

EWall: Computational Support for Decision Making in Collaborative Environments

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The Problem: Decision-makers require customizable computational solutions to help solve problems more effectively and efficiently.

Motivation: A computational framework that enables decision-makers to quickly view, collect, organize, and communicate large amounts of information as well as to facilitate the collaboration of decision-makers with different levels of involvement in large, distributed and decentralized teams across organizational boundaries.

Approach: EWall will consist of five independent frameworks (modules) each addressing novel issues in Information Visualization, Information Communication and Information Management. The WorkSpace Module will provide the user with means to collect and spatially arrange information. The remaining four modules will allow users to keep track of specifically relevant information. The analysis of the users' spatial information arrangements and activities will enable EWall to adjust its selection criteria's and present individual users with increasingly relevant information. EWall's search for user relevant information will improve with the number of cycles and with increasing number of collaborating users.

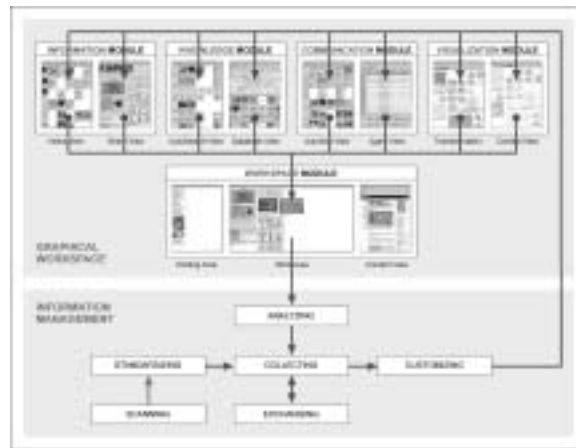


Figure 1: EWall's Graphical Workspace and Information Management components. The red arrows illustrate the flow of Information Objects.

EWall proposes a standardized format for the visual representation and organization of information. This format is modeled after William Pena's Problem Seeking methodology [3] and referred to as an Information Object. An Information Object is a rectangular box that contains a picture, a heading and a hyper-link to a web site or a database item. The picture may either serve as a visual reminder or display relevant content. Information Objects may be used either by individuals as objects to think with [2] or by groups of people to develop a shared contextual understanding [5, 1].

EWall enables a **flow** of Information Objects that is controlled in part by the users and in part by EWall: The **Work Area** will allow users to create and spatially arrange Information Objects. Users will also be able to copy

relevant Information Objects from the View windows or the Work Areas of other users into their personal Work Areas. **Analyzing:** EWall will continuously analyze the users' spatial information arrangement to detect relations and determine the users' current focus and interest. **Collecting:** EWall will maintain and automatically structure a dynamic database reflecting the content and established relations of Work Areas and other information sources. The relations will be established based on 1. explicit user input, 2. the interpretation of user generated spatial arrangement of Information Objects, 3. the collaborative use of Information Objects, and 4. the analysis of previously established relations. **Customizing:** EWall will update the individual View windows with a selection of Information Objects and information arrangements that best match the interests of a specific user or group of users.

EWall's five **modules** can be used individually or in combination: **The Workspace Module** will allow users or groups of users to create, collect and organize Information Objects. The interface will consist of a work area to spatially layout, group and link information objects, a holding area to keep information with undetermined relevance and a viewing area to explore the (hyper-linked) content of Information Objects. **The Information Module** will keep track of recent additions and modifications to parallel streams of selected information sources such as databases, newspapers and email accounts. Changes will be arranged in a matrix by categories along the y-axis and by time along the x-axis. Users will be able to manually add Information Objects and comments to Information Objects. **The Knowledge Module** will retrieve and display information available from selected information sources relevant to the content on the user's Work Area. The Knowledge Module also incorporates the functionality for automatically establishing spatial and temporal relations among information items in a user's Work Area. These relations will allow users to merge their information arrangements, easily search and explore information arrangements and to recognize emergent patterns and relationships in information arrangements. **The Collaboration Module** will propagate, display and prioritize additions and modifications to the Work Areas of multiple collaborating users. The Collaboration Module will determine differences and similarities among the users' individual Work Areas. Based on this analysis the Collaboration Module will be able to automatically identify groups of users that pursue similar lines of inquiry, detect emergent directions and sub-tasks, and prioritize the information exchange between multiple users [4]. **The Visualization Module** will offer various ways of viewing and rearranging the content on Work Areas and from other information sources. The Visualization Module will contain a wide variety of algorithms to automatically rearrange Information Objects as well as to add and modify previously established relationships among Information Objects. The algorithms will respond to the users' different styles of working and allow users to explore various relational aspects of Work Areas and other information sources.

Future Work: A first set of prototypes incorporating the base functionality for all five modules is completed. We are now in the process of implementing and testing the proposed AI functionality. We hope to release the first complete implementation of EWall by fall 2003.

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References:

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