Understanding Weight Change Behaviors through Online Social Networks

Xiaoxiao Ma, University of Massachusetts Lowell, USA
Guanling Chen, University of Massachusetts Lowell, USA
Juntao Xiao, Jiangsu HanWin Technology Co. Ltd., China

ABSTRACT

Online Social Networks (OSNs) provide a good way to make connections with people with similar interests and goals. In particular, health-centered OSNs are emerging to provide knowledge and support for those interested in managing their own health. This paper provides an empirical analysis of a health OSN, which allows its users to record their foods and exercises, track their diet progress toward weight-change goals, and socialize and group with each other for community support. Based on about five month data collected from more than 107,000 users, the authors studied their weigh-in behaviors and tracked their weight-change progress. The authors found that the users’ weight changes correlated positively with the number of weigh-ins, the number of their friends, and their friends’ weight-change performance. The authors also show that the users’ weight changes have rippling effects in the OSN due to social influence. The strength of such online influence and its propagation distance appear to be greater than those in a real-world social network.

Keywords: Correlation Analysis, Health Online Social Network (OSN), Online Community, Social Influence, Social Networks

INTRODUCTION

It has become increasingly important to advocate patient-centered health management that promotes preventative care to reduce health risks, to reduce hospital visits, and ultimately to reduce the overall healthcare cost. In particular, overweight and obesity may result in premature death and possibly lead to diabetes, heart diseases, and cancer. Studies show that about 64% of adult Americans were either overweight or obese, and 60% of U.S. adults do not exercise enough and 25% of adults do not exercise at all. It is estimated that the obesity healthcare costs US 147 billion dollars a year, doubled in less than a decade and the cost will rise to 344 billion dollars by 2018 (Hellmich, 2009).

Weight management, however, requires that the participants be aware of diet knowledge, change health behaviors, and be persistent. Building a group of supporting family members, friends, and others with similar weight change

DOI: 10.4018/jcmam.2011070104
goals is also an important factor to keep the participants motivated. For example, Weight-Watchers is a program that works for many people (though not for all), aiming for steady and long-term weight loss by providing ongoing support and advice, education of healthier eating habits, plenty of tools and resources, and group meetings with other dieters to discuss problems.

With the continued advances of Web 2.0, health-centered Online Social Networks (OSNs) are emerging to provide knowledge and support for those interested in managing their own health. These health OSNs aim to empower the users with modern technologies, such as smartphone applications and sophisticated websites, that provide easier access to health knowledge, increase health awareness, motivate better health behaviors, and track weight loss progress. These emerging health communities are often formed around new devices and applications, such as wearable FitBit (http://www.fitbit.com/) activity tracker, Internet connected Withings (http://www.withings.com/) body scale, and smartphone based RunKeeper (http://www.runkeeper.com/) mobile application.

Despite the tremendous success of the general-purpose OSNs, such as Facebook and Twitter, for better connecting the users through sharing statuses, photos, blogs, and so on, it is unclear how well the users are willing to share health related information, which is often considered personal and quite sensitive, and whether these special-purpose health OSNs can actually change the users’ health behaviors to become more healthy.

This paper provides an empirical analysis of a popular health OSN, FatSecret (http://www.fatsecret.com/), which allows its users to record their foods and exercises, to track their diet progress towards weight-change goals, and to socialize and group with each other for community support. Based on about five month data collected from more than 107,000 users, we studied their weigh-in behaviors and tracked their weight-change progress. We found that the users’ weight changes correlated positively with the number of their friends and their friends’ weight-change performance. We also show that the users’ weight changes have rippling effects in the OSN due to the social influence. The strength of such online influence and its propagation distance appear to be greater than those in the real-world social network. To the best of our knowledge, this is the first detailed study of a large-scale modern health OSN.

The rest of this paper is organized as follows. In Section Related Work we discuss related work. Section FatSecret Service introduces the FatSecret service. We describe our data collection process and present the characteristics of the collected data in Section Dataset Collection and Data Characteristics, respectively. In Section Correlated Analysis, we present the correlation results to show what factors may impact the users’ weight changes and quantify the social influence in the observed social network. Finally we discuss how a health OSN may improve its users’ effectiveness of managing their health in Section Discussion, and conclude in Section Conclusion.

RELATED WORK

Christakis and Fowler studied the nature and the extent of the social influence on obesity from family members and friends in a real social network, using data collected from 12,067 people over 32 years (Christakis & Fowler, 2007). They showed that there is strong influence on one another’s weight if two persons are relatives or friends. If one of a person’s friends became obese, the risk of obesity for that person will increase significantly. The difference of our study and theirs lies in that we applied similar methodology for an online health social network, and we found that the social influence on weight changes is much stronger and it travels further distance in this particular OSN than what Christakis and Fowler have shown for a real social network.

There have been few studies of online health support communities. Maloney-Kichmar and Preece studied for two years of a thriving
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