

Creating a Social Network from an Existing Bulletin Board Community

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Abstract. Some social networking sites are now using FOAF (Friend of a Friend) to export data from user profiles. However, for existing bulletin board communities, incentives for users to provide this semantically-rich content are necessary to aid in the integration of these communities on the Semantic Web. One approach that can be used in combination with FOAF and other RDF export functionality is the development of a social networking component that makes use of bidirectional links between user profiles, or FOAF documents, to create a “friend”. Other social networking aspects, such as interests and forum matching, can also be integrated. The approach described here will lead to the development of a socially networked bulletin board.

1 Introduction

One of the quickest and most common ways of creating an online community is via the creation of a bulletin board [1]. For example, if a site is to be dedicated to a specialised interest like coin collecting, a bulletin board could be created to allow coin collectors to meet regularly online and disseminate information to others having like-minded interests.

Social networks have grown in popularity recently [2], [3], networking both social acquaintances and professional associates [4]. Many social networking sites have incorporated community discussion features such as bulletin boards.

Rather than add a bulletin board to a social network, this paper proposes the reverse: to take advantage of the large number of bulletin boards available to automatically create a social network.

2 Exporting FOAF

In a bulletin board-based community, profile information on each user is mainly gathered at registration through the use of required fields that must be completed by a user before an account can be fully registered. This can include interests, work details, and so on. Such information can form the basis of a Friend of a Friend (FOAF)¹ file for a particular user, assuming that they have made the information publicly available (an option could be added that would allow the automatic creation of a FOAF file from their profile if enabled by a user).

A useful feature of some community-based bulletin board systems is the friends list or “buddy list”. This allows users to see when their friends are online, or to send all of their friends a private message at once. Each friends list is private to a particular user, but by adding another option to the bulletin board software to make some or all of this list publicly accessible, the public friends can be used as part of a FOAF export system. Alternatively, the enemies list or “ignore list” could be used for a FOAF export using terms from the Relationship² proposed addition to the FOAF vocabulary such as *antagonistOf* or *enemyOf*. The ignore list is normally used to hide a particular user’s forum posts and to block incoming private messages.

A FOAF exporter for the vBulletin bulletin board system called vBFOAF³ has been developed by the author, and a similar module has also been developed for the phpBB system⁴. The logical extension

¹ <http://www.foaf-project.org/>

² <http://vocab.org/relationship/>

³ <http://www.vbulletin.org/forum/showthread.php?t=66434>

proposed by the latter is that this could form the basis for an automated registration method for such bulletin boards. Table 1 shows typical mappings from a bulletin board user profile to FOAF properties. For example, the user ID or hashed e-mail address could be used to create a unique URI for a FOAF profile, and the interest keywords could be mapped to URIs for corresponding categories in the Open Directory Project⁵ (ODP) taxonomy (this will be discussed in more detail later).

Table 1. Mapping bulletin board user profiles to FOAF properties

Profile Field	FOAF Properties
User ID	Can be used to construct a unique URI
Real Name	foaf:name
Username	foaf:nick, foaf:accountName
E-Mail	foaf:mbox, foaf:mbox_sha1sum, and can also be used to construct a unique URI
Homepage, Website	foaf:homepage
ICQ	foaf:icqChatID
AIM	foaf:icqChatID
Yahoo! IM	foaf:yahooChatID
Buddy List, Friends List, Public Friends	foaf:knows
Interests	Used to derive foaf:interest URIs
Location, From	foaf:based_near
User Group	foaf:memberOf a foaf:Group
Bulletin Board URL	foaf:accountServiceHomepage is combined with foaf:accountName to create a foaf:OnlineAccount class in the foaf:holdsAccount property

2 Linking Friends and Enemies

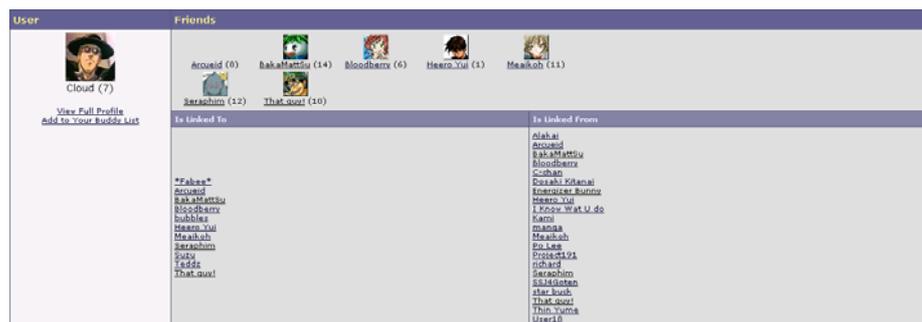


Fig. 1. Social networking module in friends mode for a bulletin board.

The social networking potential of the friends list described earlier has not previously been exploited in bulletin board systems. A social networking module for vBulletin called vBFriends⁶ is shown in Figure 1. The module has two display modes, one showing friends and the other enemies. For example, the friends display mode for a particular user ID shows who is linked to and from that user by analysing the user IDs harvested from all friends lists (similar to how Plink⁷ deals with *foaf:knows* entries from FOAF files). We will illustrate its usage in the case of two users, A and B.

User A can link to user B as a friend, and vice versa. Unlike Plink, when a bidirlink (bi-directional link) of the same type is created, user B's picture will appear on user A's profile as a friend icon, and vice versa. If the link is created in one direction, for example from user A to user B, then user B will only appear in the "Is Linked To" list of names on user A's profile, and user A will appear in the "Is Linked From" list of names on user B's profile. Bidirlinks of opposing types (friend and enemy) will result in nothing being displayed. For example, it may occur that user A will link to user B as a friend, but user B may not want that link to appear on their page in the "Is Linked From" area. This could be negated by user B placing user A on their list of enemies. Table 2 lists the possible scenarios.

⁴ <http://www.phpbb.com/phpBB/viewtopic.php?t=197635>

⁵ <http://www.dmoz.org/>

⁶ <http://www.vbulletin.org/forum/showthread.php?t=66449>

⁷ <http://www.plink.org/>

Table 2. Example of public profiles for various friend and enemy combinations

User Friends List	A's Enemies List	User A's Friends List	B's Enemies List	User B's Profile	A's Profile	User A's Friends List	B's Enemies List
User B		User A		Bidirlink Friends	as Friends	User A	
User B			User A	Is Linked to B as Friend	B as Friend	User A	
	User B		User A	Is Linked from B as Friend	as Friend		
	User B			Bidirlink Enemies	as Enemies		
		User B		Is Linked to B as Enemy	B as Enemy		
			User A	Is Linked from B as Enemy	as Enemy		
	User B	User A		Nothing	Nothing		
				Appears	Appears		
User B			User A	Nothing	Nothing		
				Appears	Appears		

3 User Interests

The FOAF specification allows for the definition of a person's interests⁸ in terms of a URI. For the purposes of matching a user with another user's interests in a social network, or for matching a user with possible forums of interest, it would be useful to categorise interests in a tree-structured taxonomy similar to that employed by the ODP. This would also aid data merging since URIs have a certain structured syntax. The links between users' interests could then be more easily analysed using clustering or graph techniques [5], [6].

Type	Name	URL 1	URL 2	Action
<input type="radio"/> Like <input type="radio"/> Dislike	Babylon 5	http://www.midwinter.com/luk/lurker.html <small>Try Google I'm Feeling Lucky for best URL</small>	http://dmoz.org/Top/Arts/Television/Programs/Babylon5/ <small>Appropriate ODP category URL</small>	<input type="button" value="update"/> <input type="checkbox"/> delete <input type="checkbox"/> auto url
<input type="radio"/> Like <input type="radio"/> Dislike	Battle Angel Alita	http://www.netjaunt.com/manga/BAAlitahome.html <small>Try Google I'm Feeling Lucky for best URL</small>	http://dmoz.org/Top/Arts/Animation/Anime/ <small>Appropriate ODP category URL</small>	<input type="button" value="update"/> <input type="checkbox"/> delete <input type="checkbox"/> auto url
<input type="radio"/> Like <input type="radio"/> Dislike	Battle of the Planets	http://www.battleoftheplanets.net/ <small>Try Google I'm Feeling Lucky for best URL</small>	http://dmoz.org/Top/Arts/Animation/Anime/ <small>Appropriate ODP category URL</small>	<input type="button" value="update"/> <input type="checkbox"/> delete <input type="checkbox"/> auto url
<input type="radio"/> Like <input type="radio"/> Dislike	boards.ie	http://www.boards.ie/ <small>Try Google I'm Feeling Lucky for best URL</small>	http://dmoz.org/Top/Regional/Europe/Ireland/ <small>Appropriate ODP category URL</small>	<input type="button" value="update"/> <input type="checkbox"/> delete <input type="checkbox"/> auto url
<input type="radio"/> Like <input type="radio"/> Dislike	Jean-Michel Jarre	http://www.jarre.com/ <small>Try Google I'm Feeling Lucky for best URL</small>	http://dmoz.org/Top/Arts/Music/Bands_and_Artists/J/Jarre/Jarre.html <small>Appropriate ODP category URL</small>	<input type="button" value="update"/> <input type="checkbox"/> delete <input type="checkbox"/> auto url
<input type="radio"/> Like <input type="radio"/> Dislike	Kraftwerk	http://www.kraftwerk.com/ <small>Try Google I'm Feeling Lucky for best URL</small>	http://dmoz.org/Top/Arts/Music/Bands_and_Artists/K/Kraftwerk/Kraftwerk.html <small>Appropriate ODP category URL</small>	<input type="button" value="update"/> <input type="checkbox"/> delete <input type="checkbox"/> auto url
<input type="radio"/> Like <input type="radio"/> Dislike	Lord of the Rings	http://www.twtowers.info/ <small>Try Google I'm Feeling Lucky for best URL</small>	http://dmoz.org/Top/Arts/Movies/Titles/L/LoRings/ <small>Appropriate ODP category URL</small>	<input type="button" value="update"/> <input type="checkbox"/> delete <input type="checkbox"/> auto url
<input type="radio"/> Like <input type="radio"/> Dislike	Lucozade	http://www.lucozade.com/ <small>Try Google I'm Feeling Lucky for best URL</small>	http://dmoz.org/Top/Business/Food_end_Restaurant/Food/Beverages/Lucozade.html <small>Appropriate ODP category URL</small>	<input type="button" value="update"/> <input type="checkbox"/> delete <input type="checkbox"/> auto url
<input type="radio"/> Like <input type="radio"/> Dislike	Manga to Anime	http://www.mangatoanime.com/ <small>Try Google I'm Feeling Lucky for best URL</small>	http://dmoz.org/Top/Arts/Animation/Anime/ <small>Appropriate ODP category URL</small>	<input type="button" value="update"/> <input type="checkbox"/> delete <input type="checkbox"/> auto url
<input type="radio"/> Like <input type="radio"/> Dislike	National University of Ireland	http://www.nuigalway.ie/ <small>Try Google I'm Feeling Lucky for best URL</small>	http://dmoz.org/Top/Reference/Education/Colleges/ <small>Appropriate ODP category URL</small>	<input type="button" value="update"/> <input type="checkbox"/> delete <input type="checkbox"/> auto url
<input type="radio"/> Like <input type="radio"/> Dislike	Popcorn	http://www.popcorn.org/ <small>Try Google I'm Feeling Lucky for best URL</small>	http://dmoz.org/Top/Shopping/Food/Snack/Food/Popcorn.html <small>Appropriate ODP category URL</small>	<input type="button" value="update"/> <input type="checkbox"/> delete <input type="checkbox"/> auto url
<input type="radio"/> Like <input type="radio"/> Dislike	Superman	http://www.kryptonian.com/ <small>Try Google I'm Feeling Lucky for best URL</small>	http://dmoz.org/Top/Arts/Comics/Titles/S/Superman/ <small>Appropriate ODP category URL</small>	<input type="button" value="update"/> <input type="checkbox"/> delete <input type="checkbox"/> auto url
<input type="radio"/> Like <input type="radio"/> Dislike	Tomita	http://www.isacomita.net/ <small>Try Google I'm Feeling Lucky for best URL</small>	http://dmoz.org/Top/Arts/Music/Composers/T/Tomita/ <small>Appropriate ODP category URL</small>	<input type="button" value="update"/> <input type="checkbox"/> delete <input type="checkbox"/> auto url
<input type="radio"/> Like <input type="radio"/> Dislike	Weetabix	http://www.weetabix.co.uk/ <small>Try Google I'm Feeling Lucky for best URL</small>	http://dmoz.org/Top/Business/Food_end_Restaurant/Food/Cereals/Weetabix.html <small>Appropriate ODP category URL</small>	<input type="button" value="update"/> <input type="checkbox"/> delete <input type="checkbox"/> auto url
<input type="radio"/> Like <input type="radio"/> Dislike	Cheese	http://www.cheese.com/ <small>Try Google I'm Feeling Lucky for best URL</small>	http://dmoz.org/Top/Recreation/Food/Cheese/ <small>Appropriate ODP category URL</small>	<input type="button" value="update"/> <input type="checkbox"/> delete <input type="checkbox"/> auto url
<input type="radio"/> Like <input type="radio"/> Dislike	Rain	http://www.accuweather.com/ <small>Try Google I'm Feeling Lucky for best URL</small>	http://dmoz.org/Top/Arts/Movies/Titles/P/P/Pain/ <small>Appropriate ODP category URL</small>	<input type="button" value="update"/> <input type="checkbox"/> delete <input type="checkbox"/> auto url
<input type="radio"/> Like <input type="radio"/> Dislike		<input type="text"/>	<input type="text"/>	<input type="button" value="add"/> <input type="checkbox"/> auto url

Fig. 2. Likes and dislikes module for a bulletin board.

Figure 2 shows a sample management system for a user's likes and dislikes called "Likedis", where a general URI is entered for the interest along with its suggested appropriate place in the ODP taxonomy.

⁸ http://xmlns.com/foaf/0.1/#term_interest

4 Forum Categories

Many social networks suffer from poor categorisation of community forums. For example on the orkut⁹ site, 160000 forums are classified in just 28 top-level categories. This makes it difficult for users themselves to find communities matching their interests, or for machines to match users to communities. A community bulletin board does not have to contain all possible categories such as Arts, Computers, Health, etc., but could instead have as its top level a particular sub-category of a particular taxonomy (e.g. Sports > Football > American).

Such a structured categorization could be used to match user-defined interests to possible forums of interest, either existing forums on registration or newly-created forums through a periodic matching system. New forums to discuss a common interest could be proposed or automatically created based on the level of demand for the interest as expressed in user profiles.

Conclusions

This paper presented some methods for adding social networking functionality to existing bulletin board sites, including friend surfing and interest-to-forum matching. Such a socially networked bulletin board can be enhanced with RDF content such as FOAF to form a semantically enabled bulletin board.

Preliminary tests on a bulletin board site with 4500 registered users show that for the 10% of users who update their friends lists, an average of 135% more friends were added within a month of social networking functionality being introduced (with an overall increase in the average friends list count from 3 to 4).

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References

1. L. Wood and D. Blankenhorn, 1990. State of the BBS Nation: Behold the Lowly Bulletin Board, Now Encompassing the Globe. *Byte*, January 1990. 298-304.
2. K. Jordan, J. Hauser and S. Foster, 2003. "The augmented social network", *First Monday*, volume 8, number 8 (August), http://www.firstmonday.dk/issues/issue8_8/jordan/
3. L.A. Adamic, O. Buyukkokten and E. Adar, 2003. "A social network caught in the web", *First Monday*, volume 8, number 6 (June), http://firstmonday.org/issues/issue8_6/adamic/
4. I. O'Murchu, J.G. Breslin and S. Decker, 2004. "Online social and business networking communities", *Proceedings of the Workshop on the Application of Semantic Web Technologies to Web Communities at the 16th European Conference on Artificial Intelligence 2004 (ECAI 2004)*, Valencia, Spain.
5. M. Boguñá, R. Pastor-Satorras and A. Díaz-Guilera, 2003. "Emergence of clustering, correlations, and communities in a social network model", *Preprint cond-mat/0309488*.
6. M.E.J. Newman, S.H. Strogatz and D.J. Watts, 2001. "Random graphs with arbitrary degree distributions and their applications," *Physical Review E, Third Series*, volume 64, parts 1 and 2 (August), 026118.
7. D. Gibson, J. Kleinberg and P. Raghavan, 1998. "Inferring web communities from link topology", *Proceedings of the 9th ACM Conference on Hypertext and Hypermedia*. New York: ACM.
8. S. Wasserman and K. Faust, 1994. *Social Network Analysis: Methods and Applications*. Cambridge: Cambridge University Press.

⁹ <http://www.orkut.com/>