

Social Network Question and Answer System

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Abstract: In today's digital world, numerous people stumble upon the questions which they don't have answers to, and as the world is shifting more and more on digital platforms, many individuals take their questions directly on the many of the questions and answers forum. Individual's who has knowledge on the asked question can write an answer relevant to questions. In this paper, the proposed primary objective of the paper is to take those questions and make a social network QnA system which can take the questions asked by people and forward it to the right person who has the right skills and knowledge to answer the asked question. The system utilizes the common mutual trust among the network, and common-interest identifying the relationships of the asker with the answerer through their friendship and the right person most likely to answer the question, also cementing the security of the user. The paper describes the architecture, algorithms, and a comprehensive large scale simulation to evaluate questions and answers in comparison with other methods. The security and the efficiency of the users, both questioner and answerer is maintained in the system protecting their privacy and identities, furthermore the answers to recurrent questions are retrieved automatically. The system also analyses the QnA behavior of real users and questions from a small scale real world QnA system.

Key Words: Questions and answers, Social Network, Information search, Information collection.

1. INTRODUCTION

The internet is a valuable source of information if used correctly; many users and surfers on the internet tend to search for the information regarding their problems. Internet, besides being the vast ocean of information, sometimes the information can get lost and user searching for the information may drift aside from the original questions (s)he having and may not get the correct satisfactory information. Many search engines like Google and Bing (by Microsoft) provide users the information they need to search for. But these search engines heavily rely on the keyword search, and sometimes may not be

able to provide the exact answers the questioner is seeking. Many researches and analysis have resulted in incomplete information or not matching the exact information user is searching for turning it futile for the person. Many question and answer forums like Quora, Baidu StackExchange, and Yahoo! Answers let users to ask questions and other users can answer the questions. These forums are used by large majority of the users around the globe.

With large population comes the large pool of questions, which these questions and answers forum fail to answer because of the increasing questions every minute in clock. Analysis has shown that only 17% of the answers asked are answered, resulting in 83% of the questions unanswered. Also these questions posted online sometimes lacks the tags related to the category of the question asked, making them hard to put in right category by the system and the question remain unanswered. As a result, current QnA system fails to address the problem of thousands of questions not answered or lacking the high quality answers due to which the questioner may not be satisfied.

In addition to these problems, privacy of the QnA system is an important aspect to keep in mind. Many users seek answers to questions which can be sensitive, or may contain revealing too much personal information in the answers or sexual orientation, which the answerer doesn't want to reveal. To mask this problem, the privacy and identity of the person answering the questions must be properly hidden. These questions can be answered by the person who is close to the questioner so that both the parties are satisfied not revealing too much information. This problem is addressed in the system, which protects the privacy of the both questioner and answerer.

To erase this problem further, we propose a system which is SocialQ&A, an online social network based on the question and answer system, which will actively forward questions to those users with highest likelihood of answering question. The design of Social network

Question & Answer is based on two principles. First the friends who tend to share similar interests, and second who tend to be trustworthy due to the property of "Friendship foster cooperation." The existing system do not provide high privacy in the question and answer system, which we have proposed in the system furthering and advancing the security of the system to ensure complete safety of identities of both the questioner and answerer.

The design of Social network Question & Answer is composed of three components: User interest Analyzer, Question Categorizer, and Question-user Mapper. User interest analyzer associates each user with a vector of interest categories. Question Categorizer associates vector with interest category of each question. Then based on both the vectors, Question-user Mapper identifies the potential answerers to each question. Also the security of the system is well designed so that only socially connected friends can answer the questions protecting their identities, also making them feel safe for answering the relevant questions.

2. Social Network Question & Answer based system

2.1 Rationale of Social Network Q&A Design

A real social life network is formed by the people who share same interest or mutual interest regarding each person as a node in the system with social relationships. The network is featured by social similarities like a computer science department, a Football club, or it can be a talk group of similar thinking people. We rely for answers based on these features, which makes it easy for other person to answer the questions as soon as possible. For example, "When are the qualifiers beginning?" This question can be answered by the people who are in same football club and likely to share the field together, making it easier for the members of the club easier to answer the questions. Similarly, many questions regarding inter-departmental activities or inter-group activities questions can be asked by many people who are easier to sort and forward to relevant people of the same group.

An online social network connects friends with real-life relationship and online friendship, which share similarity to the real-life questions. Friends in an online network tend to share similar interests and trust each other. Utilizing these facts, Social Q&A incorporates an online network to improve the quality of the answers decrease answer response time. The system will forward a user's

question to the right person in his/her social group who have common interest and close social relationship.

2.2 Design of Social Q&A

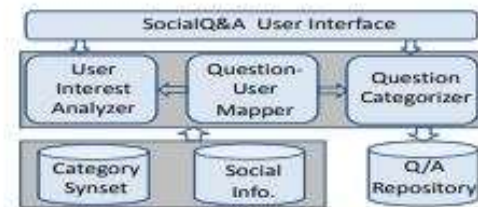


Fig. 1: The architecture of SocialQ&A.

Similar to all social networks, the each user will have a profile which will store the information about user's interest, education, hobbies, and etc. Social Q&A will have pre-defined categories and sub-categories to categorize the questions based on the tags of the category the question is asked in. The categories will include books, movies, sports, and drama. These categories are just example. When a person will ask a question, the question will be sorted in the category and will be forwarded to the user who matches the categories, making it possible for the other person to answer the question as soon as it is forwarded.

The algorithm for User Interest Analyser:

Input: A user's profile, questions and answers

Output: The user's interest vector $VU_j = \langle I_i, W_{I_i} \rangle$

1. Parse the "interests" field to generate a token stream T_I
2. Parse the "activities" field to generate a token stream T_a
3. Use the inputs from the user's selection from the Music, Movie, Television and Book fields to generate token streams T_{mu} , T_{mo} , T_t and T_b
4. for each token stream T_x ($T_x = T_I, T_a, T_{mu}, T_{mo}, T_t, T_b$) do
5. Check each token in the Synset
6. if a matching interest category I_i exists then
7. Update interest weight: W_{I_i++} (e.g., $W_{music++}$)
8. end if
9. end for
10. Keep updating W_{I_i} based on questions asked and answered and profile update

11. Periodically update W_i using $W_i = \alpha * W_{iold}$

Algorithm for Question-user Mapper:

Input: Interest vectors of a user, his/her friends and question

Output: A list of potential answer providers

1. for each friend U_k in the friend set of U_j
do
2. Compute Ψ_{I,U_k} based on Eq. (1)
3. Compute PS_{U_k}
, PA_{U_k}
and PC_{U_k}
based on Eq. (2)
4. Compute Ψ_{C,U_k} based on Eq. (3)
5. Compute Ψ_{U_k} based on Eq. (4)
6. end for
7. Order the friends in descending order of Ψ_{U_k}
8. Notify the top N friends

3. CONCLUSION

Social Network Question & Answer will be used by many people in a targeted audience, and will be used for information retrieval, academic assistance, and discussion. To increase the answer rate and quality of the answers, the Social Network Question & Answer will be tested on small groups first to make it more efficient and useful on larger scale. The system will also be tweaked for future improvement in security and privacy which will make it more secure for users to answer and ask questions on sensitive topics.

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