Ambient Dayplanner: A Tangible Interface for Public and Private Appointment Calendars

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ABSTRACT

The Ambient Dayplanner is a projected wall clock displaying time and short-term scheduled appointments. It provides a tangible interface for setting the reminder time, and has both public and private displays. The ambient quality of the clock allows it to fade into the environment, while occasional sounds and a small mirror reflecting light from the display onto the desktop keep the user peripherally informed about the immediacy of upcoming appointments without being intrusive.

Keywords

Ambient display, direct display, public display, private display, tangible interface, interactive calendar, clock.

INTRODUCTION

Myriad ways exist to keep track of personal appointments. Traditionally, such solutions have included day planners, calendars, and sticky notes. Technologies such as web calendars and personal digital assistants allow such information to be stored digitally and shared easily with others. However, these tools are constrained to virtual space. As general-purpose mechanisms instantiated in traditional computing devices, their real-time, contextual views of upcoming commitments are not optimized for unobtrusive, persistent physical presence. As traditional computer-based tools, they occupy space on a computer screen and thus cannot become a part of the environment.

For example, constrained to a calendar-like model, appointment calendars present an entire day, week, or month in detail, when one's immediate interest may concern only the events of the next several hours. Traditional analog clocks deliver a contextual view of the current time, but present a full 12 hours of future time, which is often too much information. Digital clocks adopt the opposite extreme, with most only showing "now" and no contextual information at all.

AMBIENT DAYPLANNER

The Ambient Dayplanner is an "ambient fixture" that addresses the shortcomings of traditional appointment calendars by providing a physically instantiated, publicly viewable clock coupled to a private display of detailed appointment information [1,2]. There are four primary goals in the design of the Ambient Dayplanner:

- To reduce and refine the available information, so only necessary contextual details directly interact within the personal environment.

- To introduce new information into the environment in a gradual manner, so that the timepiece and its alarms are never jarring or startling.

- To paint data into both the overall public environment (for information which may be freely shared) and into personal space (for private information and details).

- To generate gentle ambient cues using natural elements—light and sound—so that one may gradually become more aware of the ambient clock which he or she may otherwise ignore or experience peripherally.

Additionally, the design attempts to span three axes of information display—tangible versus virtual, public versus private, and ambient versus direct.

IMPLEMENTATION

The Ambient Clock contextualizes "now" by placing it in a specific, fixed location while the details of time (the passing hours and appointments) float over that fixed position. Only the prior hour and upcoming hour are numerically displayed, providing enough context to situate a viewer "in time" and to deliver a sense of the immediacy and density of upcoming commitments without presenting the distraction of unnecessary information. The display of the upcoming hour is blurred when distant, visually resolving as it approaches "now", then more blurry again as it fades into the past, signifying its relevance to "now." The Ambient Dayplanner displays only a short window of time. For long-term calendar functions, one would continue to use standard calendaring software.
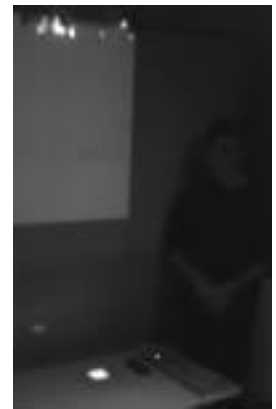
Figure 1. The Ambient Dayplanner display consists of a clock projected onto a wall, a swatch of light reflected onto a table, and a tangible interface for setting the reminder time

Figure 2. Physical interface for setting the reminder time.

Appointments appear as blocks of light that follow the flow of time across the clock. As an appointment approaches "now", its corresponding block of light becomes brighter, signifying immediacy. Passers-by can use the display to gauge the density of a person's short-term commitments.

Tangible versus Virtual
The Ambient Dayplanner has both tangible and virtual interfaces: appointments are entered into the computer using a familiar computer interface, while the setting of reminders and their projection onto a desk is accomplished by manipulating a simple pegboard interface.

The physical interface consists of a horizontal pegboard positioned above the clock display, and a peg with a down-angled mirror attached to one end. To set the reminder time, one inserts the peg into one of five holes on the pegboard. When the peg is inserted, the computer reads its location and sets, in half-hour increments, the reminder time for the clock. The mirror attached to the peg reflects the bright light of appointment blocks onto the desktop below, a physical instantiation of the reminder. The mirror and peg exist simultaneously in physical and digital space.

Public versus Private
The Ambient Dayplanner is both a public and a private display: its timeline and appointment bar appear in the upper corner of an office in full view of anyone who walks by, while in-depth information and reminders appear privately on a user's desk, out of public view. This dual display component allows only the required amount of information to be displayed, reducing clutter and allowing information about the upcoming few hours to be viewed and understood with only a quick glance.

The Ambient Dayplanner delivers information to both the public and private spaces of an office. A colleague can tell at a glance that the user is busy in the near term, and can decide against interrupting, without learning the specifics of upcoming commitments. The user can view specific information privately, projected onto the desk.

Ambient versus Direct
The public part of the Ambient Dayplanner's display exists at the fringe of perception. Its location in the upper corner of an office allows a user to ignore it, yet the display is close enough so that a one can glance up at it easily.

Purely visual ambient displays often fall short of their goal to fade into, but not wholly disappear from, the environment. To address this problem, the Ambient Dayplanner uses two direct cues to free the user from constantly monitoring the display for new commitments.

The first is ambient audio (in the prototype, a collection of birdcalls). When an appointment reaches the user set reminder time, quiet birdcalls begin to play infrequently in the background. As the appointment time approaches, the audio cues increase in intensity (louder and more frequent birdcalls) to keep one informed of the immediacy of the upcoming event. Unlike traditional alarms that go off either once, or incessantly, the Ambient Dayplanner's ambient reminder feature gradually increases the intensity and urgency of its alarms to keep the user constantly aware of their schedule without demanding conscious attention.

Coupled with the ambient audio, the Ambient Dayplanner provides a direct visual path for reminder information. A mirror, part of the tangible interface for setting the reminder time, deflects photons from the projected display onto the user's desk as a reminder of an upcoming appointment. This reflected swatch of light is only modestly intrusive: it doesn't obstruct or interfere with the user's work, it appears on top of any object on the desk, and it can be easily ignored until the user has time to attend to the reminder. This direct display allows a user to be reminded of upcoming appointments without having to glance up at the clock portion of the Ambient Dayplanner.

CONCLUSIONS
While full user testing of the Ambient Dayplanner's interface must be performed to completely gauge its usefulness, initial, brief, impromptu use of the system indicate that the design, spanning three axes of information display—tangible versus virtual, public versus private, and ambient versus direct—provides a simple and pleasing interface for a calendar display.

Future development will look at better sensing technology for more granular reminder time setting, allowing different reminder times for different types of appointments, and providing other tangible interfaces for interaction with the direct, private display of calendar data.

More information on this project can be found at: http://www.media.mit.edu/~spiegel/AmbientDayplanner/

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