TOWARDS SUSTAINING AN ONLINE COMMUNITY FOR VISUALLY IMPAIRED INDIVIDUALS

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1. INTRODUCTION

This project is motivated by the difficulties faced in sustaining GoingEasy®, a social networking site developed to promote an active and independent life style for individuals with visual impairment. Upon the launch, the site saw a burst of activity and a slow decline in usage. We examined the causes for this decay in user participation and declining content on the website. In spite of developing an accessible website, our studies point out to the following issues: users overlooking posts when using a screen reader and inability to log in frequently to keep track of a discussion. This is a problem that is common to small-scale social networking sites developed for very specific audience and our work presents a potential solution that helps with increasing user participation.

   In this paper, we propose the use of a customized recommendation system that notifies the registered user that a discussion that he might be interested in is happening on the network. We do not send prompts to the user for every post or comment, but the few selected topics that we assess are his expertise. This way, he doesn't have to log in frequently to check on the content, but visits the site based on our recommendation.

2. METHODOLOGY

2.1. User Interest Identification

The first step towards building this recommendation system is user expertise/interest identification. Figuring out topics of interest, for each user needs to be done based on user history and user preferences when he registers on the website. Latent topic modeling has become very popular way of inferring latent clusters in the last decade, because of the flexibility of defining structures. Keywords are defined as the words used in the posts the users create on the website. And topics are the latent underlying structures that we are trying to infer based on the usage patterns of keywords and the users using them. This model can be extended to infer a topic keyword model and user-topic model using Hierarchical Dirichlet Processes (HDP). This work is inspired by the author-topic model proposed by Steyvers et al who used Latent Dirichlet Allocation to do the same.
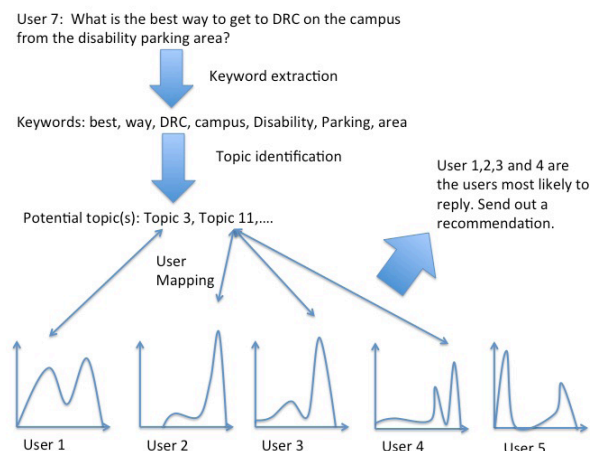

Fig 1. Examples of keywords and topics.

2.2. Using Facebook as an ally

A problem with using HDP was the dataset size. The small scale of the corpus and the relatively few number of users posed a problem with the convergence of the model. To alleviate this problem, we found a few visual impairment related Facebook groups and crawled the content from these groups to grow our dataset.

3. EXPERIMENTS

3.1. Evaluation Metric

We used the number of un-attended posts, overall response rate from replied to each post and number of recommendation notifications that lead to a reply as the metrics to evaluate this proposed system. We considered two time frames for comparison, a peak one-week window before the introduction of the recommendation system (Phase 1) and a one-week window after the introduction of the recommendation system (Phase 2). GoingEasy® has a personal messaging system inbuilt. We used that to notify users to potential interest match. Users were asked to check their inboxes before they visited the discussion board.

3.2. Recommendation system

When a user posts a new post on GoingEasy®, the model extracts keywords from the sentence and predicts topic(s) membership information. It then uses the stored topic-user relationship to predict the users who are most likely to respond to this post and sends them a notification. Since the predicted topics are in the form of a probability score, we associate each post to the top 2 topics. We then look at the members who have either of these two topics as their top interests in their user topic probability scores. We used the number 2 as the cut off threshold based on the number of topic and the users.

3.3. Results

As seen on the forum on GoingEasy, Phase one had 20% unattended posts and an average response rate of 3 replies per post. During the Phase 2 part of experiments, we observe no unattended posts and the average response rate increased to 6 responses per post. The conversion rate from the recommendation system is 76 percent, i.e when a recommendation was made, the users visited that link and contributed 76 percent of the time. We also used this model to re-kindle some of the older posts on the forum based on potential interest match. Users visited not so new posts and continued discussion that was over a year old. This is a testament to what a simple recommendation system to do to help sustain a very small community. Users were asked to give us qualitative feedback at the end of Phase 2. They mentioned that they liked the fact that they don't get a notification for everything written in the form and liked the idea of tailored recommendation.

4. CONCLUSION

The visual speech segmentation and recognition methods proposed in this paper achieve state-of-the-art performance in both subject dependent and subject independent experiments, which would ultimately provide an aid to assist the blind & visually impaired and deaf & hard of hearing to effectively communicate with others.