Palm Pilot Redesign, Experiment, and Retrospective

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Executive Summary

As part of the Introduction to HCI course at Carnegie Mellon University, 5 undergraduates (Eric Burns, Filipe Fortes, Stephanie Gaultney, Thomas Lianza, and Brian Yeung) analyzed the Palm Pilot 1000 user-interface (through the coPilot emulator). We evaluated the interface using the Contextual Inquiry (CI), Heuristic Evaluation (HE), Cognitive Walkthrough (CW), and Think-Aloud (TA) analyses. The main problems we found in the interface are the inability to link data, the inability to schedule multi-day appointments, and the lack of appropriate feedback for graffiti.

Date Book - Linking & the Event Edit Menu

Our first proposed design change allows a user to link any Palm data type to another Palm data type. Below, we show an example where an appointment is linked to a memo.

Starting State: The new "Event Edit" Dialog allows the user to edit the name of the event as well as use the new linking feature.

Step 1: The user taps on the "None" field next to "Link:" just as they would to create a repeating event.

Step 2: The "Link to Data" window appears. Note the new "Drawing" data type.

Step 3: The user selects "Memo Pad"

Step 4: A list of the available memos appears. These are the same memos found in the Memo Pad application.

Step 5: The user selects a memo to link to from the list.

Date Book - Linking & the Event Edit Menu (cont.)

Step 6: The memo appears in the Event Edit dialog box, and the "Go" button appears, enabling them to jump to the linked object.

Step 7: After clicking "OK" the user can see that their changes have been made by the appearance of the link icon.

Design Changes

Allow the user to link items; a new "Event Edit" window; a "link icon"; the Drawing data type.

Rationale

This change was mainly motivated by the Think Aloud study. The ability to associate elements of different data types was not possible in the Palm, and it was a function that the user was searching for in order to complete one of her tasks. A similar feature would be implemented in each of the primary Palm applications (Date Book, Address Book, To-Do List, Memo Pad, and Drawing Pad).

The new "Event Edit" window was motivated by the need to provide access to the link functionality; however, we also chose to let the user edit the name of the actual appointment, which allows the user to modify all properties of the appointment within this window.

Tapping on the link icon to the right of the appointment will take the user to the linked item, a shortcut for users. The drawing data type and application are unmotivated additions on our part.

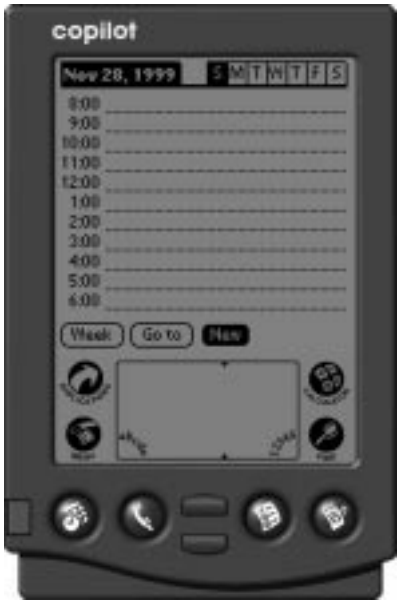
Justification

18, 19, 28

Datebook entry creation and multiple-day events

Our next redesign change involves appointment creation. We have added a “New” button, and the ability to create events that span multiple dates. A sample progression is provided below:

Starting State: The user is presented with the standard Date Book screen.



Step 1: The user taps the “New” button to create a new entry. The previous system had no obvious way of creating a new entry.

Step 2: The system responds by displaying the “set time” dialog for the new entry.

Step 3: The user taps on the Start’s Time field (labeled “No Time”)

Step 4: The system responds by displaying the “set start time” dialog.

Step 5: The user selects 1:00 PM as the start time.

Datebook entry creation (cont.)

Step 6: The user has selected 1:00 PM as the start time, and hits “OK”.

Step 7: The system created a new appointment at the desired time, and waits for the user to enter a name.

Design Changes

“New” button added to the Date Book; New entries automatically request starting and ending time when created; Appointments can also span multiple days.

Rationale

The lack of a visible “New” button was considered a problem in all stages of analysis, as is setting events for multiple days (CW, HE, TA).

Justification

14, 39, 71; 16, 44

Graffiti System Feedback

Our next redesign deals with the Graffiti input functionality of the Palm Pilot. We have modified the Palm Pilot to provide visual feedback for the user's writing.

Starting State: Palm is completely blank except for physical buttons. User can press any button, and Palm will activate.

Revised Graffiti System: The graffiti glyph is displayed as the user enters it on a screen behind the graffiti pad.

A second example of the immediate feedback graffiti system is shown above. In this example, the user is entering an "R" character.

Design Change

The graffiti pad behaves like paper, in that the pen motion translates directly into a visible glyph as the user writes. This glyph will disappear once the user lifts their pen from the writing surface. The hardware change required to implement the feedback system may allow us to also implement the umotivated change of backlighting the writing area.

Rationale

Heuristic Evaluation analysis revealed user feedback problems on graffiti entry. This complaint can be addressed by providing users with instantaneous feedback, with the goal of reducing data entry errors.

Justification

Date Book - Edit Button & Selection Visibility

The new full day view in the date book - note that the "Details" button has been eliminated.

When the user taps on the appointment, the "Edit" button appears and a thick box surrounds the event.

Design Change

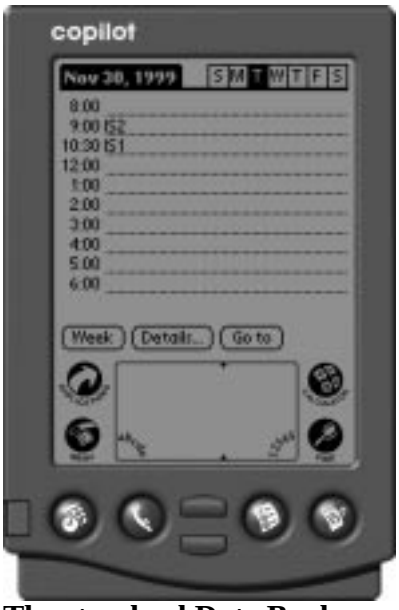
Better highlighting of selected items; renaming of the "Details..." button to "Edit"; hiding of the "Edit" button while an item is not selected.

Rationale

The old "Details" button was visible at all times, even when no option was selected and the button wasn't functional. In addition the word "Details" did not suggest the types of changes that tapping it would give you the ability to make. Selection on the original interface also wasn't clear, so we created a darkened box that would surround the event when tapped.

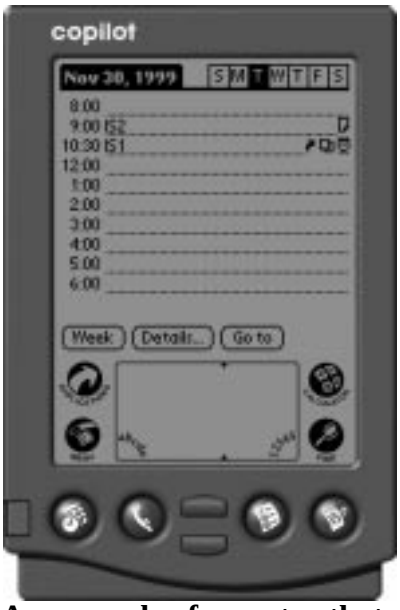
Justification

Date Book - Indicator Icons



The standard Date Book view - the user starts by selecting “Details” (note: the design change on the previous page addresses the Details button)

The Event Details Dialog box pops up, permitting the user to set repeats, alarms, and (in our new dialog described in a previous section) links.



An example of an entry that repeats, has an alarm, and has a link.

Design Change

Added icons to DateBook items.

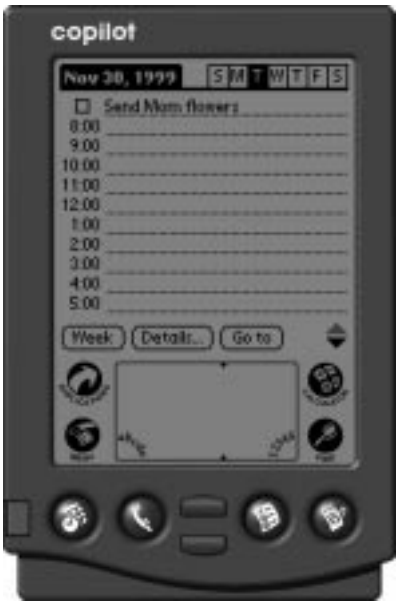
Rationale

Revealed in the Cognitive Walkthrough, the lack of adequate feedback when modifying the properties of Date Book entries was a large problem. We decided to add icons similar to the existing note icon to show the user that the changes they have made have taken effect.

Justification

73

To-Do Item in DateBook



The to-do entry for 11/30 is also automatically displayed on the datebook for 11/30.

The To-Do item displayed on the datebook page functions as it does in the To-Do application. The user can check off the entry once he has completed the task.

Design Change

To-Do entries tied to a specific day also appear on the datebook entry for that day. The To-Do entries function identically in each application.

Rationale

Think-Aloud and Heuristic Evaluation analyses both signaled To-Do/Datebook coupling as a problem area. By transparently tying To-Do items to the corresponding datebook days, the system will keep users better informed of their tasks.

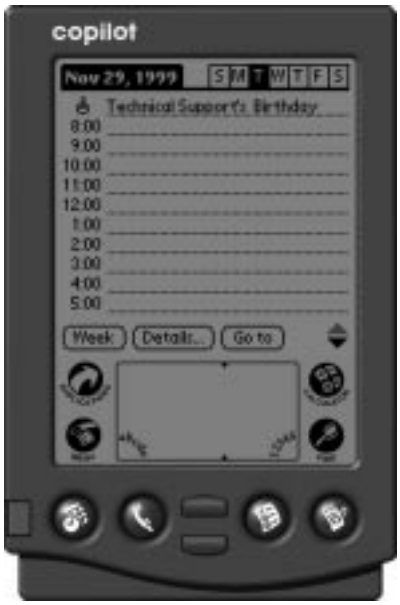
Justification

28, 35

Address Edit - The Birthday Feature

Scrolling down on the standard view reveals a new "Birthday" field.

The user can enter a birthday in the same format they set in the main Palm preferences (in this case mm/dd/yy). The year is optional.



The birthday is now displayed in the calendar, with a special birthday icon.

Design Change

Added field for Birthdays in the Address Book and Date Book.

Rationale

This is an example of another unmotivated change. It was inspired not only from personal use of the Palm Pilot but also by comparison against other organizer software. The birthday is added as an all-day yearly repeating event in the date book.

Justification

Unmotivated. This design does violate a Heuristic, consistency. The method of inputting a date (the birthday) is not consistent here with other parts of the Palm (the Date book and To-Do list). However, this is not a frequent, or important task, and we are willing to make this sacrifice.

Address View - Removal of the “New” Button

The existing Palm interface which has a “new” button displayed when looking at an existing entry.

The new Palm interface does not have a “new” button on the address view.

Design Change

Removed New button from Address View.

Rationale

We determined that it does not make sense to put a “New” button on an existing entry. This problem was discovered during the Usability Heuristic analysis. Allowing a user to create a new address book entry when they are looking at an existing address book entry does not provide a match between the system and the real world.

Justification

Address Edit - “Okay” and “Cancel”

The current view in address edit mode - the only option to signify completeness is “Done”

The new interface has both “OK” and “Cancel” giving the user the option to not preserve any of the changes made on the entry.

Design Change

Changed Done button to OK and Cancel in Address Edit.

Rationale

The Usability Heuristic analysis first revealed this problem. The “OK” button is consistent with the Palm interface (see the “Event Details” dialog box in the Date Book) and the Cancel button gives the user the ability to completely erase any changes they have made to the address entry by accident.

Justification

50, 54

To-Do List - Edit Button

A sample To-Do list is shown. No “Edit” button is displayed, since the user has not selected an entry.

The “Edit” button appears once an entry has been selected.

Design Change

The “Edit” button is not displayed when no To-Do list entry is selected.

Rationale

If the “Edit” button is clicked while no entry is selected, the system responds with an error. In many cases this is triggered by a simple mistake on the part of the user and tends to be unhelpful. By eliminating the button when no entry is selected, the error will never occur.

Justification

Preferences - Eliminating the “Today” Button

The way it works now: a standard calendar from which they select a day. Once a day is selected, the user is returned to the preferences.

“Today” button removed.

Design Change

The “Today” button was eliminated because it serves no purpose and is confusing.

Rationale

This was a confusing feature that was discovered in the Heuristic Evaluation. We never applied the other techniques to this area of the Palm, so this is the only way it could have been discovered. If the Palm Pilot really knew what day today is, why would it want us to set the day ourselves?

Justification

Problems found, but already fixed in the Palm III

Because our analysis were performed on the equivalent of a Pilot 1000, there were many problems found that had already been fixed by 3Com in the Palm III.

Find Results Dialog - In the Pilot 1000, the user must select one of the matches and press the "Go to" button. The Palm III allows the user to simply tap the matched item to open it. Justification: 5.

New Button for Appointment creation - The Pilot 1000 did not have a "New" button to create new appointments in the Date Book. Three of our analyses spotted this problem. Justification: 14, 39, 71.

Memo List Organization - The Pilot 1000 does not support any method for organizing the memos. The Palm III allows the user to drag memos into any order they wish. Justification: 66.