

Designing Multimodal Applications for Senior Users

Deborah Dahl
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Two Aspects of Application Design

- ▶ ***What*** to design
 - Applications and features that improve the users' lives – both by solving problems and by enriching life
- ▶ ***How*** to design it
 - Take into account the users' characteristics to make user interfaces maximally functional and easy to use

The answers to these questions arise from the user

- ▶ What do users want and need?
- ▶ How do they interact with technology to address these needs?

Older Adults

- ▶ A rapidly growing demographic
- ▶ Technology can assist “aging in place”
- ▶ Current computer user interfaces may be difficult to use or unappealing

What do users want and need: limitations and problems of normal aging

Everyone is different -- but limitations are common

- ▶ 72% of people over the age of 80 have some form of disability
- ▶ 100% of people have problems with close vision after age 50 (presbyopia)
- ▶ 50% of people over the age of 75 have difficulty hearing
- ▶ 33% of people over the age of 55 have some symptoms of arthritis
- ▶ 50% of people over the age of 75 use a cane, wheelchair or walker
- ▶ problems with word retrieval are common
- ▶ older adults can have problems with memory
- ▶ 28% of adults over the age of 65 in the US live alone

How can technology help: Applications and features that improve users' lives

Technology can:

- ▶ Compensate for perceptual and motor limitations such as hearing loss and reduced mobility
- ▶ Provide cognitive support in the areas of word retrieval and memory
- ▶ Provide social support by making it easier to interact with distant friends and family

But just the functionality isn't
enough – to make a difference,
it has to be usable

Taking into account the users' characteristics to make interfaces maximally functional and easy to use

The user interface for older users:

(1) perceptual/motor support

- ▶ Multimodal output provides support for vision and hearing problems
- ▶ Multimodal input allows users who have difficulty moving their hands to speak their requests instead of typing or using a mouse
- ▶ Speech interfaces make it possible for users with limited mobility to access technology without having to move too far

The user interface for older users:

(2) cognitive support

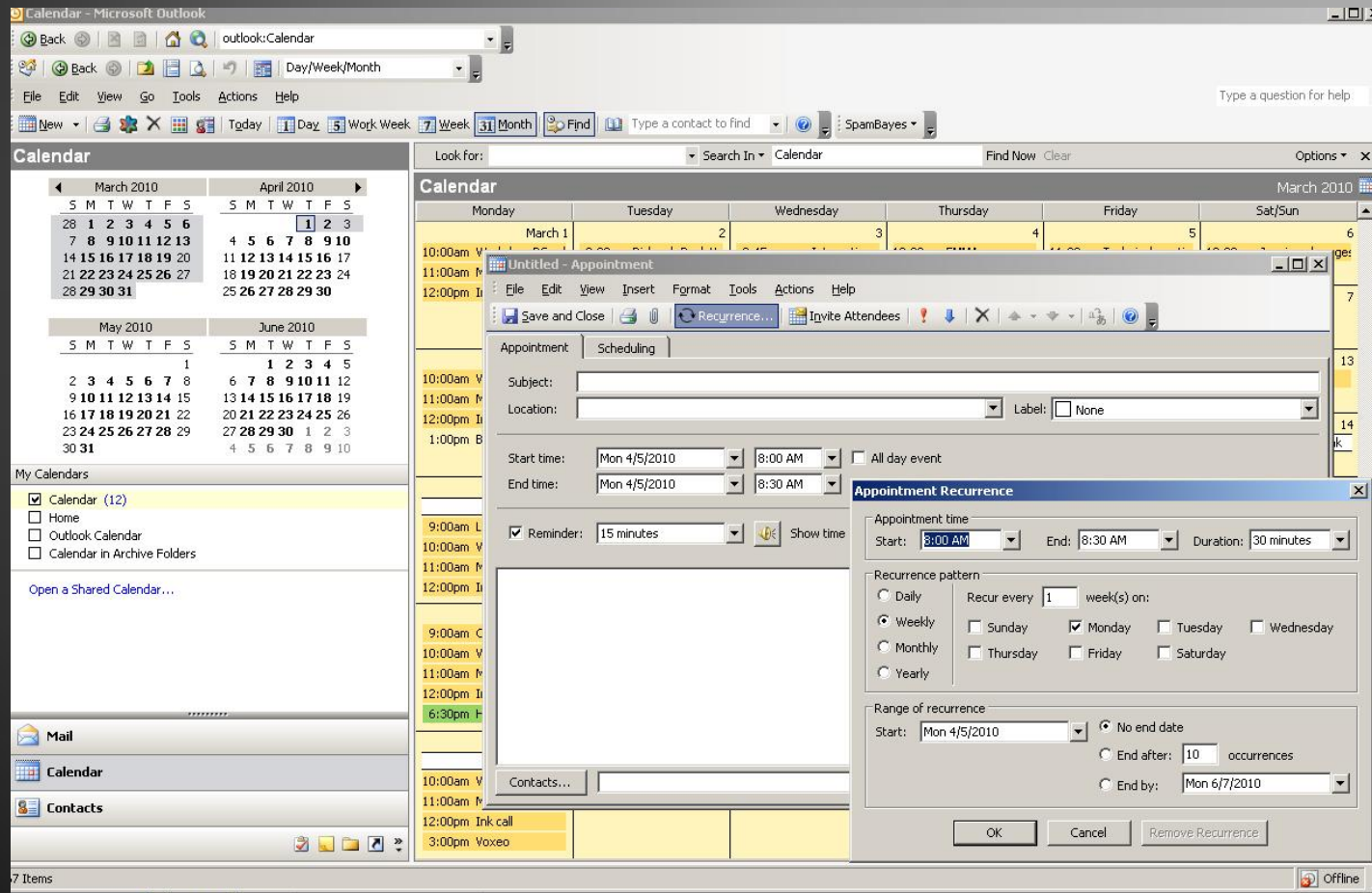
- ▶ Memory – persistence of the conversation in the visual display
- ▶ Word Retrieval – multimodal cues can help the user remember words
- ▶ Learning – a graphical interface that doesn't overwhelm the new user with complexity
- ▶ Attention – many seniors report difficulty focusing attention and distractibility. An application can keep track of what the user was doing and help them go back to an interrupted task

The user interface for older users:

(3) social support

- ▶ Easy ways to make and receive phone calls that don't require manual dexterity
- ▶ Easy ways to send and receive email that avoid the complexity of current email interfaces

A current UI for managing schedules



Things to Avoid

As a dialog-based interface becomes more capable, it also becomes more able to annoy and offend,
So it's important to avoid...

Patronizing, condescending or disrespectful language

- ▶ Speech that conveys assumptions of social superiority, such as initiating informal speech
- ▶ Use of “Elderspeak”, characterized by:
 - singsong intonation
 - overly slow speech
 - repeating or paraphrasing what the user has just said
 - using terms like “honey” or “dear”
 - simplified vocabulary
 - simplifying the length and complexity of sentences

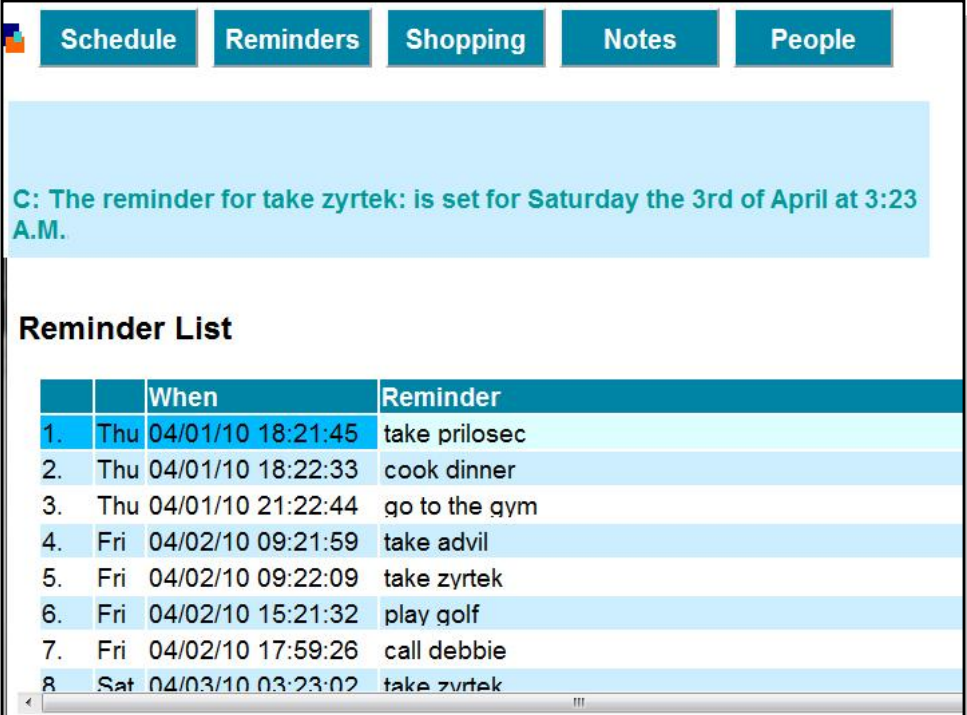


An Example

- ▶ A personal assistant application for seniors that helps them manage the details of daily life with an easy to use multimodal interface
- ▶ Memory support is one function that will make the application valuable to older users

Reminders Function

- ▶ Touch “Reminders” button to see reminders or ask for “reminders”
- ▶ Enter new reminders by voice or typing
- ▶ Hear a reminder at the requested time and see text of reminder



The screenshot shows a mobile application interface with a top navigation bar containing five buttons: "Schedule", "Reminders", "Shopping", "Notes", and "People". The "Reminders" button is currently selected. Below the navigation bar, there is a light blue notification box with the text: "C: The reminder for take zyrtek: is set for Saturday the 3rd of April at 3:23 A.M.". Below this notification, the title "Reminder List" is displayed. Underneath the title is a table with two columns: "When" and "Reminder". The table contains eight rows of reminder data.

	When	Reminder
1.	Thu 04/01/10 18:21:45	take prilosec
2.	Thu 04/01/10 18:22:33	cook dinner
3.	Thu 04/01/10 21:22:44	go to the gym
4.	Fri 04/02/10 09:21:59	take advil
5.	Fri 04/02/10 09:22:09	take zyrtek
6.	Fri 04/02/10 15:21:32	play golf
7.	Fri 04/02/10 17:59:26	call debbie
8.	Sat 04/03/10 03:23:02	take zyrtek

Application Value

- ▶ Enhances the ability to remember things by maintaining an easily managed list of things the user wants to remember
- ▶ User Interface:
 - The natural speech and touch-based interface is easy to learn
 - Multimodal touch and voice input places fewer motor demands on the users than mouse and keyboard
 - Users can configure voice and graphical display to suit their tastes and needs

Summary

- ▶ Considering the physical, cognitive and social needs of the user informs both the functionality of applications as well as the design of the user interface
- ▶ Taking these considerations into account, we are experimenting with an application that supports memory for older users