

Tools for Distributed Design Practice

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Keywords

design collaboration, design process, ispace, digital media

Abstract

During collaboration designers jointly solve problems as well as interact for critical feedback. Today's heterogeneous, distributed and global market demands of designers collaboration in both synchronous and asynchronous mode. The management and control of such projects is frequently geographical and temporally distributed. Increasingly, efficient communication is becoming a vital component in the design process, whether in managing the project data or controlling the compatibility of different inputs by design team members or minimizing the revision cycles.

Paper presents and discuss iSPACE, the mature prototype software application developed to serve different scenarios of communication between the distributed design team members. The iSPACE is web based application that can deliver an interactive environment over low-bandwidth connections. It consists of the five related components:

- 1. The "pinUpBoard", a real-time media sharing interface for graphical presentation with session management capabilities and tools for viewing and referencing the presented media.
- 2. The "sketchBoard", a real-time and multi-session whiteboarding application for preliminary conceptual drawings that can be shared between designers.

- 3. The "mediaBase", a web database application that keeps track of project data and act as a visual archive. Editable with access permissions and viewable from anywhere.
- 4. The "teamCalendar", for scheduling and planning meeting sessions and project deadlines.
- 5. The "talkSpace", a chat program with session management capabilities and a user database.

Application of iSPACE in the educational environment is monitored and discussed. Giving the potential of this technology to enhance and to streamline complex tasks associated with the design process, the quality of the design product is changing. The new style of design practice can be now practically further modeled, supported and enhanced.

Objectives

The objective of this paper is to present the design process of number of software prototypes that enable design collaborators to share, exchange, and

present architectural content and ideas on the net. The critical position of this paper will discuss and evaluate each step along the process of designing the prototypes from setting up the goals and objectives to the implementation and testing.

The proposed information space "iSPACE" will serve as the medium where users (Designers) will be able to manage the content and perform communication as needed.

Designing the iSPACE

Setting the goals and objectives

By starting up with design guidelines, we needed to answer questions like:

- What type of tasks should users be able to perform?
- What type of content should and should not be part of that space?
- What type of communication tools are served?

In building the framework of tasks users will be able to perform in the information space, we needed to identify the user experience. By setting up profiles of users and preparing scenarios of usability, we were able to selectively build a set of tasks users can perform.

Primarily, our targeted users are architects, designers, and architectural students. In profiling the user or a group of users, we selected a small group of architectural students with diverse design and cultural backgrounds to ensure a wider scope of user experience that simulates distance collaborations between designers.

Although, the information space content is all about information and the flow of data, the spectrum of the types of content in the architectural design practice is relatively wide. Architects usually, deal with high level content in early stages of design, and low level content at later stages where lines become rules and numbers become codes. For prototyping purposes, design collaboration at the

conceptual level was selected as the primary content of the information space. Low level content management was explored but not included in the tools offered by the prototypes.

To determine the type of communication tools to be offered, we needed to firstly, define the patterns of communication in terms of individuals and/or groups (one-to-one, one-to-many, many-to-many). Secondly, the modes of communication has to accommodate both realtime and non-realtime functionalities. And thirdly, decide the bandwidth on which the collaborators will use is low. Part of the reason why we are relying on low bandwidth communication is that we can not guarantee the collaborators from different place in the world will have access to more expensive communication technologies.

Preparing the blueprints

The preparation of blueprints served as the primary scheme and approach to prototype the information space. It defines the usability of the application as well as the tools and the navigation system of the application.

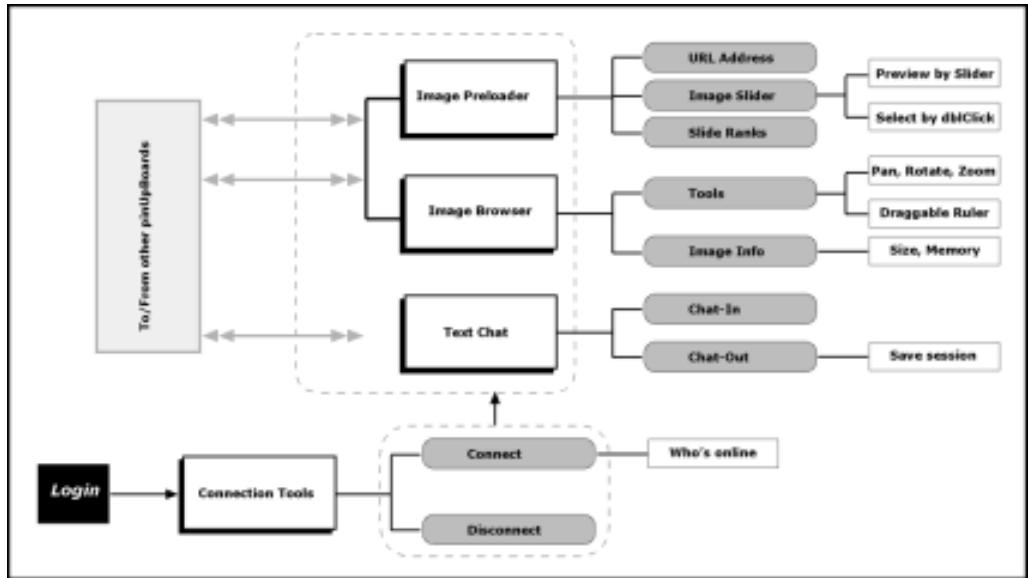
Application development

Five different applications were developed and tested as follows (Figure 2):

pinUpBoard

The pinUpBoard has offered an interface for realtime media sharing, discussing and browsing on the net to allow collaborators exchange ideas, critique work simulating by that the gathering around the pin-up board by the design team and others. Many features were integrated with this application as the user can selectively present the media in a non-linear fashion instead of a slide show as well as a memory management for the images that are preloaded into the cache memory of the endusers' computers to allow for maximum speed of interaction and collaborative browsing. The tech-

Figure 1:
An example blueprint of
the high level architecture
of the pinUpBoard
prototype application



nology used is based on the Multiuser Shockwave Server by Macromedia Inc. The Multiuser server is responsible for handling all the connections and the transfer of data among collaborators. It has its own database of users to handle the access control.

sketchBoard

The same server is used for the sketchBoard, which is an application that provides a number of virtual board rooms with an internet-enabled whiteboards to allow for realtime sketching by collaborators on the same board. A set of drawing tools is provided with the ability to select the shape, size, color, and direction for the brush.

talkSpace

The talkSpace is a chat program with multiple subject discussion forums, customized to be used by designers. It offers the collaborators to selectively send the text messages to the participants as they

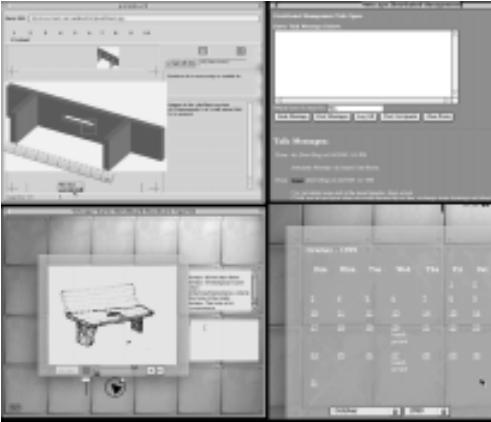
exchange the conversation. The talkSpace is also controlled by a database of registered users for security.

mediaBase

The mediaBase is a web database management system that allows collaborators who has been given password verified access to manipulate a specific database file on the web by adding, modifying, and deleting records. This application can help the design team members to control a central media database for a project, or a client and accessed from anywhere at any given time.

teamCalendar

This is a web based group calendar that allows collaborators to add, modify, and delete from a shared calendar. However, though team members can all see all of the scheduled events, only the poster of a message can modify that message.



Implementation

These applications were tested among number of architectural students based on a preset scenario for design collaboration as follows:

Step 1: Meeting on the internet using talkSpace to set the project type and discuss the work methodologies.

Step 2: Scheduling the next meetings and deadlines on the teamCalendar application and checking with each others' availability schedule to organize their work.

Step 3: Starting a sketchBoard session on shared screens, where they discussed the initial project details by sketching over and commenting on it.

Step 4: At the end of the sketchBoard session, the data is taken and compiled as a vector drawing on a CAD program. Also they rendered some images to prepare for the web presentation.

Step 5: Uploading the prepared media to the mediaBase to make it available as records in a structured database on the net.

Step 6: At the scheduled meeting time for the pinUpBoard session, they logged in and they were able to demonstrate the work and share the screens in realtime, taking terms in controlling the brows-

ing session. The team was able to exchange comments, red circle areas of drawings, measuring, zooming, and panning the media on the screen.

Step 7: As the first pinUpBoard meeting is finished, many subsequent sessions were followed for the review cycles of the design process, until they reached the desired output.

Evaluation and Conclusion

The communication model that the iSPACE followed determined the way collaborators interact. The tools offered were designed to serve basic functions of communication and knowledge exchange, textual messaging, and graphical presentation in realtime and non-realtime. The model worked under the specified scenario without problems, however testing it under different scenarios has unveiled some communication problems in terms of managing a growing content with diverse types of data. The iSPACE has a well defined social space for users to interact but users wanted to import and export data in and out the iSPACE seamlessly, which is an important feature that could enhance the portability of the iSPACE. Future plans for redevelopment of the iSPACE project will take into consideration the many issues that were raised from the user experience.

As this project finished phase 1 testing and evaluation, we found that mapping the social protocols and behavioural patterns of people to the human interface technology is a major factor in any efficient collaborative application. Developing a multisensory collaboration environment requires a great amount of attention to all the details and protocols of human communication to function properly as a medium.

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Figure 2:
Snapshots of iSPACE
applications.

Top left: The pinUpBoard,
Top right: the talkSpace,
Bottom left: the
sketchBoard, Bottom right:
the teamCalendar