VisOC: A Tool for Visualizing Online Communication in Educational Settings

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Abstract: The archives of computer-mediated communication (CMC) are valuable resources that contain explicit and implicit knowledge about the interaction among the different participants. We present VisOC, a tool that leverages localized contextual knowledge to visualize online communication relevant to a specific user. These visual representations can provide a sense of what is going on in the class "at a glance". A busy instructor can get an overview of pertinent information and then can zoom in to get relevant details. A fully functional prototype of the tool is now available on the Web and we are currently working on increasing the functionality and scalability of the tool.

Introduction

A visualization tool that can leverage localized contextual knowledge to visualize online communication that is relevant to the observer is a necessary tool for evaluating the implementation and effectiveness of CMC. With the current emphasis on on-line distance education and the use of collaborative software within traditional classroom settings, there is a unique opportunity to use CMC archives for previously unrecognized purposes. These transcripts can point to student/student and student/instructor communication and collaboration patterns, which are integral in evaluating the effectiveness of the technology in a specific, educational context. VisOC can help us come up with visualizations that will reinforce and make valuable the use of technology in the classroom. These visual representations can provide a sense of what is going on in the class. Information about student interaction in class can help in evaluating the class structure and the role of technology in the classroom (Simoff & Maher, 2000).

Assessing Online Classrooms

An online class is different from a traditional class in one important way- there is little or no face-to-face contact between students and instructors, or among the students. Consequently, teachers have lost the hands-on interaction they traditionally have had with students, which is essential for an instructor to know how his/her class is progressing, target any problem areas, and dynamically restructure the class for maximum educational value.

Analyzing Online Transcripts

An interesting methodological challenge was deciding how to analyze online transcripts. Researchers have used several methods to analyze online communication: log-file analysis, social network analysis, content analysis, and descriptive analysis. These methodologies are usually time consuming to conduct, and time is a valuable resource. So, we use the time efficient 'at a glance' perspective to form our visualizations.

The Design of the Tool

Our project team combines perspectives on education, HCI, and Information Visualization. Our first step was to research existing applications that were related to what we intended to do. Projects that were major influences include Chat Circles (Donath, 2002) and ThemeRiver (Havre, Hetzler, & Nowell, 2000). We realized that researchers would benefit from a versatile procedure that would allow them to mark up their own documents with their own language of interpretation. VisOC would assists researchers in choosing and labeling functions that produce comparisons between sets of data and subsequently build a graphical representation of the chosen functions. The chosen method accommodates a wide-range of data that can be found in multiple types of documents because it assumes researchers have the best overall understanding of their own syntactic methods and will formulate their own constant and straightforward language for referring to the information they seek to analyze and the results they want to convey. This ensures the relevancy of the data gathered.

Prototype Environment: The Global Classroom Project

We agreed that if this tool is to be useful to someone it must be useful within a context, thus our focus on the Global Classroom Project (GCP Website). The GCP is a classic example of Computer-Mediated Communication

(CMC) environment, which provides a distance-learning environment for students from US, Russia and the NIS to interact and create digital artifacts electronically. As the students are located in different continents, the geographical distance between them makes it impossible for the students to effectively use other mediums of communication. Therefore, CMC forms a critical component of the class.

The Prototype

We looked at a small number of GCP postings for affective indications of agreement and disagreement among the posters. We searched for instances of agreement and disagreement along a particular thread and, also, as the instances of agreement/disagreement related to particular topics. Although initial content for the assessment tool is limited to consciously selected, previously accumulated transcripts from online postings between Russian and American students in the GCP, we chose to use methods that could accommodate data that was not limited to our prototype set of GCP transcripts. The prototype was created using a combination of Flash, PHP, and MySQL. The user can pick the level of detail for the visualizations, such as the overall visualization of the agree/disagreement of the whole class (see Fig.1), a comparison visualization of agree/disagreement across two user-defined groups (see Fig.2), such as class sections or country of origin, and a focused view of the individual messages, all across a user-specified time period.
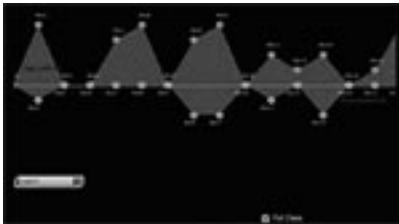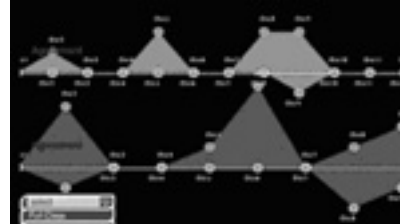
Figures

Figure 1. Whole Group Comparison

Figure 2. Two Group Comparison

Conclusion

Our initial round of usability testing and evaluation has consisted of heuristic evaluation by experts and user walkthroughs (Chen & Czerwinski, 2000). We have identified several problems and are working on improving the interface. To reduce the need for coding transcripts we are also working on implementing intelligent algorithms (Krulwich & Burkey, 1997). We realize that this is a very small step towards developing a tool that is pedagogically useful and that a lot of work needs to be done in that direction. Our aim is to build a flexible and customizable tool that would meet the demand of different audiences at a local level.

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