eTree: A Browse and Query Interface for Online Communities

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Abstract

We use a life-like tree ecosystem metaphor to represent the people, activities and artifacts created by members of an online community. The resulting system, eTree, provides a social visualization and query interface to help end users browse, navigate, participate and learn about the participants in an online community. eTree was implemented for an online community. It provides a browsing tool to various information located on the community's online space and a tool that supported real-time social interaction. The system provides easy access to social and content information that can help to foster online social interaction and enable users to use the information to develop their social network in the online community.

1. Introduction

As new online spaces for information sharing and social interaction abound, Web-based online communities have become widely popular. The resulting large number of participants and messages makes it increasingly difficult for newcomers to comprehend the interaction context of the community, to track user participation and the social connections within the community.

Visualization technology is one solution because of its power to render large volumes of information in a limited space for exploration and comprehensive. By analyzing the key information overload problems of online communities and identifying the nature of online social interaction, we designed a life-like tree visualization interface to help users to browse, navigate, participate and learn about their online communities.

2. Problems and Related Work

Information overload is a key problem most users have in online spaces like discussion forums and newsgroups. This makes it very time-consuming for individual users to browse the large numbers of new posts to find the interesting topics. Many spaces provide functions like sorting threads by time or putting hot topics on top. However, users still need to switch their focus among different pages to seek the interesting topics.

The forums-threads-posts structure grows organically as a result of participant contributions. This results in a highly dynamic structure where the breadth, depth and density of new activities and the degree and segment of involvement by the community are not easy to determine. Representing this growth and enabling community members to browse and query the evolving and emergent character of the community allows participants to learn about the community's members, goals, and activities.

Traditional Web-based communities focus mainly on sharing information and their interfaces are usually designed for accessing the content of the discussions rather than social information. However, an online community is distinguished by the people, their activities, and the artifacts (posts) they create. Integrating the social and content information and providing users with efficient access to such information is invaluable for fostering online social interactions [2].

These problems and their solutions are not individually new to the information visualization domain. For instance, context-plus-focus is widely used to help people navigate information in a large information space without losing the overall context. By presenting information visually and allowing dynamic user control through direct manipulation, visual information systems facilitate navigation of large information spaces and comprehension [1]. In social computing, PeopleGarden uses a botanical metaphor to provide static portraits of users' participation in online communities [5]. ConversationMap uses node-link graphs to display discussion threads and peoples' interaction network [4]. Our key contribution is the integration of these techniques to address a problem in the social computing domain. Specifically, eTree uses a visual ecosystem metaphor to provide a browse and query tool that enriches a community space with mechanisms for awareness, communication, interaction and the evolution and development of common ground [2].

3. eTree Design

eTree uses an ecosystem as a visual metaphor for mapping discussions messages into a tree with animals around. Online communities share many characteristics with such ecosystems. That is, an ecosystem evolves under the influence of its participants. Different animals congregate around different parts of the tree and form different botanical networks much like the way people take on different community roles, participate in varying degrees, and form different interaction networks.

Based on this mimesis, each community and the structure of their discussion forums are mapped onto a tree trunk and its branches, respectively tree (see Figure 1). Threads in a forum are mapped as leaves with the hot topics highlighted in yellow like flowers on the New posts in a thread appear as a lighter green. The links between the dots indicate the social sub-groups that exist based on daily co-posting interactions. Active participants (posters) are mapped as bees and placed in different locations on the perimeter of a ring centered around the tree. A poster's position in the circle represents the logarithm of the number of his posts. Non-active participants (lurkers) are mapped as ants and placed at the base of the tree. Links among the animals reveal the emergent online social interaction network aggregated from co-posting activities.

eTree is a dynamic visualization. New posts are added as new leaves in lighter green. Online users and their positions are highlighted as they move about the community space. This awareness function enables users to be aware of co-present visitors and to start synchronized communication with them. Newcomers can learn about the evolution of the discussions from an animation of the tree growth.

eTree uses a focus-plus-context mechanism that enables users to identify new or hot posts and to learn about the activities and interaction network of community members. Clicking on the visual elements results in details that are displayed as pages in a Web browser. eTree also provides different dynamic query filters that tightly couple queries with presentation to give users the flexibility to visually query community information [1]. For instance, users can easily click on particular people or leaves to query particular discussion threads or people which are highlighted in a different color.

4. eTree for Online Community

We implemented the eTree browser as a Java applet for Portkey — a summer intern Web site [2]. We rendered the structure of Portkey discussion forums as a 2D life-like tree and used different colored dots to represent the posters of the two groups of users (researchers and co-ops). Lurkers are presently not displayed but we plan to put them at the foot of the tree. Coupling the people and posts to Portkey Web site results in a visual and interactive query interface to the site (see Figure 1). Right-clicking on a visual element brings up a popup menu to query, for example, the co-posters for a selected thread.

Figure 1 shows that there are 21 forums on Portkey and the popularity of certain forums and threads. Hovering on the shorter branch reveals the less popular forum topic. We see that most of the posters are the co-ops (lighter grey dots) with only a handful from researchers. Limitations with displaying the large numbers of threads are overcomed in part using a magnifying lens.

Techniques from [4] to represent large volumes of data like in 3D trees can be also applied.

Figure 1: eTree in Portkey.

5. Conclusion

We presented a number of limitations with existing online community spaces that impacts participation in online communities. We use a botanical ecosystem as a visual metaphor for displaying social and content information for an online community space. The system, eTree, was implemented for a Web-based community site for summer interns and researchers to enable them to learn and interact on the site.

6. References

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