

MOTIVATION

Although today many documents are in an electronic format, the use of paper in knowledge-centric occupations continues to be high. Traditional digital document navigation offers several advantages such as text-searching and small storage costs. However, few interfaces currently offer any of the beneficial affordances of traditional paper. The characteristics of tabletop environments such as a direct touch, intuitive collaboration and transference from traditional tables offer the potential for gaining some of the benefits ideal for developing a paper-based metaphor for active reading of multi-page documents. Currently, there has been no published exploration of multi-page document navigation.

AIMS

This research aims to create new intuitive interfaces for multi-page document navigation to support active reading. Due to limitations of traditional computing environments, creating such an interface within a tabletop system will allow the incorporation of some of the traditional affordances of paper such as easy multi-page viewing, fixed pages and multi-document interaction.

Contributions

To achieve the aims of this research, my project has:

- Researched existing interfaces and identified key successes as well as areas for improvement and further investigation
- Developed a conceptual framework to guide design of multi-page document interfaces for tabletops

AIMS (cont.)

- Designed novel interfaces on the basis of this research
- Conducted laboratory trials to evaluate the interfaces in realistic contexts and scenarios

BACKGROUND

Tabletops

Tabletop interfaces are a form of Single Display Groupware; they allow a group of people to collaborate using a single, shared horizontal display that any user at the tabletop can interact with. As tabletops are designed for intuitive interaction, tabletop interfaces typically employ intuitive physical gestures and mimic the interaction a user would have with real objects.

Cruiser and the Current System

The CHAI research group has previously developed Cruiser, a novel tabletop surface computing interface within which the multi-page document navigation interface was developed. Prior to the commencement of this project, a multi-page document interface had been developed for Cruiser by Emma Fitzgerald and Anthony Collins.

CONCEPTUAL FRAMEWORK

Part of the contribution of this work is the development of a conceptual framework for the design of multi-page document navigation interfaces on a tabletop. The framework identifies pages, strings, links and marks (manual and automatic) as primitive elements of a document, and identifies the primitive actions as viewing consecutive and non-consecutive pages, enlarging and reducing document size,

moving the document around on the tabletop, moving forwards and backwards within the document, annotation and creating *linked* and *unlinked* copies of documents.

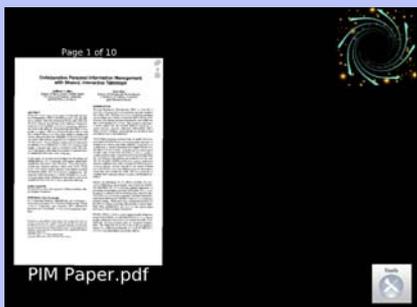
INTERFACE FEATURES

Working from the conceptual framework developed, several pieces of functionality were added to the existing interface. First, an unlinked copy function was added. This is accomplished by pressing a copy button on the top-right of any page of the document. A copy of the document focused on the page the user copied from is then displayed on the table (see screenshots 4 and 5). Creating linked copies allows one user to control the groups movement through a document, which is especially useful in scenarios such as document review meetings or a book club. A linked copy is created through the use of the copier function already included in the Cruiser framework. The ability to follow links, such as those found in PDF documents is also included in the interface. This is useful when reading documents with appendices, tables of contents, references or similar special document regions. When a user clicks on a link, a copy of the document is created, with the current page being the destination of the link (see screenshot 7).

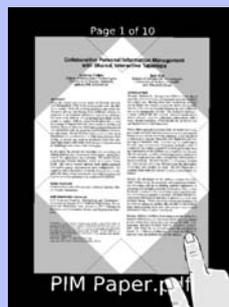
FUTURE WORK

Future work on this interfaces involves evaluating the current interface through a series of usability studies. Furthermore, additional features identified in the conceptual framework as important in a multi-page document navigation interfaces would be implemented and evaluated.

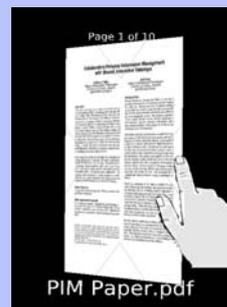
SCREENSHOTS



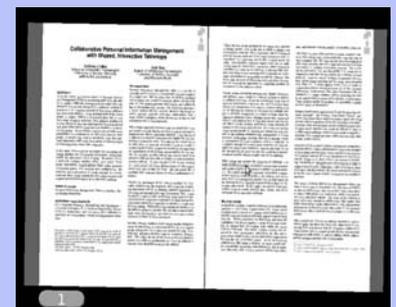
1. A single-page view of a document on the tabletop



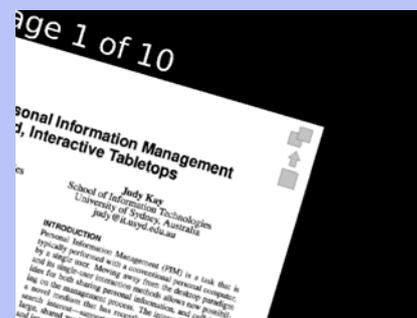
2. The document can be rotated or resized by holding and dragging the corners of the document



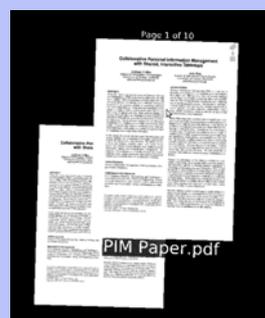
3. The pages can be turned by tapping the edge of a page or using a flipping motion



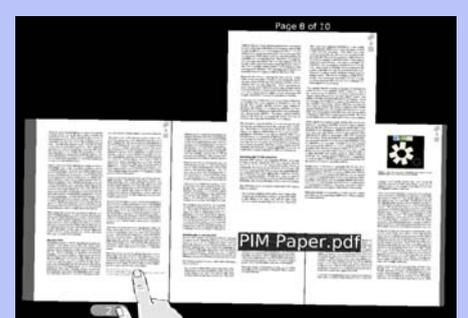
4. A multi-page view of a document on the tabletop



5. Documents are copied using a copy button, located in the top-right hand corner of every page



6. Unlinked copies are created by pressing the copy button



7. Links are followed by pressing on them, displaying a copy of the document starting at the page which is the destination of the link