Linking in Lurkers: The Comtella Discussion Forum

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Abstract. Comtella Discussions is an experimental online discussion forum designed to motivate participation. The primary aim is to connect non-participating members (lurkers) with participating members by modeling and visualizing the asymmetrical relations formed when one member reads, evaluates (rates), comments, or replies to another's contributions. We hypothesize community members will take action to correct asymmetrical relationships (i.e. reciprocate with ratings, comments, etc.) if made aware of the inequality.

1 Introduction

In interest-based online communities, a discussion forum is typically one of the principle means of interaction between community members. The purposes of such interactions are diverse and may include exchanging information or social support [1], fostering social ties [2], supporting learning [3], extending real-world relationships/communities [4], or a combination of these. Regardless of purpose, it is a well-known dilemma that a certain amount of interaction/contribution must occur before members begin perceiving the benefits of the system and become active participants. It is important developing communities initially capture as much participation as possible to reach their full potential. Otherwise, they risk stagnation and decline.

Members who never contribute (i.e. only read or access information) are often called lurkers and frequently make up the majority of an online community's membership (45-90%) [5]. Our focus is to motivate participation from these individuals. We recognize there is tension between supporting lurking as a "bona fide activity" [6] (p 216) while at the same time desiring more explicit contribution from them. We demonstrate Comtella Discussions (CD) as an experimental online discussion forum to motivate participation through making explicit and visible the process of developing networks of interpersonal relationships among the community members aiming to "weave" in lurkers with active members. There is no explicit mechanism coercing participation, yet our hypothesis is both groups will take action (which requires participation) to correct asymmetrical relationships.

2 Comtella Discussions: Energy and Relations

2.1 Energy: The Building Block

First, we introduce the concept of *energy* which is a measure of the current level of activity in CD. When an item (e.g. discussion post) is contributed to the system, it brings in a default number of new *energy units*. For example, a new post in a thread produces 5 units.

Only a certain number of energy units are allowed to stay attached to the new contribution (e.g. by default a post may keep 3 of the 5 units). The number of these units determines the contribution's *visibility*. Different levels of visibility are achieved through the scaled use of colour and font size. If a contribution possesses many units, then it will be rendered with hot colours (e.g. orange, yellow) and large fonts, advancing towards the viewer. Conversely, if an item has few or no units, then it will be rendered with cold colours (e.g. blue, purple), and small fonts, receding from the viewer (see Fig. 1).

Energy units kept by an item are considered to be in the *@work state* (i.e. the units work to make the item more visible) while units not kept are considered to be in the *stored state* (i.e. units available to be put into the @work state). Energy units can freely move between the stored and @work states; this movement is mainly dependent on the actions of the community's members. If a member positively evaluates an item (and stored energy is available) then she may decide to "heat it up" by moving a stored energy unit into that item (equivalent to rating the contribution). As a result, the item becomes a little more visible to all other members. Conversely, other members may negatively evaluate the same item and "cool it down" by moving energy units back into storage, one at a time. There are 4 simple rules governing how energy may be distributed:

1. A member cannot add or remove energy from items she has contributed
2. A member can only heat up and cool down an item once
3. Items can only be heated up if stored energy is available
4. There is a set upper limit on the number of energy units an item may hold

In combination, these features allow members to easily determine where activity in CD is occurring and what particular activities are relevant to the whole membership (see Fig. 4). This should be of particular benefit to new members who are trying to decide what the CD community presently values in order to best introduce their contributions, opinions, values, etc.

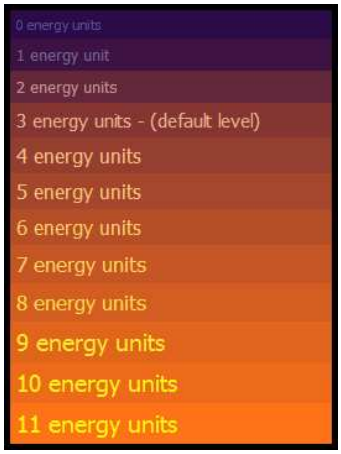

Fig. 1. The visual appearance of contributions at different levels of energy.

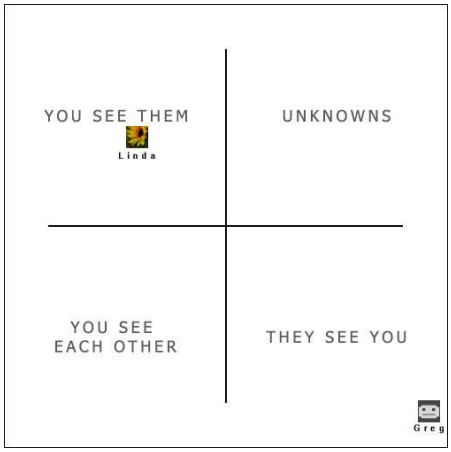

Fig. 2. Example relation visualization (Relavis) from Ralph's viewpoint.

2.2 Modeling Interpersonal Relations

Modeling and visualization for interpersonal relations aims at three goals: 1) connect lurkers and contributors, 2) give the viewer opportunity for reflection which can be beneficial, as suggested by open user modeling approaches [7], 3) influence the viewer to modify her behaviour in a desired way (to participate more). The visualization should also be dynamic to reflect that individual actions constantly modify relationships and in this way confirm and reward the user's actions.

The most common relationship found in online communities is the weakest (making it difficult to capture): the lurker-contributor relationship. The importance of weak ties has long been recognized [8] so defining a tenable connection between lurkers and contributors is a desirable feature of the visualization but also a challenge.

A relationship between two members A and B always has two sides: from A→B and from B→A, which are not necessarily symmetrical. We define the notion of *member visibility* to capture the inherent asymmetry in interpersonal relationships. The *member visibility* has a value ranging from 1 (invisible / unknown / opaque) to 0 (completely visible / transparent). For example, when a new member enters the community, she does not know or "see" any other member. Thus, from this member's perspective, visibility values of 1 are assigned to all other members, i.e. her relationships with all other members of the community have value 1. Conversely, as she is a new member, all other community members will assign a value of 1 to their relationships with this new member.

The visibility value at one end of the relation pair is dependent on actions performed by the member on the other end (see Section 3.4). For example, if a lurker reads several messages in CD, then the authors of these messages will become slightly more visible to the lurker (i.e. the value of the lurker's relationships with the authors of the posts will decrease), yet the lurker's visibility for the other members still remains unaffected (i.e. their relationships with the lurker will still have value 1).

2.3 Relation Visualization (Relavis)

The relation between two individual members can be visualized in a two-dimensional space which we call a Relaviz (Fig. 2). The horizontal axis (0 to 1) indicates the visibility of other members to the visualization's viewer (in this example, Ralph) while the vertical axis (0 to 1) indicates the visibility of the viewer to the other members. For example, in Fig. 2, the position of Linda's avatar icon (~0.3, ~0.7) describes the relation between Linda and Ralph.

To assist reading, the space is characterized by four relation quadrants: "you see them," "unknown," "you see each other," and "they see you." Insignificant relations (i.e. unknowns) are located in the top-right corner with coordinates (1, 1) while more significant relations (i.e. mutual awareness) are located in the bottom-left corner with coordinates (0, 0).

Let us return to the scenario where a lurker reads posts in CD. Let Ralph be an active contributor, checking his Relaviz once in a while to see how things stand. This time he notices "Greg" in the "they see you" quadrant (who did not appear the last time Ralph checked). Ralph can guess that Greg has read and rated positively most, if not all, of Ralph's contributions since the relation is so strongly asymmetric. Depending on the size of the community, Ralph may guess that Greg is new or a chronic lurker who has recently discovered Ralph's contributions. This discovery gives an opportunity for Ralph, who has already received some benefit (i.e. Greg adding energy units to Ralph's contributions), to directly communicate with Greg, to search for Greg's contributions and perhaps evaluate them.

If Greg looks at his Relaviz, logically, he will see Ralph appear in the "you see them" quadrant. The important consideration is that both members now have some awareness of each other and can take actions to further define the relation. In order to encourage the use of the Relavis, whenever possible, a light-weight version is displayed alongside the contribution to give specific relation information (see Fig. 3).

2.4 Calculating Visibility Values

The calculation of visibility values is largely dependent on the features of the online community. Actions which are deemed to affect the visibility between members are assigned constant values which will either increase or decrease the overall visibility value (recall it ranges from 0, visible, to 1, invisible). In CD, accessing discussion thread subtracts a little (-0.005) from the opaqueness of each reader-author relationship regardless whether the reader actually looks at every post. Explicit actions that indicate preference (e.g. "heating" (-0.05) or "cooling" (+0.05) posts) have the most impact on visibility. For example, if a member comments on another's post (-0.08) and then cools down that post, the resulting decreased visibility is much greater (+0.15) had there been no comment. Also, energy units come into play to provide bonuses: "hot" items have stronger effect on changing visibility than "colder" ones.

The determination of these constants is an open question. Some initial intuition is required to say certain actions affect visibility between two community members more than others.

3 Comtella Discussions Implementation

Comtella Discussions has been implemented and studied as an online community for university students to discuss the social, ethical, legal and managerial issues associated with information technology and biotechnology. The study lasted for four months in early 2006. Please see our conference paper for full details and results. The experiment provided insight into the development of the next iteration of CD which we will be demonstrating.

Fig. 3. A Comtella Discussion post header.

Fig. 4. The distribution of energy units when displaying forums for the study.

4 Summary

We propose Comtella Discussions as a direction for motivating participation in interest-based online communities which engages lurkers through modeling and visualizing the relations they build with other community members through reading, evaluating, commenting or replying to their contributions. The mechanism is based on ideas from open user modeling, a concept of community energy, and a new mechanism of rating contributions and visualizing the rank of contributions in the interface.

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