Comparing IPL2 and Yahoo! Answers: A Case Study of Digital Reference and Community Based Question Answering

Dan Wu[1] and Daqing He[2]

[1] School of Information Management, Wuhan University

[2] School of Information Sciences, University of Pittsburgh

Abstract

In this paper, we took IPL2 and Yahoo! Answers as the two samples for our case study of digital references and community-based Q&A sites. We examined the services of the two systems based on 200 real questions raised in IPL2 and their similar questions found in Yahoo! Answers. Question type, topic classification, answer type, and answer time delay were compared between the similar questions in these two platforms. The result analysis showed that the two systems classify their questions differently, and the types of the questions asked are different too. It took much longer time to obtain answers from IPL2, whereas different types of questions in Yahoo! Answers generated dramatically different response time. However, some differences also demonstrated that there is need to consider integrating certain ideas in the two systems.

Contact: woodan@whu.edu.cn, dah44@pitt.edu

1   Introduction

With the wide usages of the Web, people increasingly seek for information online in their professional and personal lives. Web search engines are playing important roles in satisfying people's information needs, but they still suffer limitations for handling people's complex questions and needs. Therefore, asking questions to and obtaining answers from a human being (rather than a machine as in search engines) have also been extended to the Web, and have developed into two commonly used platforms: online digital reference extended from traditional face-to-face library reference services (Jeffrey Pomerantz, Nicholson, Belanger, & Lankes, 2004), and community-based question and answering (Q&A) that resembles asking questions among friends (Liu, Bian, & Agichtein, 2008; Y. Liu, et al., 2008).

There are many digital reference services and community-based Q&A systems developed over the years. Both platforms have also drawn a great amount of research interests, which cover areas such as the characteristics and services of digital references (Janes, 2002; Lankes, 2004; Jeffrey Pomerantz, et al., 2004), questions and answers in community-based Q&A sites (Fichman, 2011; Gazan, 2007, 2011), and the comparison of services provided by the two platforms (Wang, 2007; Wu & He, 2013).

Our ultimate research goal is to explore the integration of these two services into one coherent framework so that the strengths of one can compensate the weaknesses of the other. As a preliminary study toward this goal, this note paper, therefore, focuses on exploring the problem space with the following research question:

- RQ: what are the similarities and differences in terms of question type, topic classification, askers' intentions, answer types, and answer time delay between the similar questions really asked in these two platforms?

The motivation for us to concentrate on similar questions is that there are existing studies in the literature on examining the connections between the two platforms in general (Wang, 2007) and through a set of carefully crafted experiment questions (Wu & He, 2013). However, there is no study examining the connections based on truly occurred similar questions on these two sites. We want to emphasis on "truly occurred questions" because these questions would tell us more accurately about what exactly happening in those platforms. The reason that we paid attention to "question type, topic classification, askers' intentions, answer types, and answer time delay" is because these are important (though incomplete) parameters for examining the possibility of integrating these digital reference services and community-based Q&A services.

In this study, we adopted case study as our main research method, and selected IPL2 and Yahoo! Answers as the two typical cases for collaborative digital reference and community-based question answering respectively. IPL2[1] was developed in January 2010 by the School of Information Science and Technology of Drexel University by combining IPL (Internet Public Library) and LII (Librarians' Internet Index). Yahoo! Answers[2] is one of the most popular English community-based Q&A sites, which has high reputation with both big user populations and active Q&A communities. They each represent a top quality, well-known system in their own type of services. Although we acknowledge the potential questions on the generalizability of our results due to our case study research method on just two samples, we think that the results are still invaluable for a preliminary study.

To obtain similar questions from the two platforms, we first selected the 200 questions in the last month (June 1-30, 2011) of our IPL2 transaction logs. Then we developed queries based on each of these 200 questions and searched in Yahoo! Answers for similar questions. We manually judged the similarity between the returned Yahoo! Answers questions and the original IPL2 questions, and kept only those returned Yahoo! Answers questions that were judged to be similar enough. Next, for each IPL2 question, we ranked the remaining Yahoo! Answers questions according to their similarity to the original IPL2 question, and also according to the time that these questions were posted in Yahoo! Answers. To enable us to complete the study, we only sampled up to three similar Yahoo! Answers questions for each IPL2 question. That is, if there was only up to three similar Yahoo! Answers questions were found, we kept all three questions. When there were more than three similar Yahoo! Answers questions, we retained the one that is most similar, the one with the earliest time in Yahoo Answers, and the one that is closest in time to the question asked in IPL2. However, not all IPL2 questions can find their similar ones in Yahoo! Answers. In total we located 157 Yahoo! Answers questions by the day 15 August, 2012. This gave us 157 pairs of similar questions between IPL2 and Yahoo! Answers.

We do acknowledge that the above method is just one of many approaches for finding similar questions between the two platforms. For example, we could start with questions in Yahoo! Answers, and then find similar questions in IPL2. However, in practice, since the number of questions in IPL2 is much smaller than that in Yahoo! Answers, we think that our approach actually would give us higher chances to find more similar questions between IPL2 and Yahoo! Answers.

2 Comparison and Discussion

As stated, we will compare IPL2 and Yahoo! Answers based on the question type, topic classification, askers' intentions, answer types, and answer time delay. They can be classified into question comparison and answer comparison.

---

[1] http://www.ipl.org/

[2] http://answers.yahoo.com/

Rank of IPL2	Question Type	IPL2 Question Number	IPL2 Question Percentage	Rank of Yahoo! Answers	Yahoo! Answers Question Number	Yahoo! Answers Question Percentage
1	Exploratory question	51	25.5%	3	29	18.5%
2	Factual question	43	21.5%	4	23	14.6%
3	Informational question	36	18%	1	59	37.6%
4	Navigational question	35	17.5%	2	35	22.3%
5	List question	21	10.5%	6	2	1.3%
6	Definition question	14	7%	5	9	5.7%
	Total	200	100%		157	100%

Table 1: Question Types of IPL2 and Yahoo! Answers

2.1   Comparison of Questions

Borrowed ideas from several existing work (Gazan, 2011; J. Pomerantz, 2005; Voorhees, 2002), we classify the questions into six types, which are *Factual questions, List questions, Definition questions, Exploratory questions, Informational questions* and *Navigational questions.* Table 1 shows the distribution of the questions from both IPL2 and Yahoo! Answers. The first impression is that the IPL2 questions and their similar Yahoo! Answers share similar distributions on many question types. For example, List questions and Definition questions are among the smallest in percentage. However we also notice that the most common question in IPL2 is Exploratory questions which has 25.5%, and Factual questions and Informational questions are at the second and third. But the most common Yahoo! Answers questions belong to Informational questions (37.6%). Navigational questions are the second, and Exploratory questions are the third. This shows that IPL2 questions are in general more complex and difficult to answer, whereas Yahoo! Answers questions are most often aim for some ready answered information.

Subject Areas of the Questions	
IPL2	Science; History; Literature; Other; Library; Business; General Reference; Humanities; Education; Biography; Geography; Government; Heath; Entertainment/Sport; Sociology; Computers; Internet; Music; Religion; Politics; Hobby; Household/Do-It-Yourself; Psychology; Military
Yahoo! Answers	Arts & Humanities; Beauty & Style; Business & Finance; Cars & Transportation; Computers & Internet; Consumer Electronics; Dining Out; Education & Reference; Entertainment & Music; Environment; Family & Relationships; Food & Drink; Games & Recreation; Health; Home & Garden; Local Businesses; News & Events; Pets; Politics & Government; Pregnancy & Parenting; Science & Mathematics; Social Science; Society & Culture; Sports; Travel; Yahoo! Products

Table 2: Question Subject Categories and Numbers in IPL2 and Yahoo! Answers

Both IPL2 and Yahoo! Answers provide classifications to the subject areas of the questions (see Table 2). Based on the 157 pairs of similar questions, we compared the classifications of the similar questions in the two systems. Using Yahoo! Answers subject categories as the base, Table 3 shows the number of pairs that have consistent subject label only at the top first level of subject category in Yahoo! Answers, only at the second level category, at both levels and no corresponding label at either level. The results show that majority of the questions have different category labels (106 out of 157), but there are still some questions that are being classified similarly at both levels (13 out of 157) or at least at the top level (23 out of 157). Therefore, it would take consider amount of mapping effort to connect IPL2's subject categories with that of Yahoo! Answers, but some subject categories can be used for starting points in the integration.

Question Type	Consistent with the 1st Level Category in Yahoo! Answers	Consistent with the 2nd Level category in Yahoo! Answers	Consistent with Both Levels in Yahoo! Answers	Not Consistent with Any Level Category in Yahoo! Answers
Exploratory questions	6	4	4	28
Factual questions	12	1	0	13
Informational questions	0	1	3	26
Navigational questions	2	5	1	19
List questions	1	3	3	18
Definition questions	2	1	2	2
Total	23	15	13	106

Table 3: The Classification Comparison between IPL2 Questions and Yahoo! Answers Questions

Morris et al. (2010) showed that 52% of their respondents used their social networks with the intention to ask for recommendations or other types of opinionated questions, whereas in general these kinds of opinionated questions are not common in library references. We examined the intention behind the 200 IPL2 questions, and only identified three questions (1.5%) as opinionated questions. In contrast, we found that 54 of the 157 Yahoo! Answers questions (34.4%) were either seeking personal recommendations or subjective opinions. This result confirms Morris et al.'s findings. It seems that people often view digital references and online social Q&A systems as two different services. Our further examination of these questions revealed that most of the opinionated questions in Yahoo! Answers are exploratory questions with open-end answers. More study is needed on how to support users' such information needs.

2.2   Comparison of Answers

Depends on whether the returned information contains direct answers or related references/links to look for answers, we divided the answers of the questions from IPL2 and Yahoo! Answers into five types: *direct answers, related references/links, both, no answers*, and *others*. Table 4 shows that majority IPL2 questions always contain related references/links as part of the answers, which helps to establish the authenticity and authority of the answers. This is due to the professional training of the reference librarians in IPL2. In contrast, answers from Yahoo! Answers most often just contain direct answers without any references and links. This is useful for the users who just want to have ready answers, but it is difficult for the users to

establish the correctness and authority of the answers. This is true for both the selected best answers and non-best answers in Yahoo! Answers. Therefore, users in Yahoo! Answers need better support in determining the answer qualities.

There are 19 IPL2 questions contain answers classified as "others". Top common instances of the "others" include 1) pointing users to the FAQ available in IPL2 and online, 2) failing to find the answer, so describing what searches had been done, and 3) pointing out that third parties (such as original sales staff) should be contacted rather than IPL2. Therefore, we can see that the professional training of IPL2 librarians help the users even when the questions cannot be answered well. There are cases in Yahoo! Answers that even the voted best answers are still wrong or offending.

	Direct Answers	Related References/Links	Both	No Answers	Others	Total
IPL2	8	98	73	2	19	200
Best answers of Yahoo! Answers	114	23	14	3	3	157
Non-best answers of Yahoo! Answers	84	9	17	0	1	111

Table 4: Answer Types of Questions in IPL2 and Yahoo! Answers

It takes time to answer a question, and the time delay for a question being answered could affect people's impression of Q&A services. IPL2 usually give back askers' one answer, which establish the first answer time. But sometimes, the askers and the librarians may conduct follow-up interactions until the last answer was given back. We view this last reply with an answer as the best answer time in IPL2. If there is only one reply from IPL2 to the user, the first answer time is also the best answer time. Yahoo! Answers usually provide multiple answers, one of which has the earliest answering time (thus the first answer time) and one of which is voted as the best answer (thus the best answer time). In both IPL2 and Yahoo! Answers, the time difference between the first answer time/the best answer time and the time that the questions was asked is the time delay for the first answer or the best answer.

Table 5 shows that the time difference between IPL2's first answer time delay and that of its best answers is 765 minutes (close to 13 hours), which is relatively small considering the average time delay for the best answer is 35389 minutes and that for the first answer is 35236 minutes (both are roughly 8 days). This means that the follow-up interactions after the initial answers are less common and often short. Therefore, the roughly 8 days delay for obtaining the first answer is the biggest issue in IPL2. In contrast, Yahoo! Answers, with its participatory design, requires only in average about 8 hours for producing the first answer and about 15 hours for the best answer. Therefore, Yahoo! Answers has very obvious advantage over IPL2 on quickly replying to the askers. This is probably a clear angle for the integration of digital reference and community-based Q&A.

	Time Delay for the Best Answer			Time Delay for the First Answer		
	average (minute)	max (minute)	min (minute)	average (minute)	max (minute)	min (minute)
IPL2	11602	35389	52	10837	35236	22

Yahoo! Answers	913	11520	2	495	11520	1

Table 5: Time Delay for Obtaining Answers in IPL2 and Yahoo! Answers

We further correlated time delay with question types. Interestingly, as shown in Table 6, different types of questions did not make great difference in IPL2. There are only noticeable differences at the delay to the first answers in List questions and Navigational questions. If we have to pick up a question type for IPL2 to spend the most time, it is Exploratory questions in both first answer and best answer cases. This probably makes sense since Exploratory questions in general need more time to answer.

In contrast, different question types make dramatic difference in Yahoo! Answers. Definition questions had the quickest answer time on both first answers and best answers, which took less than 2 hours in average. Exploratory questions took long time to answer, but they were not among longest in Yahoo! Answers' (rank number 4 for the best answer and 2 in the first answers), nor in comparable range with IPL2 (9-11 hours vs. 8-9 days on both the first and the best answers). It is interesting to see that Navigational questions took the longest delay in Yahoo! Answers, which are about 12 hours for the first answers and 24 hours for the best answers. We cannot figure out the reason, so further study is needed.

Question Type	Delay to the best answer average time (minute)		Delay to the first answer average time (minute)	
	IPL2	Yahoo! Answers	IPL2	Yahoo! Answers
Definition questions	11221	105	11021	105
Exploratory questions	12665	781	12204	550
Factual questions	11847	411	11728	344
Informational questions	11272	1137	10429	468
List questions	10439	971	9583	394
Navigational questions	10961	1466	8807	759

Table 6: Time Delay on Different Question Types

We know that many questions in IPL2 were answered by library science students, which might not be greatly different to the users in Yahoo! Answers in most demographic parameters. However, it is with careful professional training in their studies, mutual help among peers, and close supervision by experienced librarians that the superiority of their answer quality was noticed in the literature (Wu & He, 2013). We observed 83 such mutual help and close supervision cases among the 200 IPL2 questions. This could be a feature that is useful to be maintained in future IPL2 as well as be implemented in Yahoo! Answers.

3 Conclusion

In this paper, we took IPL2 and Yahoo! Answers as the two samples for our case study of digital references and community-based Q&A sites. We examined the services of the two systems based on 200 real questions raised in IPL2 and their similar questions found in Yahoo! Answers. Our result analysis show that the two systems classify their questions differently, and the types of the questions asked are different too. It took much longer time to obtain answers from IPL2, whereas different types of questions in Yahoo! Answers generated dramatically different response time. However, some differences also demonstrate that there is

need to consider integrating some of the ideas in the two systems. Our further study lies on studying more cases of digital references and community-based Q&A sites, as well as examining in detail the response quality and time-taken to respond from digital reference and community based Q&A sites, the feedback from the questioners, and the usability of the questions by other users. Ultimately, we want to research on how to borrow insights of community-based question answering to improve digital reference and exploit the development of hybrid tools.

4   References

Fichman, P. (2011). A comparative assessment of answer quality on four question answering sites. *Journal of Information Science, 37*(5), 476-486.

Gazan, R. (2007). Seekers, sloths and social reference: Homework questions submitted to a question-answering community. *New Review of Hypermedia and Multimedia, 13*(2), 239-248.

Gazan, R. (2011). Social Q&A. *Journal of the American Society for Information Science and Technology, 62*(12), 2301-2312.

Janes, J. (2002). Digital reference: reference librarians' experiences and attitudes. *Journal of the American Society for Information Science and Technology, 53*(7), 549-566.

Lankes, R. D. (2004). The digital reference research agenda. *Journal of the American Society for Information Science and Technology, 55*(4), 301-311.

Liu, Y., Bian, J., & Agichtein, E. (2008). *Predicting information seeker satisfaction in community question answering.* Paper presented at the Proceedings of the 31st annual international ACM SIGIR conference on Research and development in information retrieval, Singapore, Singapore.

Liu, Y., Li, S., Cao, Y., Lin, C. Y., Han, D., & Yu, Y. (2008). *Understanding and summarizing answers in community-based question answering services.* Paper presented at the COLING '08 Proceedings of the 22nd International Conference on Computational Linguistics, Manchester, UK.

Morris, M. R., Teevan, J., & Panovich, K. (2010). *What do people ask their social networks, and why?: a survey study of status message q&a behavior.* Paper presented at the Proceedings of the 28th international conference on Human factors in computing systems.

Pomerantz, J. (2005). A Linguistic Analysis of Question Taxonomies. *Journal of the American Society for Information Science and Technology, 56*(7), 715-728.

Pomerantz, J., Nicholson, S., Belanger, Y., & Lankes, D. (2004). The current state of digital reference: validation of a general digital reference model through a survey of digital reference services. *Information Processing and Management, 40*(2), 347-363.

Voorhees, E. M. (2002). *Overview of the TREC 2002 question answering track.* Paper presented at the Proceedings of the Eleventh Text REtrieval Conference (TREC 2002).

Wang, J. M. (2007). Comparative Analysis of Ask-Answer Community and Digital Reference Service. *Library Magazine*(6), 16-18, 25.

Wu, D., & He, D. (2013, February 12-15, 2013). *A study on Q&A services between community-based question answering and collaborative digital reference in two languages.* Paper presented at the iConference 2013, Fort Worth, TX.

5   Table of Tables