Semantic social network portal for collaborative online communities

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Abstract

Purpose – The motivation for this investigation is to apply social networking features to a semantic network portal, which supports the efforts in enterprise training units to up-skill the employee in the company, and facilitates the creation and reuse of knowledge in online communities.

Design/methodology/approach – The paper provides an overview of an emerging area for work-related research in the field of knowledge management and collaborative online communities.

Findings – The growing number of social network online communities requires a systematic assessment of the application and design of social network technologies, which makes this study relevant and timely.

Practical implications – This paper gives guidance in an emerging research area with major implications for online communities and human resources management.

Originality/value – Fulfils a need, since a lack of literature in the field is apparent.

Keywords Social networks, Internet, Communities, Semantics, Human resource management

Paper type Research paper

Introduction

The Internet and, in particular, the web has enabled a communication revolution: the ability to send and retrieve information everywhere has changed the way we work and live. Web portals, as content aggregators, provide efficient access to information and services online: they are electronic gateways or entrances that provide hypertext links to other sites and collect information. They provide a focal point and an information source that can be personalized, allowing people to gather detailed information, on demand. Web portals play an increasingly important role amongst online communities as audiences seek out more specific information, providing valuable opportunities for both profit and non-profit communities to introduce basic collaborative knowledge management, group administration to reduce time-consuming tasks.

Social networking portals are a recent trend in the development of content rich web portals. A social networking site connects people based on data about them, stored in user profiles. These user profiles determine the way in which users present themselves to other users. The most important distinguishing factor between the various sites is the range of profile information that they hold, store and can perform operations on.

This paper presents various classifications of social networking portals, e.g. registration or connection based; user profiles for social and professional purposes; non-profit or profit-based sites; business models and profitability. An evaluation is carried out under the headings of searching capabilities; communication and collaboration features; perception of users; privacy measures. The first part introduces a representative portal development project for work-related collaborative knowledge management and is followed by a review of portal sites in general and the rationale for the development of social networking portals in particular.

Background
The motivation for this investigation is the development of a semantic social network portal (SSNP), which will support the efforts in enterprise training units to up-skill employees in the company and facilitate the creation and reuse of knowledge in online communities. A combination of a semantic web-based knowledge management framework and social network analysis features, enables social networking in the context of knowledge management for on-line communities and helps monitor the changing needs and skills of the work force in enterprise environments. The development of the SSNP is motivated by the introduction of explicit semantic representation of online resources to improve search results in online resources and enable automatic linking based on conceptual similarities based on data semantics. Furthermore semantic web technologies will allow for personalization, tailoring of information and in particular, improve interoperability between resources for communities of practice through the use of shared vocabularies. The integration of semantic web portals and online social networks is a novel view of and an approach towards work-related collaborative online knowledge communities.

Aims
The principal aims of the Programme for University Industry-Interface (PUII) SSNP are to identify the skill sets and technical competencies needed by individuals in enterprise environments and to research and pilot new, innovative learning models and online support networks that will deliver in-company education and training for future employability (Neumann *et al.*, 2004).

The SSNP builds on the design of enterprise knowledge portals (Collins, 2003) and allows the gathering of field information from communities of practice (CoP), which contribute to the knowledge base, a semantically enabled repository of domain here work-related information. Resources are available to all members of the project in form of controlled vocabularies and meta-data enhanced documents, and collectively authored hypertext documents.

Specifically, the PUII portal provides:

- information tailoring of resources based on social networks and metadata;
- support for collaborative knowledge creation; and

- discovery of information through meaningful annotation and reusability for online communities.

In addition the user actively shapes the portal structure through the creation of computer supported social networks. For example, in practice, the user will not only be able to search and gather information, but can add content to the knowledge base, visible to the user's community. Moreover the user can create new relationships regarding available data to administer a particular view on some subject within the knowledge base. Special interest groups identify the most relevant and useful relationships and concepts to further develop a topic, structure the information and turn it into a reusable resources repository annotated with semantic web meta-data.

Social networking and semantic aspects of the web portal
Online social networks are becoming increasingly popular and it can be envisioned how they will enhance online collaborative knowledge management (McDonald, 2003) in the context of human resource development. Online social networking sites introduce a new quality of social participation in online environments through identification and motivation to contribute to the community, to share experience and discover expertise in the organization. The development of the SSNP endeavours to combine ontologies (Gruber, 1993), here specification of work-related concepts, semantic web portals (Davies *et al.*, 2003; Lara *et al.*, 2003) with explicit representation of social networks in the process of collaborative knowledge management.

Social networks connect and present people in online communities based on data about them, stored in user profiles. User profiles determine the way individuals are able to access content or view other users on the network. The main principle of social networking sites is the use of explicit representation of user information and relationships between users for content selection, recommendation and trust mechanism. They provide automatic inference of common interest and experience of members through logical reasoning and hence offer matchmaking services and resource identification to solve tasks arising in the community.

The term semantics in context of the semantic web technology describes the relationship between unique resources and meaning based on meta-data, controlled vocabularies and ontologies. The semantic web representation of data on the World Wide Web, based on the resource description framework (W3C RDF Model and Syntax Working Group, 1999), is an attempt to apply this for web resources. "RDF integrates applications using XML for syntax and URI for naming. The semantic web extends the current web where information is given well-defined meaning to better enable computers and people to work in cooperation" (Berners-Lee *et al.*, 2001).

The current architecture of the World Wide Web and the increasing amount of web documents exhaust conventional search approaches, which make use of simple link collections, matching of single or combinations of keywords. To search for a particular concept in the current web, the user's search horizon is therefore restricted to keyword matching or in some instances to category browsing. Documents bear no or limited explicit semantic information accessible to machines and users at the same time. To query documents on the web, search engines have to parse documents, traverse hypertext links, and finally index keywords and documents based on subjective definitions and proprietary standards.

The semantics of documents and their respective domain relevance for the search-system is not accounted for. An approach to address this problem is the application of ontologies where controlled vocabularies and relationship properties are used for the construction of specialized domain area definitions to enhance query results. For this reason the main characteristics of the PUII SSNP development are:

- introduction of explicit semantic representation of online resources and users;
- information tailoring and linking based on user profile data and social network analysis; and
- semantic interoperability between communities of practice through the development and integration of open standards.

An area of particular interest is the ability to build and version ontologies, dynamically based on social network interaction (Kim, 2002). The semantic web technologies can help to enable communities to evolve, use and manipulate more intuitively emerging knowledge structures. The user can adjust how to view and interact with content and user data, based on ontologies and meta-data descriptions, which act as a query framework for community content.

The lack of explicit formalization of current online communities prevents semantic interoperability between communities (Friesen, 2002). The PUII SSNP makes use of social networks in the construction of taxonomy properties to enhance collaborative work and recommendation based on reusable meta-data feeds in accordance to open standards in HRD (Sure *et al.*, 2000).

Portals

The following list provides an overview and evaluation of existing portals and online social networks and identifies emerging features and requirements for a SSNP:

- *Enterprise portals*. Enterprise portals help to increase overall efficiency and business needs with an online presence. They enable the sharing of information within, and outside of, an organization. They maintain, organize, analyze, and disseminate information and provide a means for integrating systems that are used within the enterprise. They help to manage business knowledge content, present information in a personalized manner to the user whilst providing a common user interface.

- *Community portals*. Community portals provide a platform for communication and contact with a community, providing local or community-based information. Members can find information and furthermore can contribute relevant information to be shared within the portal. Community portals provide an awareness and interaction amongst a community whether for profit or non-profit. They provide an online collaboration environment for a community of interest. They strengthen the community by informing and providing an open place for communication, interaction, and the exchange of ideas.

- *Semantic community portals*. This is an emerging type where semantic web technologies enrich community portals with meta-data. They process and share information amongst their members through a personalized information access. Current web technologies are seriously limited in making distributed information accessible for users in an efficient manner. The use of ontologies

and semantic web technologies enable web portals to become more efficient at the task of sharing information. A semantic web portal makes information accessible to both humans and software agents by providing machine processable data. Semantic community portals offer high quality searching features by providing semantic-based browsing, querying and searching. Examples of semantic web community-type portals are the academic community portals Esperonto and OntoWeb. Commercial-type community portals include Empolis K42 or Mondeca ITM. The potential for using semantic web technologies amongst these communities dramatically improves information processing and sharing amongst members (Lara *et al.*, 2003).

- *Social networking portals*. Social networks originate from the field of network analysis (Wellman, 1996). Web-based social networking portals represent a set of persons as nodes and relationships between them. Profile information serves as a query parameter to retrieve resources matching users, documents and concepts. Social networking portals draw on the effect of identification and social participation in communities. An emerging form is the distributed social network that interconnects web resources and user profiles to augment online documents with a virtual network.

Online social network examples
The following list presents representative online social networks and their application. It can be anticipated that the next generation social network will be a semantic social network, as proposed by the PUII SSNP, which interconnects people and resources with the help of meta-data and ontology reasoning capability:

- *Ecademy (www.ecademy.com)*. Ecademy is a business-networking site built up of trusted business connections for people to share contacts and business opportunities. It is free to join, however membership can be upgraded for a monthly fee. It provides a catalogue of "Ecademy" clubs, and calendar functionality for meetings and events. "Ecadamy" provides a geographical list of networking regions globally for arranging meetings and events offline.

- *Friendster (www.friendster.com)*. Established in 2003, this is primarily a site for social connections for making friends. A member's photo and profile are only revealed to people in personal networks; messages can only be sent and received from those with a mutual network of friends. "Friendster" is currently in its development phase, during which membership is free.

- *Friendzy (www.friendzy.com)*. A free social networking site used mainly for making connections based on relationships of a sociable nature, "Friendzy" has led to a growth of online social network communities that are built up through online trusted connections. The site lists a classifieds section that can be posted to by members of the "Friendzy" community and makes use of electronic polls.

- *LinkedIn (www.linkedin.com)*. Founded in May 2003, it focuses on professional users creating networks of co-workers and other business associates. It allows members to look for jobs, seeking out experts in a particular area, or to make contact with other professionals through trusted connections. "LinkedIn" is probably the site with the least potential for social purposes.

- *Meetup (www.meetup.com).* Set up in 2002, is a networking site almost entirely devoted to the arranging of meetings for communities with similar interests. Unlike most other social networks, where the focus is towards user profiles and their networks of personal friends or associates, "Meetup" organizes local interest groups that meet monthly at local cafes and establishments. "Meetup" profits from establishments that pay to be listed as possible venues for these meetings, and also from services such as text advertising and its advanced "MeetupPlus" functionality.

- *orkut (www.orkut.com).* Primarily a social site, "orkut" has a relatively low user-base as it requires an invitation to join. Communities are created from a choice of 30 or so general category headings and contain the usual message forums and events listings. "orkut" has been criticized for its poor privacy policy, which has recently been revised.

- *Ryze (www.ryze.com).* Originally an online business networking site, but members use the site to communicate with other members for dating and other social networking purposes through the use of photos in each member's profile. The basic membership is a free. Paying Members can perform advanced searches. "Ryze" organizes events for people offline. In addition it lists a section for classifieds that members can post to.

- *Spoke (www.spoke.com).* A professional networking site that helps people to build their business network connections online. It helps to build a private and secure business network. The value of the network increases as more professional members are added. "Spoke" uses e-mail details and other information provided by its members in their user profiles to strengthen their relationships. In helping to find a job, "Spoke" also enables members to obtain referrals through people they already know.

- *Tickle (www.tickle.com).* "Tickle" states that they apply science to help their members to build relationships online, providing a psychological analysis of each member's personality and other insights. "Tickle" subscription gives access to additional personalized reports on the site. The site also contains a number of "ice-breaking" type e-mails that members can send to one another.

- *Tribe (www.tribe.net).* Is a subscription free social networking site in beta testing and derives revenue from job postings and featured listings. While "Tribe" is primarily used for social purposes, the site does include professional elements. "Tribe" contains categories of communities where each community is termed a tribe, and a message forum and events listing are associated with tribes. Messages from forums are made available in RSS XML feed format for use in desktop news aggregating applications.

Social networking motivation
Social network portals introduce an easy and efficient way to build and manage offline social networks online. The rationale is to inform communities better and more quickly through augmented social networks, and become more engaged and involved with one another. The development of this social and business infrastructure has motivated more people to join up with a specific aim in mind. The introduction of digital camera photos online has taken away some of the elements of uncertainty from meeting people,

and has even created an element of trust. Some sites like "Friendster", "orkut" and "Ryze" use photos for browsing. As people are naturally curious they tend to browse through photos, searching for people they find attractive or recognize. "orkut" actively encourages this by its hot list section where members can also send a message to the member they find attractive.

Another motivating factor in social networks is that they are a means of socializing on moving to another city. Social networking sites make it easier to join and connect to new people or communities within a similar geographical area, and to share common interests. There is clearly the impression that the more connections you have the stronger your network is, even if the connections are weak ties. "orkut" presents its members with large networks as connectors, celebrities and stars depending on the number of profile views, average paths and trust counts each member has.

An even more important factor is the unique identification of users and resources. The current web interaction limits the user to consume predefined content from a publishing source. In online social networks each participating member is a producer and consumer at the same time of content available to the network. Therefore identification as a social value is reintroduced into an otherwise context free publishing environment, reinforcing trust and participation in the social network where the individual can take ownership.

An evaluation and classification schema for social networking sites
Registration-based vs connection-based
The majority of social networking sites have no restrictions as to who can join or when. These sites are registration based, where a person simply fills out a form of required details such as name, location, e-mail address and desired password. Registration for most sites is not subject to approval or moderation by another user, but usually does require some confirmation of details by clicking an activation link sent to the e-mail address entered. Once an account is activated, a user can begin adding friends to their network. Some registration forms can be complex with optional questions ranging from your previous employers to your favourite meal. Unfortunately it is not always clear what information is required or optional when registering with a site.

There are some sites where an existing connection to a user on a site is required before membership to that site can be obtained. For example, to become a member of "orkut", a non-member would have to contact a friend or acquaintance who is already a member of the site and ask for an invitation, or alternatively an existing member would send an invitation to a non-member to join the site. This tends to lower the number of inactive accounts.

To establish a link with another user on a social networking site usually requires the agreement of that user. For example, on "Spoke", an e-mail invitation message is sent to another user with whom you wish to establish a connection. There are a few sites where this is not the case. Word of mouth is such an example. A link is established by simply entering the e-mail address of the person with whom you wish to communicate.

User profiles
User profiles are identification information about a user stored in a central location or distributed on the network. They contain a description of user attributes and

preferences to allow for permission to interact with system resources based on user credentials in a user managements system. Business profiles allow professionals to interact with one another through business-orientated information, endorsements, testimonials and reputations. This allows business professionals, owners and entrepreneurs to connect together and search for contacts by location or expertise. These personal profiles contain information ranging from relationship status to member's religion and gender, and are shared with partners and in a predefined form to the general online community. User profiles are a central property of online social networks and increase quality of recommendation services through explicit relationships. They are of particular value to the business asset of commercial social network sites.

Business models and profitability
The commercial potential for social networking sites is based on how profitable they could be. Social network Sites have low overheads and aggregate large quantities of valuable information through user profiles, ranging from favourite books to movies lists, and can be targeted for very specific advertising. A number of these sites have classified advertisements (see Table I) and also advertise openings for job opportunities. However, business-networking sites are believed to be profitable, as they provide more opportunities for people with membership subscriptions to look for jobs, contracts and other prospects.

Social networking sites at present look for a solid business model for sustainable online commerce. There is a growing number of people on the Internet already paying for subscriptions to various sites, especially socially oriented networks. Following on from those who are willing to pay for online dating and matchmaking services, the CEOs of companies such as "LinkedIn" and "Tribe" are interested in how business people will connect for business and social purposes online.

Sites like "Tickle", "Ryze" are profitable, membership provides users with extra features such as advanced searching. Adrian Scott, the founder of "Ryze", has stated that "Ryze" has been profitable since 2003 without any venture capital funding. These

Site	Profitable	Potential revenue
Spoke	Unknown	Business contacts, jobs, referrals, requests, subscription
Ryze	Yes	Awareness of brand, business contacts, publicity
LinkedIn	Unknown	Business contacts, jobs, referrals, requests, subscription
Friendster	No	Advertising, classifieds, community subscription, matchmaking service, membership
Tribe	No	Advertising, classifieds, subscription to join tribes
orkut	No	Advertising, dating and matchmaking subscription, subscription to communities
Meetup	Yes	Advertising, charge for sites to hold meetups, exclusive membership for meetups
Ecademy	Unknown	Connectivity to business persons, jobs, referrals
Friendzy	Unknown	Advertising, matchmaking subscriptions
Tickle	Yes	Advertising, matchmaking registration

Table I.
Revenue and profitability
potential of various social
networking sites

sites can also be used to publicize a brand by targeting a company's publishing and advertising capabilities towards the large numbers of members that have signed up to a site.

Social networking technology enables people to connect in a way that closely mirrors natural social behaviour. These structures are fundamental to the way people organize and communicate, and so far personal communication products do not take full advantage of available features.

Evaluation
Searching and browsing capabilities
Social networking sites must provide some mechanism for users to search and browse for information, ranging from matching other users or communities who have shared interests, to job vacancies in a particular industry or location. Table II classifies a number of sites in terms of searching functionality. While most sites are targeted

	Friendzy	orkut	Tickle	Tribe	Friendster	Meetup	Ryze	Ecademy	Spoke	LinkedIn
User relationships	s	s	s	s	–	–	–	–	–	–
User gender	s	s	s	s	–	–	s	–	–	–
User age	s	s	s	s	–	–	–	–	–	–
User interests	s	–	s	s	s	–	–	s	s	–
User favourites	s	–	s	–	s	–	–	–	–	–
User associations	–	–	s	–	s	–	s	–	s	–
User location	s	s	s	s	–	sb	s	s	–	sb
User articles	b	–	–	–	–	–	–	sb	–	–
Community articles	b	b	b	b	–	sb	b	sb	–	–
Community events	–	b	b	sb	b	sb	b	sb	–	–
Community names	sb	s	sb	s	–	sb	sb	sb	–	–
Community descriptions	sb	s	sb	s	–	–	sb	sb	–	–
Community categories	b	b	b	b	–	b	–	b	–	–
Classified advertisements	b	–	–	–	–	–	–	–	–	–
User real name	s	s	s	s	s	b	s	s	s	s
User e-mail	s	–	s	s	s	–	–	–	–	–
User job name	–	–	s	s	–	–	s	s	s	s
User job description	–	–	–	s	–	–	–	s	–	–
User job prospects	–	–	–	–	–	–	–	–	–	s
User employer name	–	–	s	s	–	–	s	s	s	s
User employer category	–	–	s	–	–	–	–	–	s	sb
Site help	b	sb	sb	b	s	b	sb	b	sb	b

Notes: Search = s; browse = b; neither = –. From top to bottom and left to right, these range from social to real world events to professional

towards either professional or social pursuits, there are a few like "Tribe" and "Tickle"
that allow comprehensive searching and browsing in both areas.

Social sites devoted to user relationships tend to focus their searching functionality
on personal information such as age, gender, and relationship status. For equality
reasons, most professional networking sites ignore age and gender and instead focus
on searching through users' current jobs and employers. Both social and professional
sites allow searching of interests, locations and communities since these are common
matching requirements.

Communities, consisting of discussion forums and event details, can be searched in
terms of keywords in their name or description. However, when a keyword is not
apparently obvious for a search, browsing the categories of communities is often
unwieldy due to the creation of top level categories and no subcategories on many sites,
leading to hundreds of communities being listed within a single category that have to
be browsed manually. Some sites offer unique searching and browsing functionality
not found on other sites. For example, "LinkedIn", with their partner
"DirectEmployers", are aiding users in their search for new employment. "Ecademy"
also allows searching of content posted by users in their weblogs. "Friendzy" allows
users to browse classified ads, grouped by type or location. Other sites like "Meetup"
do not focus on searching for users or content at all, but rather on browsing possible
topics for on site community meetings.

Searching for a particular user can be restricted by what settings the user has
specified in their control panel, or by an initial default setting. On "Friendster", the
default setting is that users who are over three degrees away from a particular person
cannot see how they are connected to that person and cannot view their full profile.
This can make searching for some users difficult, and some people must arrange
outside the social network to make a connection manually within it.

Communication and collaboration features
As well as the basic social networking features of user searching and profile browsing,
many sites like "orkut" and "Tribe" offer a range of community building primitives.
These include features allowing the building of communities, based on memberships
with read and/or write privileges, and special communication features like message
boards and event lists. Current technological developments and research point to
future social networking collaboration and communication techniques with mobile and
network connected portable devices.

User to all. Weblogs or "blogs" have become a popular tool for users to make their
opinions known online, and with at least 5 million weblogs in existence (blogger.com
has 1.5 million, LiveJournal.com 700,000 and Xanga.com 2.5 million), social networking
sites are starting to incorporate blogging features. Blogs are often exported to
meta-data, as RSS or Atom XML formats, for use by news aggregator software such as
Radio User Land. Another method of user to all communication is by means of a user's
Friend of a Friend file (FOAF), which is a resource description framework (RDF)
application for expressing the information found in a user profile, but can incorporate
new fields as needed. FOAF uses XML for syntax and OWL for user-defined
vocabularies.

User to user. Most user-to-user communication on social networking sites is carried
out by means of private messaging (PM) functions, similar to sending an e-mail

message except that the target username is specified rather than an e-mail address. Like e-mail, private messages can be sent to a number of users at once; however most social networking sites place some restrictions on the total number of people to whom a single private message can be sent. E-mail messages can be sent, but many sites keep their users' e-mail details hidden, and messages are then sent via a predefined web-based form. On some sites, users can choose whether to make their e-mail address publicly viewable or not. There are restrictions on contacting members (by PM or e-mail) who are more than a certain number of degrees away in the network. This can be a site-wide setting or a degree number specified by a user in the profile. Some sites store profile information on user's instant messaging (IM) or short message service (SMS) accounts, but do not normally provide any inbuilt functionality to send messages using these services, rather linking to external sites or resources that can provide this functionality. Another method of user-to-user communication is the virtual card or vCard. vCards allow the automatic exchange of information typically found on a traditional business card. vCards are not limited to text, and can include photos, company logos, hyperlinks.

Community discussion. The community discussion forum has long been a popular feature of Internet-based communication. It has evolved beyond a static admin-maintained bulletin board into the realm of social networking, where communities can be created by any user and their success depends on whether they reach a certain critical momentum. The creator of a forum usually acts as the moderator, blocking undesirable threads and banning unwanted users from the forum.

Community forums are classified in categories according to major social or professional topics, depending on the type of parent site. They may also integrate event-meeting calendars, as on "orkut" and "Meetup". On some sites, the creation of a commercial community forum is forbidden and can result in a user ban. Most community forums on social networking sites employ threaded display methods, where topics are initialized by a certain user and replied to by others. It is important to note that communities can be used to enhance existing software that they are implemented on. An administration discussion forum can raise useful suggestions or bug reports that can increase the usability of the underlying software.

Internet relay chat (IRC) has long been used by communities to host real-time discussion of various topics. With the advent of meta-data storage and searching of chat conversation log files, and the use of Java-based applets to offer IRC functionality on the web, chat collaboration features are being incorporated into social networking sites.

The wiki is a method for community collaboration that has yet to feature on most social networking sites. Wikis, allow a community open read and write access to a database of pages, even if a user is not the originator of the material being edited. This flexibility can either be highly successful in a healthy busy community or disastrous in an indifferent community where anonymous users can make unwanted changes to the online site. However, wikis normally employ a version control system so that rollback to a previous version can be employed, and in a busy community any deleted pages will normally reappear if they are important.

Real world events. Event listings are a major feature of social networking sites. These are usually either linked to an entire site as a general meeting for all members, or to a particular community with events listed beside a particular discussion forum.

Some sites such as "Meetup" focus almost exclusively on arranging meetings for particular communities, being either localized or distributed with meetings for that community topic occurring worldwide at the same time.

Perceiving other users

A user's reputation is affected by how they relate to other people in the real world, but also by how they conduct themselves in an online social network. Social networks often employ a variety of methods to allow users to add positively or negatively to a user's personal reputation or rating, thereby affecting how the network perceives that user. Some sites allow a user to privately rate their network, and ratings can be used to increase the *karma* of another user if a sufficient number of users have privately ranked them in a positive manner. Some sites such as "orkut" further classify a user's reputation by trustworthiness.

Users may leave comments about one another's posts on the forum, and rank a user's benefit to a particular community by adding or taking away points from their rating score. In some communities, a user with an extremely negative rating can be disabled after passing a certain negative threshold. An endorsement or testimonial is another feature of social networking sites, where a fan or friend will declare exactly what it is that they find positive about another user. Most sites like "Friendster" or "Tribe" require the user to approve testimonials written about them. A similar feature is provided by "orkut", whereby a user can publicly declare themselves as being a "fan" of another user without an explanatory message.

Trust mechanisms. Positive reputation or testimonial is a type of trust mechanism, similar to the ratings system employed by "eBay" where auction transactions completed successfully or unsuccessfully are linked to a person's profile and often determine whether another user will deal with them or not. In professional sites, this is particularly important if, for example, you get five matches while looking for a venture capitalist with two degrees of your network, and no other determination can be made apart from user ratings as to whom to contact. While an endorsement is also a useful way of determining whether to trust another user or not, some emphasis should be placed on the number of degrees between the endorser and the endorsee to ensure that a person's friends are not the only people extolling their virtues.

Statistics

While accurate statistics on social networking sites are difficult to obtain due to the lack of publicly available independent data, some idea of their relative popularity can be obtained from traffic history figures provided by Alexa (www.alexa.com). Figures 1 and 2 show the traffic history for sets of social and professional sites respectively. The graphs represent each site's position in the top 100,000 sites as ranked by daily hits. Professional sites have a longer history, and traffic is shown over a two-year period.

On some sites, the amount of statistics or demographics available to a user can depend on whether they are a subscribing member or not, or can depend on how long they have been registered with a site.

The membership figures in Heineman and Kim (2003) for the various sites over the six month period from September 2003 to March 2004 make interesting reading. According to "Tickle" (established as eMode in 1999), their numbers have increased to 18 million (5 per cent increase). "Meetup" has increased to 1.45 million (> 30 per cent
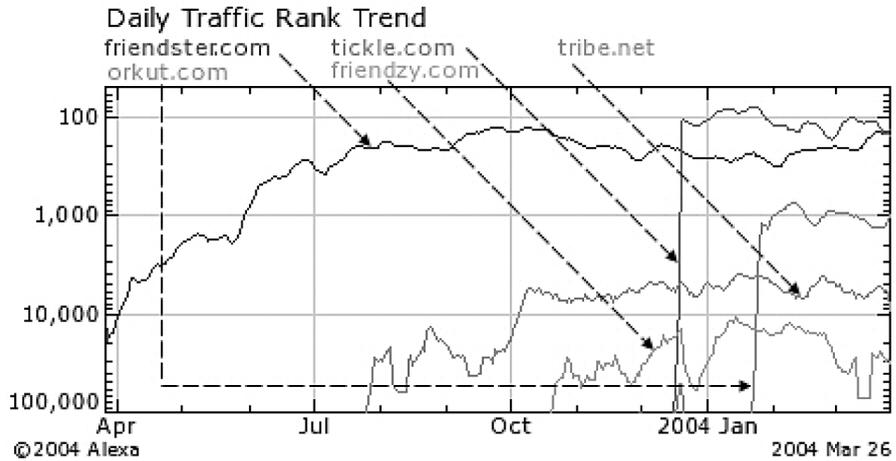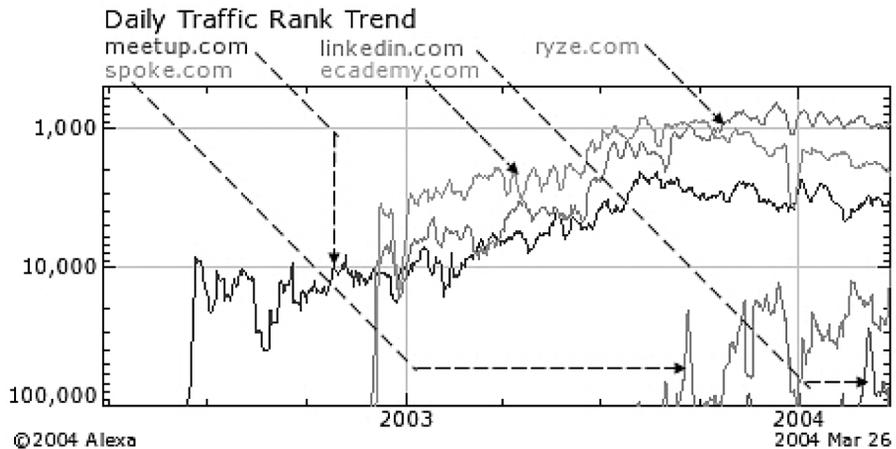
increase) "Friendster" has increased to 6 million members (50 per cent increase). "Tribe" has increased its membership from 58,000 to 113,152. "orkut" has already amassed 175,000 members over the three months since its launch. Clearly, this rapid growth is only beginning.

Some sites also list the number of views that a particular user's profile has had in total. This can increase a user's desire to complete all the optional fields in their profile, since this may provide more matches to searches performed by other users, and possibly add to their own popularity.

Privacy

Privacy may be defined as "the freedom from undesirable intrusions and the avoidance of publicity". Social networking sites actively encourage people to contribute information about themselves to these sites freely. People are providing this

information consensually without giving much thought or concern to the issue of privacy. In some cases, members provide information about their friends through testimonials. Personal information is much more open to abuse at present to the malicious elements in society, i.e. persons who can potentially abuse the information in user profiles. The aggregation of information gathered in the user profiles makes them particularly valuable and collectable and potentially open to abuse depending on the exposure depth set in the profile.

Identity theft is a possibility. Despite the claims of sites that contain the "TRUSTe" or "WebTrust" logos, just how highly the privacy value of these sites has been rated have yet to be determined. Most users sign up and contribute information without even reading the privacy policy. Sites like "LinkedIn" seem to be far more aware of privacy: they state in their privacy policy that they are the sole owner of the information collected on the site. "LinkedIn" also never lists the people to whom you are directly connected to. By default, your network of professional persons is closed. The site itself also strongly discourages users from placing e-mail addresses or other contact information in their user profiles. Another issue with privacy is the mining of contacts from Microsoft Outlook e-mail clients by sites such as "Spoke", "LinkedIn" and "Ryze". Valuable contacts are uploaded to these sites despite all the privacy warnings.

Conclusion

This paper provides the first systematic overview of portal sites and the rationale for portals specifically dedicated to the creation of social networks. A classification of social networking portals has been provided and a comparison of the methods for establishing membership and user-to-user links on such sites was presented. An evaluation was performed on search, communication and privacy features, as well as the relative popularity of sites.

Current knowledge representation and management projects limit the discovery and exploitation of resources to document properties. But knowledge is a social construct and needs to consider the social effect for successful collaborative knowledge sharing and use.

Web-based online communities are helping to transform the web from document server into a collaborative work environment; people are meeting in a virtual space and jointly create documents; web-based social networks help to keep track of collaborations, contacts, and are used to connect individuals within a community.

The findings will be applied to the development of a semantic social networking portal, which presents an innovative approach to support enterprise communities to ensure the quality and timeliness of enterprise education of employees and supports the circulation of knowledge already existing in the company throughout in the group. The combination of enterprise training and SSNP development offers new opportunities for universities in post third-level education to act as guides and innovators in online educational communities.

Social networks in collaborative environments stimulate the motivation to learn in the community. The semantic web technologies can help to enable communities to evolve, use and manipulate more intuitively emerging content and knowledge structures. The introduction of explicit semantics and ontologies for current online social networks and communities will lead the way to semantic interoperability of resources for online communities. The PUII SSNP will provide a support system for

online collaboration of employees in companies, researchers in third level institutes and individuals, based on open standards.

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