Territory-Based Interaction Techniques for Tabletop Collaboration

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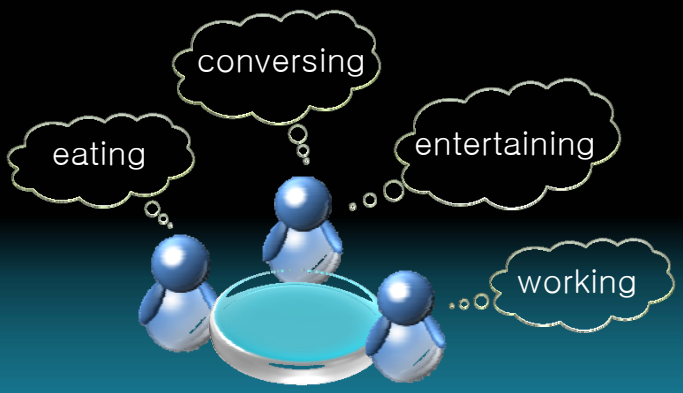
ABSTRACT

- Co-located collaboration researchers exploring alternatives to traditional “desktop” computers are beginning to exploit the benefits that familiar table environment appears to have for facilitating social interactions.



ABSTRACT (cont.)

- Studies of tabletop collaboration involving traditional media show collaborators often partition the tabletop workspace into various areas.
- Just as partitioning of our physical spaces helps to maintain social order, such territorial behavior on a tabletop workspace appears to be an important mechanism for organizing collaborative activities.

Territory-based interaction techniques for tabletop collaboration

INTRODUCTION

- As more and more of our society's work is performed on computers, the information required for collaboration is often in digital form.
- A variety of systems have been created to support computer-supported collaboration in a face-to-face environment.
  - desktop computer, interactive wall display, digital tabletop system
- Tabletop systems, users interact with digital information on a large horizontal display.
- Users can exploit the considerable years of experience people have collaborating at a traditional table. With this experience, come certain expectations of the interactions that should be available in this environment.
- Therefore, to be successful, tabletop systems must support the fundamental mechanisms that people make use of when collaborating on a table.

INTRODUCTION (cont.)

- One such mechanism used during tabletop collaboration is the **partitioning of the table workspace**.
  - Serve to organize interpersonal and group interactions to facilitate social order.
  - Help collaborators organize their interactions with the task objects and with each other.
- However, few existing digital tabletop systems provide effective support for territoriality.

The goals of this research are

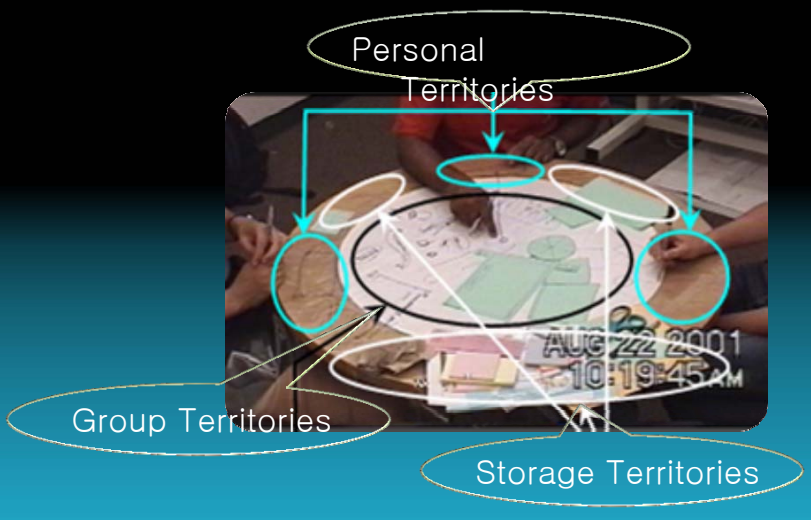
- to understand the requirements for supporting workspace partitioning in digital tabletop displays.
- to apply this understanding to tabletop interface design.

OBSERVATIONS OF TRADITIONAL TABLETOP COLLABORATION

- Two observational studies of traditional tabletop collaboration
  - casual / formal
- The casual collaboration study
  - A university café/atrium area at Dalhousie
  - University
  - Eighteen participants played collaborative tabletop games(puzzles & board games).
  - The collaborative interactions were recorded in field notes.
- The formal collaboration study
  - A usability laboratory at Dalhousie University.
  - Three small groups performed two collaborative tasks. (one group of 2 people, and two groups of 3 people)
  - Furniture layout task(90-minute) & Participatory design task(60-minute)
  - Their interactions were videotaped for later analysis.

OBSERVATIONS OF TRADITIONAL TABLETOP COLLABORATION (cont.)

- Initial analyses have further revealed that people tend to partition the workspace into three distinct types of spaces.



THE TEST-BED ENVIRONMENT

- Three characteristics of territories on a shared tabletop workspace:
  1) The workspace contains personal, group, and storage territories.
  2) The location of these territories are generally defined by the position of the people at the table.
  3) The boundary of these territories are, in part, defined by the orientation of the objects within them.

- These characteristics provide the foundation for how the test-bed environment will define and maintain territories on the tabletop workspace.

- Personal territory: the table directly in front of each user.
- Group territory: the centre of the table within easy reach of all users.
- Storage territories: the table edge outside of these other two territories
  and within reach of nearby users.

THE TEST-BED ENVIRONMENT (cont.)

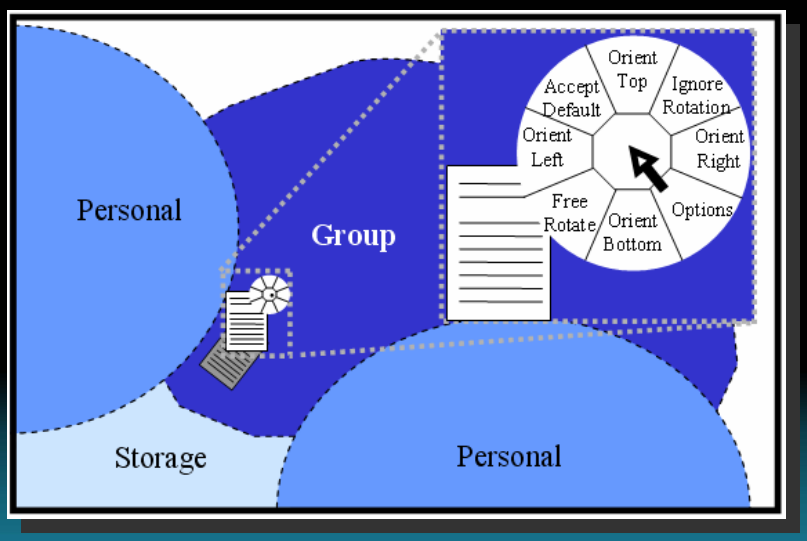
- The test-bed environment:
  - All information items represent as images
  - And that can be moved, rotated, and resized.

- System requirements to support natural human territorial behavior:
  - All Easy adjustment of territory sizes.
  - Easy adjustment of orientation associated with different territories.
  - Easy adjustment of item orientation, regardless of location.
  - Easy override of system-assisted actions.

Preview

Automatic action

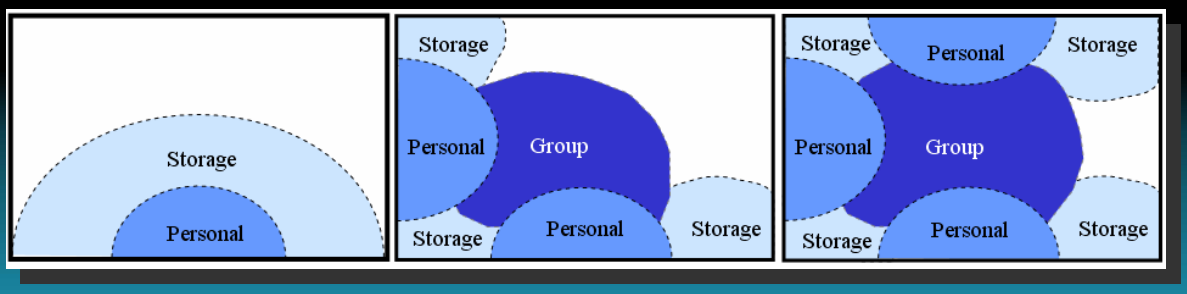
THE TEST-BED ENVIRONMENT (cont.)



A system-override using a FlowMenu

TERRITORY-BASED INTERACTION TECHNIQUES

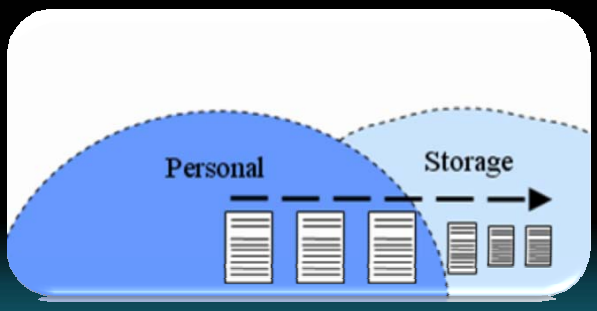
- The territory-based interaction techniques
  - the analyses from the observational studies
  - information visualization (InfoVis) techniques
- Territories on a tabletop display.

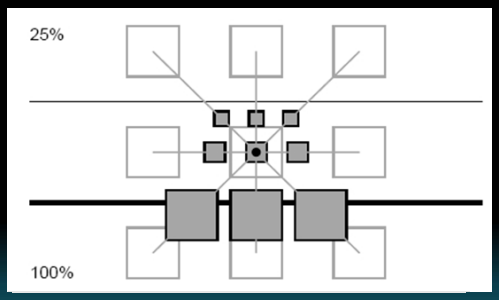


only one user 2 users 3 users

TERRITORY-BASED INTERACTION TECHNIQUES (cont.)

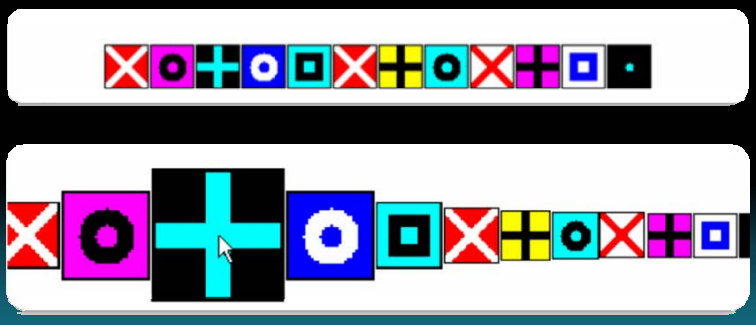
- ZoomScapes (InfoVis technique)





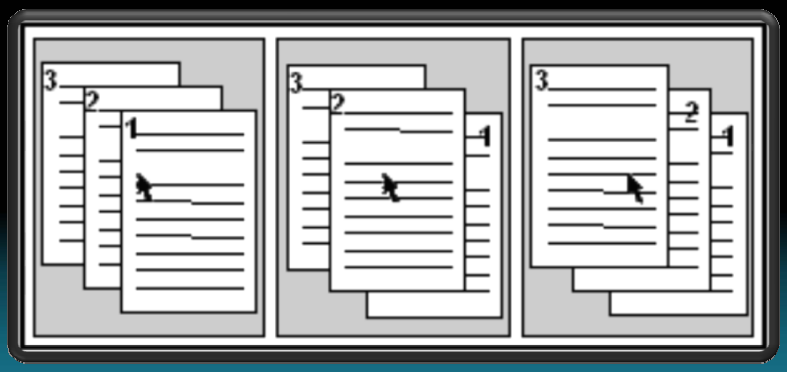
TERRITORY-BASED INTERACTION TECHNIQUES (cont.)

- Widget distortion interaction (InfoVis technique)
  - Elastic Presentation Space framework



TERRITORY-BASED INTERACTION TECHNIQUES (cont.)

- Shuffling technique



EVALUATION OF INTERACTION TECHNIQUES

- A series of user-studies testing the ability of these interaction techniques to support territoriality during collaborative tabletop activities will be performed once the implementation of the test-bed and interaction techniques are complete.
- The studies will investigate the effectiveness, efficiency, and the suitability of these techniques for facilitating interaction with digital media.

SUMMARY

- Observational studies of traditional, small-group collaboration have been performed to provide further understanding of interaction on a table.
- These studies show the emergence of personal, group, and storage territories during tabletop collaboration.
- Interaction techniques that leverage existing work practices, such as tabletop territoriality, can hopefully improve collaboration involving digital information.
- Furthermore, leveraging information visualization techniques offers the potential to provide more effective use of limited tabletop workspace.