Directed Social Queries With Transparent User Models

Saiph Savage[1] **Angus Forbes**[1] **Rodrigo Savage**[2] **Tobias Höllerer**[1] **Norma Elva Chávez**[2]

[1]**University of California, Santa Barbara**
{saiph@cs, angus.forbes@cs, holl@cs}.ucsb.edu

[2]**Universidad Nacional Autónoma de México**
{rodrigosavage@comunidad, norma@fi-b}.unam.mx

ABSTRACT

The friend list of many social network users can be very large. This creates challenges when users seek to direct their social interactions to friends that share a particular interest. We present a self-organizing online tool that by incorporating ideas from user modeling and data visualization allows a person to quickly identify which friends best match a social query, enabling precise and efficient directed social interactions. To cover the different modalities in which our tool might be used, we introduce two different interactive visualizations. One view enables a human-in-the-loop approach for result analysis and verification, and, in a second view, location, social affiliations and "personality" data is incorporated, allowing the user to quickly consider different social and spatial factors when directing social queries. We report on a qualitative analysis, which indicates that transparency leads to an increased effectiveness of the system. This work contributes a novel method for exploring online friends.

Author Keywords

Interactive verification, user modeling, social network group creation, access control lists, friendsourcing, social transparency

ACM Classification Keywords

H.5.2. [Information Interfaces and Presentation]: User Interfaces

INTRODUCTION

An increasing number of individuals regularly use social networks as a platform from which to pose questions and engage in playful social interactions. The questions and social interactions are often directed to a subset of the user's friends who are potentially helpful in answering a particular question or who share a particular interest. While many social network sites already let users define collections of people in various ways, manually classifying friends into collections is time consuming, and even if users were to finish this exhaustive categorization task, the predefined lists might not cover all of the user's intended social interactions, especially as social groupings dynamically shift. For example, a user might be hosting an event related to a particular theme and seeking to invite only the friends that are interested in that theme. In this case, the user's predefined lists might be too coarse or otherwise inappropriate for this particular task. Therefore, a system which could automatically find

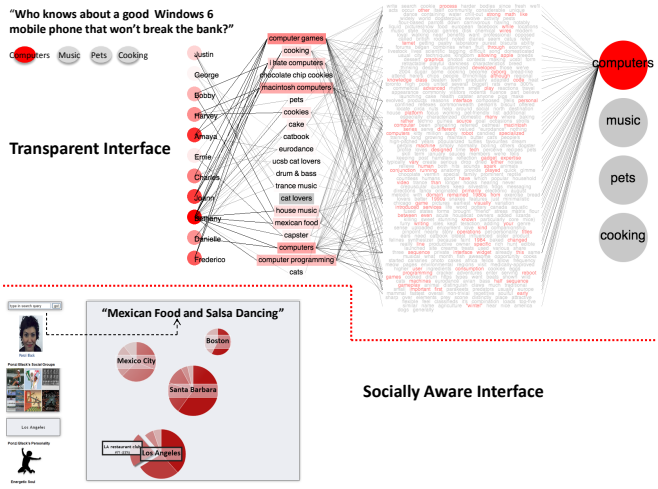

Figure 1. Screenshot of our two interactive interfaces. Top shows the transparent interface, with the friends most related to the social query: "Who knows about a good Windows 6 phone that won't break the bank?". To the right of the highly correlated friends' names, we see their associated likes, their meanings and the mapping to the shared interests. The four shared interests shown, are the ones the system automatically found for the friends of a particular user. The user can explore and analyze all the data the system used to recommend that particular set of friends. The socially aware interface is shown below. This interface is using spatial and social variables to organize friends related to the social query: "Mexican Food and Salsa Dancing". In the left side of this interface, the user can analyze particular characteristics of a specific friend. Our system allows for various different types of social query formulation; a specific query format is not required.

friends given a user's social query would be beneficial. Bernstein et.al [2] addressed this problem, by presenting a system which recommended the friends a user should share particular web content to. The work of Amershi et. al [1] presented a system that helped people create custom, on-demand groups in online social networks. Despite their novelty, these systems did not offer much transparency to the inner workings of their approach, and this could impact user experience. Furthermore, while [1]'s work let the user filter group members based on particular attributes, their system did not directly allow a user to target individuals based on a particular social query. Additionally, both of these studies paid little attention to the overall personality of each of the user's friends, which is an attribute that has been shown to play an important role in online and physical social interactions [3]. These insights lead us to create a transparent online tool that effectively matches people to social queries, and also offers information on particular social and spatial factors related to these individuals, such as personality traits, and social-spatial affiliations.

UIST'12, October 7–10, 2012, Cambridge, Massachusetts, USA.
ACM 978-1-4503-1582-1/12/10.

SYSTEM DESIGN

Our system has 3 parts: a machine learning part that infers the interests shared by a user's friends and finds friends relevant to a social query, a transparent verification interface, and a socially-aware interface.

Modeling Shared Interests: A friend's interests are determined through his/her Facebook *likes*. Given that the textual information describing a *like* can be very sparse and thus difficult for a machine to interpret, our system retrieves additional information that can provide a broader semantic description, and expose the potential meaning of the *like*. The additional data is obtained by using the name of each of the *likes* as a search phrase in a crowd-sourced knowledge base (Wikipedia) and collecting all the textual data that relates to the *like*. Each friend is then linked to a bag of words representing *likes* and their meanings. A user modeling approach similar to that of [4] is used to find from this data, how related each friend is to a set of automatically derived "shared interests", that broadly define the different tastes of a user's friends. A "shared interest" is defined as a set of words that frequently co-occur together in the bag of words of all of the user's friends. Figure 1 shows the different "shared interests" the system discovered for the friends of one particular user. When the user types a social query, this query is also modeled in terms of these shared interests, and the K friends who are the most relevant to the query, are recommended to the user. For visualization purposes K=11 was chosen in this case.

Transparent Verification Interface: This component offers a visualization of the friends who are most correlated to a particular social query. It also links and presents the data utilized in recommending that particular set of friends, thus allowing a user to verify if a recommendation is indeed appropriate. Figure 1 shows a screenshot of the interface when the user typed the social query: "Who knows of a good Windows 6 phone that won't break the bank?". We ran a series of in-depth cognitive walkthroughs with a small number of subjects to solicit feedback about the basic design as well as to identify how effective this type of transparency might be for identifying appropriate friends for directed queries. All of our subjects were able to navigate the represented information within a few seconds and only minimal instruction. For the most part, the subjects had positive responses to the visualization, and noted that it aided them in verifying and correcting friend lists. As a test case, we included two friends who were purposefully correlated with shared interests incorrectly. In order to see if users would notice that some correlations were incorrect. Without exception, users independently noticed that something was awry without any indication from the experimentors. Our motivation in providing this example was to show that even a simple visualization of the underlying data was sufficient to allow a subject to confirm or refute a classification. The simple visual cues in these instances were sufficient to indicate issues with the model and to cause users to investigate their cause.

Socially-Aware Interface: Although our transparent interface is effective at weeding out problematic correlations, it does not consider social contexts or spatial temporal constraints, which are known to affect a user's preferences and decisions [5]. We extended our system to address potential real-world scenarios. To this end, we organize highly-correlated friends in terms of their geographical location and their inclusion in particular Facebook groups. Through visualizing friends in this way, a user can quickly determine which of the users are appropriate for a particular social query. This is especially true if the query may only have local relevance. There are also several different social constraints that can play a role in the user's desire to direct a social query to a particular friend. For example, a user organizing an event to prepare for a competition might not wish to invite rivals from the other team. We also considered that a friend's overall personality might play a role in the user's desire to include the friend in the directed social query. A friend's personality is determined by calculating the similarity index that the friend's *likes* and their associated textual meaning present with the adjectives from Thayer's Activation-Deactivation Adjective Check List [6]. A friend's personality is classified as either energetic calm, energetic tense, tired calm or tired tense. For entertainment purposes, the following categories were used in our interface: "energetic soul", "high strung", "sleepy soul", and "anxiously drowsy".

It is important to note, that the friend features used here were for showing the potential machine learning and visualization have in aiding social decisions; they are not exhaustive.

CONCLUSION

This paper introduces a novel system for modeling and recommending social network users based on content and social factors. To mitigate potential machine learning modeling errors, we introduce two interactive visualizations that allow for result analysis and verification. A user study evaluating our system is forthcoming. We believe our system offers a novel clear fast way for directed social querying and allows a user to explore and learn about her friends in a new way.

ACKNOWLEDGMENTS

This work was partially supported by CONACYT-UCMEXUS & NSF grant IIS-1058132. Special thanks to Victor Fragoso, Janet L. Kayfetz and Mary Jones for their aid and feedback.

REFERENCES

1. Amershi, S., Fogarty, J., Weld, D.S. ReGroup: Interactive Machine Learning for On-Demand Group Creation in Social Networks.Proc. CHI '12, ACM Press(2012)
2. Bernstein,M., Marcus,A., Karger, D., Miller R. Enhancing directed content sharing on the web. Proc. CHI '10, ACM Press (2010)
3. Caropreso, E., Chen, S.J. Effects of Personality on Small Group Communication and Task Engagement, Proc.of World Conference on E-Learning, AACE (2005)
4. Dietz,L.,Gamari B.,Guiver J.,Snelson E.,Herbrich E. De-Layering Social Networks by Shared Tastes of Friendships. ICWSM The AAAI Press (2012)
5. Savage,N.S,Baranski, M.,Chavez,N.E.,Hollerer T. I'm feeling LoCo: A Location Based Context Aware Recommendation System. Proc. 8th International Symposium on Location-Based Services, Lecture Notes in Geoinformation and Cartography,Springer (2011)
6. Thayer, R.E., Activation states as assessed by verbal report and four psychophysiological variables. Psychophysiology 7, 1 (1970), 86-94. (1970)