FilePiles
Using a Piling Metaphor for Digital Document Organization

A thesis submitted for candidacy for the degree of Master of Design in Interaction Design

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Introduction

It's been over 10 years since the Human Interface Group at Apple explored a new UI widget—the pile—as a means of casual organization of information on the digital desktop. Since then, the idea has fallen by the wayside, even though using piles to organize documents instead of hierarchical file systems seems to be an obvious extension of the desktop metaphor and is how many people naturally work. With the recent additions of personal information management applications such as Apple’s Exposé to operating systems, it’s the right time to revisit this idea. Using new research, I've designed and prototyped a new system for piling digital documents on the desktop, one that tries to emulate the natural use of paper documents on physical desktops. Users have responded positively to prototypes of this new system.

This document outlines the research and development process of this project.
Hunt Statement and Hypothesis

Before beginning research, it's always a good idea to put together a hunt statement to test a hypothesis.

**Hunt Statement**
I am going to look at how people currently organize and use physical and digital documents in order to create a better system for doing so on a desktop computer.

**Hypothesis**
People need a method of organizing and using their digital documents in a way that better mirrors their physical documents: into piles.
RELATED PRODUCTS

- Lifestreams 2000
- WorkScape 1994
- Data Mountain 1998
- TimeScape 1999
- Apple Piles 1991
- Stuff I’ve Seen 2003
- Presto 1999
- MessyDesk 2002
- TimeScape 1999
- Presto 1999
Literature Review

Barreau, D. and Nardi, B. “Finding and Reminding: File Organization from the Desktop”

Bergman, O., Beyth-Marom, R., and Nachmias, R. “The User-Subjective Approach to Personal Information Management Systems”

Boardman, R. “Workspaces That Work: Towards Unified Personal Information Management”


Fass, A., Forlizzi, J., and Pauch, R. “MessyDesk and MessyBoard: Two Designs Inspired By the Goal of Improving Human Memory”

Gifford, D. “Semantic File Systems”


Henderson, S. “Personal digital document management”

Henderson, S. “How Do People Organize Their Desktops?”


Mark, G. and Gonzalez, V. “Managing Information in Multiple Spheres of Work”


Peters, R. “Exploring the Design Space for Personal Information Management Tools”

Quan, D., Bakshi, K., Huynh, D., and Karger, D. “User Interfaces for Supporting Multiple Categorization”

Ravasio, P., Schar, S., and Krueger, H. “The virtual desktop: Selected results of a user study”


Ringel, M., Cutrell, E., Dumais, S., and Horvitz, E. “Milestones in Time: The Value of Landmarks in Retrieving Information from Personal Stores”


Whittaker, S. and Hirschberg, J. “The character, value, and management of personal paper archives.”
I did several participatory research sessions to dig up more information about how people pile and file physical documents and about how they feel about them. I used an IDEO technique called Draw Your Experience, where the subjects draw things in a subject area. I gave them the topic “The Life Cycle of Your Paper” and 30 minutes to draw. Then they had to explain their drawing to the group.
DRAW YOUR EXPERIENCE SESSIONS
DRAW YOUR EXPERIENCE SAMPLES
Research Models

Based on my Draw Your Experience sessions, interviews, observations, and survey, I created two research models: Anatomy of a Pile and the Lifecycle of Documents.
RESEARCH MODEL: ANATOMY OF A PILE

Items at the top of the pile are either important, referenced often, or new. Documents here remind users of tasks they need to accomplish. Documents in view.

Items in the middle of the pile are referenced less often and are decreasing in importance. Documents hidden but easily found.

Items at the bottom of the pile are seldom referenced and are ready to be filed or thrown away. Documents hidden and more difficult to find.

Piles are collections of documents related by type, theme, time, or any combinations of those.

Documents in piles are sometimes annotated by post-it notes or writing directly on the document.

The more important a document is, the longer it takes to travel from the top of the pile to the bottom.
**Design Implications from the Research Models**

Items on the top of piles should be visible.

As files get accessed less frequently, they should drift deeper into the pile.

Piles should be easy to file when done.

Users need to be able to browse through the piles to find things not at the top.

Pile visualization should reflect the amount of items in the pile.

Pile visualization should reflect the last time accessed.

It should be easy to re-sort the pile (to move files back to the top or down to the bottom).

It should be easy to discard things from the pile.

It should be easy to pile things as they are received or created.
RESEARCH MODEL: DOCUMENT LIFE CYCLE

Documents created and delivered by other people

Documents are sorted based on relevance and type.

Documents are piled for easy use and access.

Documents are filed for storage.

Documents are lost.

Documents are discarded.

Self-generated documents
Personae

I distilled my users down to three personae, based on their document usage, computer expertise, and physical piling.
Ann
primary persona

**demographics**
- age 34
- occupation: Journalist
- location: Pittsburgh
- marital status: Divorced
- children: Two
- income: $42,000
- education: College Graduate
- hobbies: Yoga, Hiking, Reading

**computer usage**
- computer: Dell PC Laptop
- operating system: Windows XP Home
- expertise: Intermediate
- comfort: Comfortable
- time: 40 hours/week
- programs: Email, Word, Powerpoint, IE

“I make an Important Papers Stack. The stack is a nightmare, but I know what’s in it and where to find it.”

**paper usage**
- desktop: Messy
- filing time: Every Six Months
- piles: One Big Pile
- types: Printouts, Mail, Post-Its, Receipts

**document usage**
- types: Word Files, Email
- desktop: Folders, Few Loose Items
- filing time: As Created
- piling: Folders as Piles
Ralph
secondary persona

computer usage
computer Mac G4 Powerbook
operating system OSX
expertise Expert
comfort Very Comfortable
time 50 hours/week
programs Email, Illustrator, InDesign

paper usage
desktop Semi-Messy
filing time Every Three Months
piles Piles for Different Projects
types Printouts, Memos

document usage
types Image Files, Word Files, Email
desktop Many Loose Items
filing time Every Few Weeks
piling Desktop as One Big Pile

“The desktop becomes an important papers file while I’m working on something, then afterwards I clean it up.”

demographics
age 42
occupation Creative Director
location San Francisco
marital status Married
children Two
income $110,000
education College Graduate
hobbies Surfing, Rare Record Collector
Andy

tertiary persona

computer usage
computer Mac G5 Tower
operating system OSX
expertise Super User
comfort Very Comfortable
time 80 hours/week
programs Email, IM, iTunes, Word

“I have multiple desktops. Each one is its own pile.”

demographics
age 26
occupation Graduate Student
location Cambridge, MA
marital status Single
children None
income $26,000
education College Graduate
hobbies Gaming, Skiing, Pinball

paper usage
desktop Neat
filing time Daily
piles Piles for Different Projects
types Printouts, Articles

document usage
types Image Files, Word Files, Email, IM
desktop Messy
filing time Every Few Weeks
piling Each Desktop is Its Own Pile
Scenarios of Use and Task Analysis

Once I had my personae, I ran them through scenarios of use, then distilled those scenarios down to an actionable task list that the system would have to support.
## SCENARIOS AND TASK ANALYSIS

<table>
<thead>
<tr>
<th>SCENARIO ONE</th>
<th>SCENARIO TWO</th>
<th>SCENARIO THREE</th>
<th>SCENARIO FOUR</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ann</strong></td>
<td><strong>Ann</strong></td>
<td><strong>There is a file somewhere in one of her desktop piles that Ann wants to see.</strong></td>
<td><strong>Done with a project, Ann wants to file the associated pile.</strong></td>
</tr>
<tr>
<td><strong>primary persona</strong></td>
<td><strong>She saves the document.</strong></td>
<td><strong>She double-clicks the document and the document opens in the appropriate program.</strong></td>
<td><strong>She selects the pile, then drags it to a folder.</strong></td>
</tr>
<tr>
<td><strong>She creates a Word document.</strong></td>
<td><strong>Under the File menu, she chooses Add to Pile and then the name of the pile.</strong></td>
<td><strong>When she sees the file she wants, she double-clicks it to open it.</strong></td>
<td><strong>Inside a folder, the pile breaks up into its component parts.</strong></td>
</tr>
<tr>
<td><strong>The document becomes part of the pile.</strong></td>
<td><strong>Done with a project, Ann wants to file the associated pile.</strong></td>
<td><strong>He finds the document in the pile and selects it.</strong></td>
<td>****</td>
</tr>
<tr>
<td><strong>Ralph has a number of documents on his desktop he wants to make into a pile.</strong></td>
<td><strong>Ralph wants to see all the documents in a pile.</strong></td>
<td><strong>Ralph wants to remove a document from a pile because it is no longer relevant.</strong></td>
<td>****</td>
</tr>
<tr>
<td><strong>He selects them.</strong></td>
<td><strong>He selects a pile and hovers his cursor over it.</strong></td>
<td><strong>He finds the document in the pile and selects it.</strong></td>
<td>****</td>
</tr>
<tr>
<td><strong>He chooses Make a Pile from the Finder menu.</strong></td>
<td><strong>The pile expands to show all the documents in it.</strong></td>
<td><strong>He drags it out of the pile.</strong></td>
<td>****</td>
</tr>
<tr>
<td><strong>The documents become a pile.</strong></td>
<td>****</td>
<td>****</td>
<td>****</td>
</tr>
<tr>
<td><strong>He names the pile.</strong></td>
<td>****</td>
<td>****</td>
<td>****</td>
</tr>
<tr>
<td><strong>Andy gets an email about a research project he’s working on. He wants to add that to the project’s pile.</strong></td>
<td><strong>Andy has an email message on the top of his pile, but he doesn’t want it on top, just in the middle somewhere.</strong></td>
<td>****</td>
<td>****</td>
</tr>
<tr>
<td><strong>From his email client, Andy drags the email onto the pile, creating an alias of the email on the pile.</strong></td>
<td>****</td>
<td>****</td>
<td>****</td>
</tr>
</tbody>
</table>

### TASK ANALYSIS
- Make a pile
- Add an item to the pile
- Remove an item from the pile
- Move a pile
- File a pile
- Search a pile
- Browse a pile
- See all documents in a pile
- Open the top document of a pile
- Return documents to the pile
- Break up a pile
- Name a pile
- Combine piles
- Move an item higher in a pile
- Move an item lower in a pile
- Filter pile by file type
Mood Board

To get the feel of the system (as opposed to the functionality), I made a mood board.
“Paper” Prototype

After a brainstorming period, I created a crude (intentionally so) prototype, made of HTML, non-interactive animated images, and text to demonstrate the features, aesthetics, and functionality of FilePiles. I posted this prototype on the web and proceeded to test it and get feedback on it.

While this prototype (and the final one) have the appearance of Mac OS X 10.3, FilePiles was conceived platform-neutral and could potentially be implemented on Windows or Unix.
SCREEN CAPTURES FROM THE “PAPER” PROTOTYPE
Interactive Prototype

For nearly three months (March–May 2005), I worked with a developer, Dave Rowett, in the creation of an interactive prototype. The prototype, built in Flash, went through two rounds of testing and refinement before time and monetary restrictions put an end to the project.

The details of the final prototype will be described in the following pages, alongside screenshots of the prototype.
Filing a Pile
Piles can be dragged into folders for more permanent storage. Once in a folder, they can remain piles, or else be unpiled to unpack their contents.

Folders and Piling
Folders, too, can be piled.

Creating a Pile
Piles can be created in two ways. The simplest way is to simply drag one file onto another until both files are selected. Releasing the dragged file will create a pile. The second way to create a pile is to create one while doing a “Save as...” command, creating a pile to save the file to instead of a folder or the desktop.

Adding Documents to a Pile
Once a pile is formed, documents on the desktop can be simply dragged onto it to be added. Icons will turn into images (screenshots) of the document. Documents can also be saved to a pile using the “Save” commands of programs. Some types of documents like email can be dragged directly from their programs into a pile.

Using Piled Documents
The document at the top of the pile is considered active. A double-click on it will launch the program associated with that file. Pressing the delete key will move that document to the trash. The document underneath will now be on top and can be opened. Hovering the cursor over a piled file will bring up a “tool tip” of the file name. Clicking on a document in the pile will bring that document to the top of the pile. Documents can be dragged off the pile and back onto the desktop.

Moving and Scaling a Pile
Piles can be moved via drag and drop like other desktop items. Grabbing the bottom right corner of a pile will scale it (and the images of the documents inside) larger or smaller.

Browsing and Sorting a Pile
Using the up and down arrows or the scrollwheel on a mouse will thumb through the documents in a pile. Double-clicking on the pile itself (not a document in the pile) will scatter the pile (see the section on scattering). Additionally, using the right-click (PC) or control-click (Mac) menu, piles can be sorted by file type, date files were created, or by date added to the pile.

Deleting and Unpiling Piles
Piles (and their associated files) can be deleted by either dragging the pile to the trash or else clicking on Delete Pile in the right-click (PC)/control-click (Mac) menu. A pile can be broken up into its individual files again using the right-click/control-click menu item Unpile Files.
**Scatter Mode**

A pile can go into scatter mode either by using the Scatter Pile item in the right-click/control-click menu or by simply double-clicking on the edge of pile. In scatter mode, all the files in a pile are scaled and placed around the screen so that they can all be seen at once, with the top of the pile being in the upper left corner of the screen and the bottom of the pile in the lower right. Rolling over a file will reveal its file name in a “tool tip” manner. Files can be dragged to new positions while in scatter mode, moving them either lower or higher in the pile. The other files will automatically adjust to the dragging and dropping. Clicking on any file will reform the pile on the desktop with that file on the top of the pile. Clicking on the blue edge of the pile will reform the pile on the desktop with whatever file is in the top left on top of the pile.