TimePress: Creating a Specialized Dynamic Calendar

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ABSTRACT

Waiting to enter a walk-in clinic such as a doctor's office or professor's office hours can be frustrating and time consuming. The TimePress system is a new dynamically updating calendar which provides a grounded estimation of when an appointment will actually begin, not just when it was originally scheduled to. We believe that this up-to-the-minute estimation alleviates some of the frustration of waiting while allowing people to use their time more efficiently by picking tasks which fit within the more accurate estimated wait time.

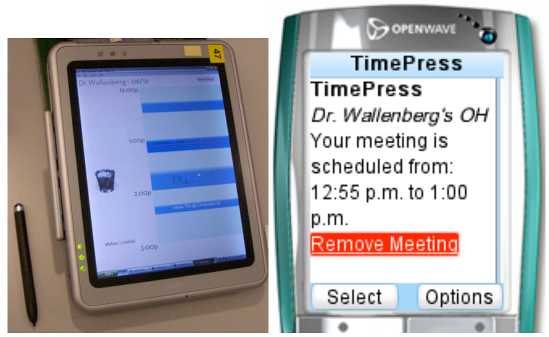
Keywords

Calendar, Scheduling, Remote Access, Office hours

INTRODUCTION

Two major problems in walk-in clinics are long lines and ambiguous wait times. These varied wait times can be extremely frustrating, as they interfere with planning and time-management on the part of the patient. These problems arise in many other walk-in situations, such as while waiting for a table at a restaurant or in a professor's office hours (the latter of which was evaluated). These problems are partially solved by a calendar with estimates of the amount of time each meeting will take. However, as researched by Elizabeth Mynatt, calendars do not map directly to the real world, and people do not necessarily abide by them [3]. Appointments often take up more or less time than originally scheduled. Even with this predictive measure, the length of wait-time is still ambiguous, and thus often frustrating.

Research in the area of digital calendars has generally focused on the problem of scheduling many people together for a single meeting and the problems of public calendars. Palen points out that calendars often contain information which can be used by peers to judge users [5]. Later programs, such as groupTime [1] use sophisticated weighting mechanisms to decide on the best time for a group to meet while protecting each individual's privacy. The problem of walk-in clinics (scheduling many people for separate meetings during a set period of time) has not been as intensely researched, and ways to alleviate the frustration and waste of time have not been explored. TimePress attempts to do so by extending the concept of feedback used in graphical interfaces to the calendar world. Feedback has been shown to help users budget their time and prevent user frustration in graphical interfaces [2] [4].



Figures 1, 2: TimePress Tablet and Mobile Interfaces

THE TIMEPRESS SYSTEM

The issues with various forms of walk-in clinics can be illustrated by the example of professors' office hours in a university setting. These office hours are often scenes of miscommunication and disorganization. Students are forced to wait for long periods of time, and may not get a chance to speak to the professor. The professor may not be aware of how many students are outside of their door, and is unlikely to know how much time individual students will require. TimePress provides a clearer, more informative display of the time distribution than conventional methods such as paper sign-up sheets or whiteboards.

Interaction Methods

We designed the interaction for the tablet using a painting metaphor. At the tablet, meetings can be created, labeled, swapped and removed with a stroke of the stylus. At the first stroke, an appointment box the height of the stroke appears; the user is then prompted to enter a label. If the user wishes to swap times with another, this can be done simply by drawing a line between the two. Deleting a meeting can also be done simply by drawing a line from a meeting to the trashcan. All meeting times dynamically resize to accommodate meetings which run shorter or longer than anticipated. This dynamic resizing and updating is similar to a progress indicator, in that it allows users to budget their time between tasks and, we believe, prevents user frustration. There is also functionality for a waiting list, for the case when all available meeting times have been booked. If a meeting is missed, the system compensates by allowing the next person in the queue to begin, and reserving a later spot for the delinquent student. Recognition of entry/exit into office hours is done using motion-capture on a webcam. All information is stored remotely, so that the same functionality which is available at the tablet can also be accessed, for example, on mobile phones.

For the mobile interface, appointment creation is accomplished using a drop-box format for selecting the length and start time of the meeting. Once an appointment has been created, the expected meeting time is shown, and refreshed regularly to reflect changes in the schedule. An alert is sent to the phone five minutes before the updated meeting time.

Improvements over Paper and Digital Calendars

Among the improvements that TimePress affords, professors can now be immediately updated on the number of people awaiting their attention simply by glancing at their computer screen. If some students are not seen during office hours, the automatically created waiting list allows the professor to assign priority for the next session to those who were not seen. Students with approaching deadlines can determine whether or not going to office hours will benefit them or simply be a waste of their time. The constant, minute-by-minute updating allows for a much more grounded assessment of how much time is available than a sign-up sheet would. Also, the clear display of who is in line prevents the need for a student to come in and ask every person already there who the last person in line is, creating an atmosphere where a new person is not an annoying distraction. It is easy to imagine how these benefits would extend to other walk-in clinic situations.

USER EVALUATION

Our hypothesis for the user tests was that TimePress would lower the frustration level among people waiting to be seen in office hours. Also, because the people waiting were informed of the amount of time left before they went, we expected that they would pick problems which would fit the amount of time—in essence, different problems than they would have picked in a situation in which the wait time was more ambiguous.

Method

We evaluated our system through two sets of user tests. In the first, we deployed the system in three sets of office hours. Two of these were held in professors' offices, and the third was a session run by a Teaching Assistant in a public computer cluster. All of the office hours were for Computer Science classes. The second test was a lab test. We had nine participants in the first set of tests and ten in the second, for a total of nineteen.

Our first user test consisted of having students use the system and then fill out a one-page questionnaire regarding how the system affected their frustration level and behavior during the wait period for the instructor. Other questions on the questionnaire related to the mobile access system, which several students used. We also gave each student a chance to comment on ways in which s/he thought that the system could be improved. In compensation, all participants received a cookie. Our second test focused on usability and our tablet and mobile interfaces.

DISCUSSION

While the number of participants at the office hours tests did not stress the system to its full potential, all participants found that the system did reduce their frustration while waiting for the instructor and allowed them to better budget their time. Most indicated that having the system helped them pick which problems to work on while they waited, selecting only those which they could make significant progress on within the estimated amount of wait time. While we had expected that students would have more frequently changed location because of the mobile interface, we did not find this to be the case; however, this may have been due to the fact that most office hours we studied were not overly crowded, and thus the wait times were not long. Other suggestions included alternating the color of the appointment boxes for easier reading from a distance; adding a numerical timestamp to the graphical representation of the calendar; and making the drop-down menu of time selections in the mobile interface begin at the current time.

FUTURE WORK

Based on our user feedback, in the future we will explore different ways to prioritize sign-ups and group appointments - professors expressed interest in "streamlining" office hours in this way. One possible system we would like to test is a bidding system, in which users can group up and move earlier in line by using tokens authorized by the professor. This system would encourage users to form groups if they had similar questions without forcing the professor to actively organize the office hours. Also, we would like to integrate our system more seamlessly into environments, including an ambient component to the tablet that shows large-scale information when viewed from afar, but changes to show more details upon approach.

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