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ABSTRACT

Online Health Communities (OHC) aim to support patients through offer them the opportunities to exchange support with others. However, patients have difficulties and problems locating expertise within the online health communities. In this regard, this study aims to create a patient recommender system to help users locate those with relevant experience and similar health status. Specifically, we aim to leverage the type of online social support users seek to determine the patient health status to build a patient status prediction model. Building the model will help create a peer recommendation system for online support group members to easily locate peers and build a sustainable online health community. Building this type of recommendation system will help patients to effectively interact with other patients who have same health status. Moreover, it will help online health communities in improving the services provided, which in turn will be reflected positively on patient's health status.

Keywords

Online health communities, online social support, recommendation system, support groups.

INTRODUCTION

An online health community (OHC) is defined as an asynchronous online message board system that contains multiple message boards, each of which typically focuses on a single disease, and used by a collection of users who share concerns about common healthcare problems and needs (Fan et al. 2010; Kim and Mrotek 2016). Such communities aim to support patients and health care providers and enable information exchange, and offer support and improve communication in a virtual venue (Demiris 2006). In addition, it provides patients with chronic diseases the opportunities to learn more about their current condition and seek various kinds of online social support. In fact, individuals tend to look up online health related information and connect with patients with similar conditions, share their health status and seek support from their online peers (Wang et al. 2016).

The literature indicates that members of online health communities can achieve better health results by seeking different kinds of support (Abrahamson and Rubin 2012). According to Cutrona and Suhr (1992), Social Support Behavior Code (SSBC) framework, online communities provide users with different kinds of support, including informational support which consist of "practical resources such as objective information, suggestions, advice, and appraisals of situations that helped receivers reduce uncertainty and cope with illness", tangible support which mean willingness to give direct physical assistance, emotional support such as "encouragement, empathy, and sympathy aimed at reducing stress or negative affect", network support which involves broadening recipients' social networks, and esteem support "which help recipients restore self-concept or self-validation" (Oh et al. 2013)

This study addresses the role of online health communities of patients with cancer, and aims at automatically predict patients' cancer stage based on the type of support they seek in such online communities. More specifically, we use content analysis to build a prediction model to help predicting cancer stage (Stage 0, Stage I, Stage II, Stage III, or Stage IV) based on the type of social support (informational, tangible, emotional, network and esteem) patients seek. After determining the cancer stage for the patients, we will feed a peer recommendation system with the patient predicted cancer stage and match the online health forums members with each other depending on their cancer stages. According to Li et al. (2014), friend recommendation measures for online health communities consists of 4 components: network similarity, profile similarity, methods for scoring weight gain related behaviors, and behavior network. In this proposal, the patients' matching measure mainly will depend on their cancer stage and the online social support seeking.

LITERATURE REVIEW

Many studies have investigated online communities of practice in general (e.g., López et al. 2015) and many others have studied online communities of practice related to a specific domain (e.g., Sherer et al. 2003). Despite the increasing number of studies about online communities of practice within healthcare (e.g., Adams 2010; Civan et al. 2009; Elkin 2008), there has been little empirical work that demonstrates ways patients use online health communities to locate the necessary patients' expertise (Civan et al. 2009). The literature is rich when it comes to locating patients' expertise within a structured and process driven environment such as organizations (McDonald and Ackerman 1998), however, it is not clear how online users locate expertise within a less formal environment such as online health communities.

In this regard and to help patients locate those resources with relevant experience to their health conditions, most of studies adopted either content analysis or network analysis approach. When it comes to network analysis, the focus was on patients' connections with other patients in the online community (Jha and Elhadad 2010). Based on these connections, researchers predict patients' cancer stages based on other patients' current cancer stages. So, the analysis was mainly focused on the structure of the network.

On the other hand, studies that employed content analysis were mainly focused on the disease itself (e.g., Zhao et al. 2014). In this respect, Jha and Elhadad (2010) conducted content analysis to characterize patients' cancer stage based on the information they provide about their current status like size of the tumor and any other health related issues. However, few studies tried to develop a patient recommender system to help online communities' users to locate others with similar health status and conditions.

RESEARCH METHODOLOGY

This study uses content analysis to analyze the content of a cancer related online health community. More specifically, we will analyze the content of patients' threads and try to code the content with the appropriate type of support they are seeking based on the SSBC framework, as well as the stage of the patients' cancer. Based on the analysis, we will build a prediction model that can help predict cancer stage based on the type of social support that patients seek. Based on such model, we will match those with similar stage and condition and develop a peer recommender systems.

The data analytics methods we plan to use are:

1. Text mining will be used to extract, transform, and load the content from the target online health community.
2. Content analysis will be used to code the extracted information based on the SSBC framework
3. Cluster analysis will be used to classify the members into different clusters based on common characteristics, which will help building our recommendation system
4. Prediction algorithms, such as regression and decision trees will be used to determine the online social support that the members seeking.

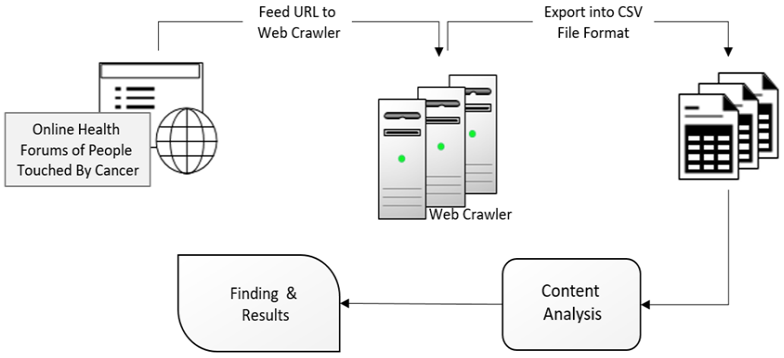

Figure 1. Framework of the Suggested Peer Recommendation System

Figure 1 summarize the steps followed to complete the objectives of this research. using an open source web crawler and extractor software, the content of the target online health community will be downloaded into a temporary repository. Data extracted will be stored in a comma separated file format based on the structure of the online health community. Next, the content of the file will be manually analyzed to select a set of features to be used for analysis purposes. Also, content analysis will help code types of supports based on the SSBC framework and cancer stages. The results from the content analysis will

be used to build a prediction model for cancer stage. Using the results from the prediction model, the recommender system will match patients with similar symptoms and cancer stage and recommend those patients to the one who seeks help in online health communities.

EXPECTED CONTRIBUTIONS

By addressing the proposed research questions and building a reliable peer recommendation system, cancer patients will be able to effectively interact with other patients who have same health status. This in turn would help them conduct healthier lifestyles and obtain the support that they are looking for on online health forums communities. Building this recommendation system can help online health communities to improve the services provided, which in turn will be reflected positively on patient's health status.

REFERENCES

1. Abrahamson, J. A., and Rubin, V. L. (2012) Discourse Structure Differences in Lay and Professional Health Communication, *Journal of Documentation*, 68, 6, pp. 826-851.
2. Adams, S. A. (2010) Blog-Based Applications and Health Information: Two Case Studies That Illustrate Important Questions for Consumer Health Informatics (Chi) Research, *International journal of medical informatics*, 79, 6, pp. e89-e96.
3. Civan, A., McDonald, D. W., Unruh, K. T., and Pratt, W. (2009) Locating Patient Expertise in Everyday Life, *Proceedings of the ACM 2009 international conference on Supporting group work*: ACM, pp. 291-300.
4. Cutrona, C. E., and Suhr, J. A. (1992) Controllability of Stressful Events and Satisfaction with Spouse Support Behaviors, *Communication Research*, 19, 2, pp. 154-174.
5. Demiris, G. (2006) The Diffusion of Virtual Communities in Health Care: Concepts and Challenges, *Patient education and counseling*, 62, 2, pp. 178-188.
6. Elkin, N. (2008) How America Searches: Health and Wellness, *Opinion Research Corporation: iCrossing*, pp. 1-17.
7. Fan, H., Smith, S. P., Lederman, R., and Chang, S. (2010) Why People Trust in Online Health Communities: An Integrated Approach.
8. Jha, M., and Elhadad, N. (2010) Cancer Stage Prediction Based on Patient Online Discourse, *Proceedings of the 2010 Workshop on Biomedical Natural Language Processing*: Association for Computational Linguistics, pp. 64-71.
9. Kim, H.-S., and Mrotek, A. (2016) A Functional and Structural Diagnosis of Online Health Communities Sustainability: A Focus on Resource Richness and Site Design Features, *Computers in Human Behavior*, 63, pp. 362-372.
10. Li, A., Leung, H., and Lui, Y. (2014) Friend Recommendation for Weight Loss App, *Proceedings of the 2014 ACM International Joint Conference on Pervasive and Ubiquitous Computing: Adjunct Publication*: ACM, pp. 1257-1264.
11. López, C., Lin, Y.-R., and Farzan, R. (2015) What Makes Hyper-Local Online Discussion Forums Sustainable?, *System Sciences (HICSS), 2015 48th Hawaii International Conference on*: IEEE, pp. 2445-2454.
12. McDonald, D. W., and Ackerman, M. S. (1998) Just Talk to Me: A Field Study of Expertise Location, *Proceedings of the 1998 ACM conference on Computer supported cooperative work*: ACM, pp. 315-324.
13. Oh, H. J., Lauckner, C., Boehmer, J., Fewins-Bliss, R., and Li, K. (2013) Facebooking for Health: An Examination into the Solicitation and Effects of Health-Related Social Support on Social Networking Sites, *Computers in Human Behavior*, 29, 5, pp. 2072-2080.
14. Sherer, P. D., Shea, T. P., and Kristensen, E. (2003) Online Communities of Practice: A Catalyst for Faculty Development, *Innovative Higher Education*, 27, 3, pp. 183-194.
15. Wang, L.-W., Liu, X., and Li, J. (2016) The Establishment of Friendhsip Ties in the Online Health Forum Based on Exponential Random Graph Model.
16. Zhao, K., Yen, J., Greer, G., Qiu, B., Mitra, P., and Portier, K. (2014) Finding Influential Users of Online Health Communities: A New Metric Based on Sentiment Influence, *Journal of the American Medical Informatics Association*, 21, e2, pp. e212-e218.