SmartBook:Combination of Web-Based Q&A and OSN-Based Q&A

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*Abstract--***Question answering communities such as Quora.com and Yahoo! Answers have emerged as popular and effective means of information seeking on the web. By posting questions for other participants to answer, information seekers can obtain specific answers to their questions. Users of popular portals such as Yahoo! Answers already have submitted millions of questions and received hundreds of millions of answers from other participants. However, it may take hours–and some time days– until a satisfactory answer is posted. Spamming and anonymous answers are other major issues in such communities. In this paper we propose an OSN which is a combination of web based Q&A and OSN based Q&A for knowledge sharing with additional features such as personalized and multi-keyword web search and news sharing. The proposed system provides a friendship and knowledge-category based knowledge sharing with reduced spam.**

Keywords: Online Social Network,Q&A.

I. INTRODUCTION

Web search engines (e.g., Google and Bing) allow us to search information by keywords on the Internet. Recently, web search engines have been improved by combining with social networks enabling friends in social networks [1]-[2] to collaborate with each other to determine the relevance of the returned results to their queries. Users use web annotations or bookmarks to indicate the search results they are interested in, which helps their friends sharing the same interests to quickly identify results useful to them as well. In reality, people are the most "intelligent machines" that are capable of parsing, interpreting and answering questions, provided they are familiar with the topics. Each person has knowledge from his careers, education, life, experience, interests and so on, which forms his knowledge base. By collecting the intelligence of people to find information, Question and Answer (Q&A) websites such as Yahoo! Answers and Ask.com have naturally emerged as an alternative to Q&A. These websites provide a platform where users can post questions and receive answers. To encourage participation, a user pays points for asking a question and earns points from answering a question.

Although Q&A websites are becoming increasingly popular and can provide high quality answers [3], they have some shortcomings in satisfying users' needs. First, the latency for receiving a satisfying answer is high [4]. This is because most users log in the Q&A website only when they have questions to ask. Even if some users may intend to answer others' questions, since all questions in one topic appear together in one forum, it is difficult for them to identify the questions they can answer. Second, as Q&A websites are normally open to all anonymous users in Internet, spam is a difficult problem.

In recent years, OSN-based Q&A systems [5]-[6], have been developed. In an OSN-based Q&A system, users post and answer questions through the OSN to take advantage of the collective intelligence of their friends. However, the characteristics of the knowledge of the friends in a user's social network may affect the quality of the answers for the user's questions.

OSN-based Q&A systems cannot provide expert answers while web Q&A systems cannot provide timely personalized answers. By synergistically integrating the web Q&A system and OSN-based Q&A system through building a social network in web Q&A system, both systems shortcomings can be overcome.

II. RELATED WORK

A. Distributed Social Networks Based Mobile Q & A System with Low Overheads and Cost Effectiveness

The social based Q&A systems answer non-factual questions, which cannot be easily resolved by web search engines. These systems either relies on a centralized server for identifying friends based on social information or broadcast a user's questions to all of its friends [8]. Mobile Q&A systems, where mobile nodes access the Q&A systems through internet, are very promising considering the rapid increase of mobile users and the convenience of practical use. However, such systems cannot directly use the previous centralized methods or broadcasting methods, which generate high cost of mobile internet access, node overload, and high server bandwidth cost with the tremendous number of mobile users. A distributed social-based mobile Q&A system with low overhead and system cost as well as quick response to question askers. It enables mobile users to forward questions to potential answerers in their friend lists in a decentralized manner for a number of hops before restoring to the server. It leverages lightweight knowledge engineering techniques to accurately

identify friends who are able to and willing to answer questions, thus reducing the search and computation costs of mobile nodes. The trace-driven simulation results show that Q&A system can achieve a high query precision and recall rate, a short response latency and low overhead.

B. Measurement and Analysis of OSN

Online social networking sites like Orkut, YouTube, and Flickr are among the most popular sites on the Internet. Users of these sites form a social network, which provides a powerful means of sharing, organizing, and finding content and contacts [9]. The popularity of these sites provides an opportunity to study the characteristics of online social network graphs at large scale. A large-scale measurement study and analysis of the structure of multiple online social networks. Thus by examine data gathered from four popular Online social networks: Flickr, YouTube, Live Journal, and Orkut. The publicly accessible user links on each site, obtaining a large portion of each social network's graph. This confirms the power-law, small-world, and scale free properties of online social networks. The indegree of user nodes tends to match the outdegree; that the networks contain a densely connected core of high-degree nodes; and that this core links small groups of strongly clustered, low-degree nodes at the fringes of the network.

C. The Online Social Networks on Knowledge Exchange: Online Social Identity, Social Tie and Culture Orientation

The purpose of this research paper is to understand the mechanism of knowledge exchange in the virtual community from the social perspective. By drawing upon social exchange theory and social capital theory, this study develops a theoretical model that predicts individual knowledge exchange behavior in the virtual environment, where trust and outcome expectation mediate the relationship between the online social identity, online social tie, personal culture orientation and the effect of knowledge exchange. The study also lays emphasis on the cross-culture effect which influenced the knowledge exchange in the virtual community. Using the survey instrument, the model was tested empirically based on a sample of 248 users who had experience within the online community. We also made comparison studies with the previous research carried out mainly in the Western countries. The findings of the research suggest that the online social attributes of the Internet users are key facilitators in knowledge exchange in virtual communities.

III. PROBLEM DEFINITION

Most users log in a Q&A website only when they have questions to ask. Even if some users may intend to answer others' questions, since all questions in one topic appear together in one forum, it is difficult for them to identify the questions they can answer. As Q&A websites are normally open to all anonymous users in Internet, spam is a difficult problem. OSN-based Q&A systems cannot provide expert answers. Web Q&A systems cannot provide timely personalized answers. It is difficult for users to navigate from one news website to another for getting updates from popular news website. A common user can easily get the feed data by clicking on the feed-icon in the corresponding websites. However, the user can only get the feed information of that particular website only. For the updates and details of another website, the user has to navigate to that particular website, and choose its own feed-icon. Most of the common OSNs provide searching facility for searching the site content only. General web search is not available in them.

IV. ALGORITHMS

A. RSA ALGORITHM

- Choose two prime numbers p and q

- Compute $n = p\,q$

- Compute $\varphi(n) = \varphi(p)\varphi(q) = (p-1)(q-1)$

- Choose an integer e such that $1 < e < \varphi(n)$ and $\gcd(e, \varphi(n)) = 1$,e is public key exponent

- Determine d as $d-1 \equiv e \pmod{\varphi(n)}$

- $d\text{-}e \equiv 1 \pmod{\varphi(n)}$

- d is kept as the private key exponent

- **Encryption**

Alice transmits her public key (n, e) to Bob and keeps the private key secret. Bob then wishes to send message M to Alice.
$$C \equiv (m\char`^e) \bmod n$$

- **Decryption**

Alice can recover m from c by using her private key exponent d via computing
$$m \equiv (c\char`^d) \bmod n$$

V. PROPOSED SYSTEM

SmartBook, the proposed system, is a combination of web-based Q&A system and OSN-based Q&A system [7] with the above proposed strategies. The framework uses language models to exploit categories of questions for improving answer search.

Fig.1 depicts the overall view of proposed system, SmartBook. There are four modules in SmartBook. They are Entertainment, Q&A, Search and Share News modules. The entertainment module provides users with the facility to find and make friends, share images, videos and communicate with them through messages.

The Q&A module allows users with common knowledge domain to collaborate each other and share knowledge. The users need to provide his/her complete profile information including interested areas, professional details, knowledge domain during registration. User can post questions from any category and he/she will get answers from people with that category as interested area. To encourage participation, points are provided for each user action such as asking question,

answering a question, like an answer, best answers, etc. A user can view and answer questions only from his/her interested area or knowledge domain. This ensures expert answers and reduces spamming.
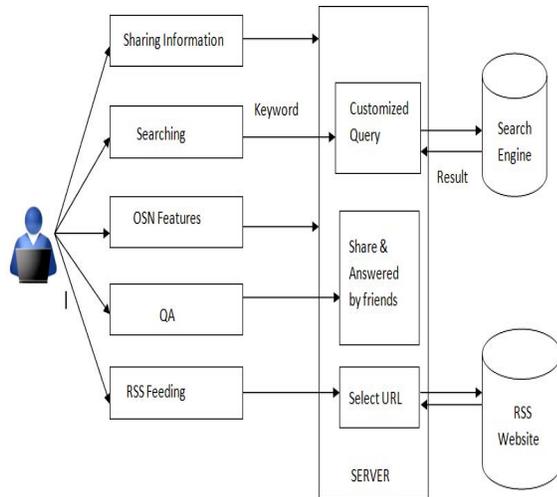

Fig.1: SmartBook- Overall view of the system

Two types of searching are available in SmartBook. First one is a personalized search facility and the second one is multi-keyword search. In personalized search, the search results will be based on user behavior. In order to ensure personalization, user's search query is mixed with his/her profile information. So the obtained search results will be relevant to that particular user. Multi-keyword search allows user to search multiple keywords simultaneously. The search query will be a set of space separated keywords. Search results for both individual keywords as well as the combined query are provided by the multi-keyword search.

In share news module, the administrator saves RSS feeds of various news websites to get updates from popular websites. So users do not have to navigate to different websites as news from different websites are made available in a single interface and thereby ensures that the users get updated with news from their favorite websites.

IV. CONCLUSION

Question and Answer (Q&A) websites such as Yahoo! Answers provide a platform where users can post questions and receive answers. These systems take advantage of the collective intelligence of users to find information. Community Question Answering (CQA) has recently become a viable method for seeking information online. In addition to using general-purpose web search engines, information seekers now have an option to post their questions (often complex and specific) on Community QA sites such as Naver or Yahoo! Answers, and have their questions answered by

other users. Such Q&A communities are also available in various OSNs, for e.g. Facebook. However, OSN-based Q&A systems cannot provide expert answers while web-based Q&A systems cannot provide timely personalized answers. Our proposed system, SmartBook is a solution to all the above discussed problems. It is a combination of both web-based Q&A and OSN-based Q&A. It is an OSN which provides a Q&A for sharing knowledge avoids the difficulty of navigation to various news websites, platform for entertainment and introduces a personalized searching facility. In SmartBook's Q&A facility a user can ask questions from any category, but he or she will be able to view and answer questions from his/her's interested domain/category that is provided in the profile information. This ensures valid answers and also reduces spam. So SmartBook provides users with a platform where people having same interests can collaborate each other to learn more. The news search facility available in SmartBook provides category-wise news updates from various websites so that users do not have to navigate from one website to another every time. This ensures that user gets news updates from his/hers favorite website. RSS feeds are used here to get news updates from various sites. The entertainment module in SmartBook is similar to that of all common OSNs. The users can upload photos, videos, etc.; they can add one another as "friends" can have chat with friends and connect with users who share similar interests, regardless of where they are in the world.

Search facility available in SmartBook provides two types of searches: a simple personalized search and multi-keyword search. Personalized search provides search results based on the user behavior. Multi-keyword search is a special type of searching which takes search query as a set of space separated keywords and provides results for each individual keyword and then results for the entire query.

SmartBook is an OSN which enables users with same interests to interact each other and share knowledge. It is a platform for sharing knowledge, entertainment, and advanced web search . It is an OSN for enhancing the learning process.

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