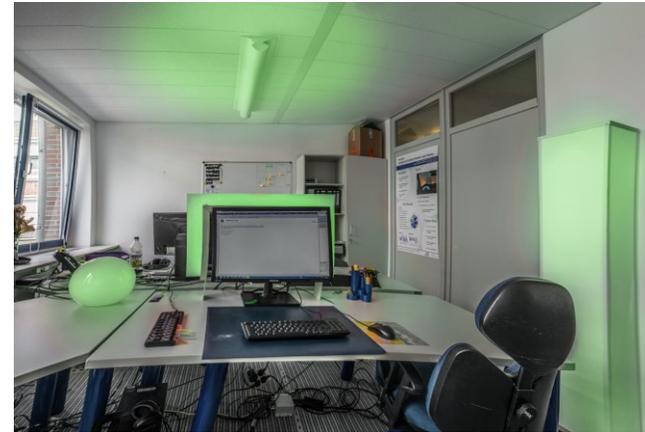

Figure 5: Study setup

Compared to their experiences with other reminder systems the participants were used to they stated that they felt less interrupted by the ambient light displays regardless of type of display or pattern than when using standard reminders.

Conclusion and Outlook

We conducted an initial exploratory study into displaying reminders for upcoming calendar events with ambient light displays. Of the four systems used participants preferred a table lamp.

In future work, we will explore creating a small form factor, portable ambient light display to keep users informed of upcoming events and maybe other notifications as well. We will investigate the design

space for such a smaller version of the Ambient Timer and evaluate its performance.

From an initial series of interviews we derive that people prefer a device that would fit in their pockets, will be used mostly at the office, uses either direct interaction or interaction via an app, and has its LEDs switched off when not displaying information. Besides reminder information on upcoming events, interviewees could also imagine using the device as a countdown timer to structure meetings or activities.

References

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