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Assessment of subjective influence and trust with an online social network game

Michael Seufert^{*}, Valentin Burger, Karl Lorey, Alexander Seith, Frank Loh, Phuoc Tran-Gia

Institute of Computer Science, University of Würzburg, Am Hubland, D-97074, Würzburg, Germany

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ABSTRACT

The deduction of influence and trust between two individuals only from objective data in online social networks (OSNs) is a rather vague approach. Subjective assessments via surveys produce better results, but are harder to conduct considering the vast amount of friendships of OSN users. This work presents a framework for personalized surveys on relationships in OSNs, which follows a gamification approach. A Facebook game was developed, which was used to subjectively assess social influence and interpersonal trust based on models from psychology. The results show that it is possible to obtain subjective opinions and (limited) objective data about relationships with an OSN game. Also an implicit assessment of influence and trust with subcategory questions is feasible in this case.

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1. Introduction

Since online social networks provide users with the possibility to manage real life friendships and to communicate online, they are well suited for information exchange in any form. This intensive information exchange comprises influence and trust processes and leads to formation of opinion as well as decision making. In contrast to real life interaction, online social networks (OSNs) make it possible to study this process by providing much of the information the user was exposed to, before making his decision. This data helps researchers to understand what led to an opinion, a decision, or an action in general, as they have most of the relevant information at their hands.

While there has been a lot of work on influence and specifically the effects of influence in online social networks, there has not been enough work to fully understand the reasons for the measured influence. Furthermore, a lot of work applied very specific and narrow definitions of influence, as influence was mainly measured by the ability to encourage others to some activity. Accordingly, these definitions of social influence only cover external effects but ignore internal effects and thus are measuring only a part of social influence.

Also trust has been the subject of many works in different fields. Models of trust relationships are highly required and could be employed by many applications, such as security and e-services. However, not all facets of trust are fully understood, e.g., how trust relationships are built or how trust is gained and maintained. Moreover, a representation of trust values associated with relationships is difficult. Current approaches try to infer trust from objective data with the help of rather simplistic assumptions, but their validity and goodness have not been proven.

These shortcomings strengthen the call for more detailed investigations and modeling of influence and trust. This work presents a framework for subjective assessment tests in an online social network. It allows asking test users for subjective opinions on relationships with their friends. At the same time objective data about the structure of their social network and about their interactions can be obtained. This fosters research on both subjective and objective aspects of interactions in online social networks. During this work, the presented framework was integrated into Facebook and a test for assessing influence and trust was designed. The results provide insights into the subjective rating of the social influence of and interpersonal trust in Facebook friends. Note that the online social network is not considered to be a closed environment. This study acknowledges that social influence and trust may initiate from both sources within the online social network, like exchanged messages or posted pictures, and external sources,

^{*} Corresponding author.

E-mail address: seufert@informatik.uni-wuerzburg.de (M. Seufert).

like direct conversations or joint activities. Thus, in this work, Facebook is used as a means for acquiring study participants and their subjective opinions on real world friends together with objective social network data, which was exposed by the users and is accessible by the test framework. Still, the concepts of social influence and interpersonal trust shall be assessed in a holistic way comprehending all kinds of influence factors.

The goal of this work is to study whether it is possible to assess complex psychological concepts, like social influence and interpersonal trust, with an online social network game. For both trust and influence, additional social qualities (i.e., subcategories) are surveyed that are correlated with a person's trust and influence. Moreover, this work investigates correlations between the objective metrics of users, which can be obtained through the online social network, and the subjective opinions on influence and trust. The results of the conducted study show that interpersonal trust in friends is rated high, while users give low scores to being influenced by their friends. Using subcategories to implicitly assess influence and trust, we observe high correlations for most subcategories. However, the limited objective data, which was available in Facebook mainly due to users' privacy settings, could not be used to predict influence and trust of relationships.

This work is structured as follows. Section 2 outlines related work on psychological tests in online social networks. Section 3 presents the underlying models for social influence and interpersonal trust, on which our study is based. Section 4 describes the app design, gamification elements, and the framework. The results on influence and trust are presented and discussed in Section 5, and Section 6 concludes.

2. Related work

To the best of our knowledge, only few subjective psychological tests have been conducted in OSNs until now. Krotoski, Lyons, Barnett (2009) investigated how to predict attitude and behavior from information about avatars in Second Life. Thereby, he carried out an online survey among users of this social network to obtain information about them and their personal social network. Wilson, Gosling, and Graham (2012) provide an extensive review of Facebook research in the social sciences, classifying the articles according to descriptive analysis of users, motivations for using Facebook, identity presentation, the role of Facebook in social interactions, and privacy and information disclosure. Friggeri, Lambiotte, Kosinski, and Fleury (2012) used a Facebook app to examine a user's personality and how it influenced the nature of the user's social network. They provided users with a personality test to find out about their openness, conscientiousness, extraversion, agreeableness, and neuroticism. Lewis, Gonzalez, and Kaufman (2012) investigated social selection and peer influence based on a Facebook dataset of users' tastes and show that the social impact of a taste may depend on its medium and on the particular content of the preference. Bond et al. (2012) investigated social influence based on political mobilization messages on Facebook and show that the messages directly influenced political self-expression, information seeking and real-world voting behavior of millions of people. The messages not only influence the users who receive them but also the users' friends, and friends of friends. The relationships in social networks are leveraged in Chard, Bubendorfer, Caton, and Rana (2012) to infer a level of trust between users. The approach is demonstrated by using a social storage cloud implementation in Facebook. In Jiang, Wang, and Wu (2014), an algorithm is developed that generates trust graphs in large online social networks based on small network characteristics and by taking advantage of weak ties. Palazon, Sicilia, and Lopez (2015) examine the role of Facebook friends on the intention to

join brand pages by conducting a Facebook experiment. In their case the Facebook experiment is developed to quantify the influence of the tie strength of Facebook friends.

Psychological aspects of relationships, e.g., popularity, influence, or trust, are of special interest and much research was conducted in this field (e.g., Adali et al., 2010; Bakshy, Hofman, Mason, & Watts, 2011; Golbeck & Hendler, 2006; Kwak, Lee, Park, & Moon, 2010). Details on the psychological backgrounds are provided in Section 3. However, almost all of these works try to deduce results from objective information like personal data or interaction traces. There has been little work on a subjective assessment of these psychological properties, mainly due to the size and complexity of such a survey. Xu, Benbasat, and Cavusoglu (2012) conduct a survey on trust and privacy in Facebook, investigating both given and received trust. Ganesh and Sethi (2013) present empirical results from a Facebook reputation system, in which users could rate their friends to help other people on whom to trust. In addition to trust, this work also investigates influence in social networks based on subjective assessments considering six principles of influence. To overcome the lack of subjective surveys towards influence and trust a Facebook application with gamification framework is used in this work to conduct personalized surveys in OSNs. The gamification framework used is presented by Seufert, Lorey, Hirth, and Hoßfeld (2013) and will be described in detail in this work. Similar to Rafelsberger and Scharl (2009), gamification and social networks are combined to encourage users to participate in the subjective psychological assessment tests. In their case the gamification framework is used for sentiment detection. Further details on gamification are provided in Section 4.2.

3. Underlying influence and trust models

This section presents the underlying models of social influence and interpersonal trust on which our study was built. The concepts and models described only provide some insights and are far from being complete. For a more in depth study of the psychological backgrounds, the interested reader is referred to the respective scholarly literature.

3.1. Social influence

Early sociological studies of social influence were done by Kelman (1958), in which he defined three processes of attitude change, namely, compliance, identification, and internalization. Compliance describes the response of individuals to a request. Identification is the adoption of an attitude because of liking or admiration. Internalization describes the adoption of norms or behavior from others. Since then the importance of influence in social networks has been acknowledged on a large scale. Influence has the ability to affect information dissemination and can therefore increase word-of-mouth diffusion, which in turn may even change public opinion. Thus, researchers and marketers have focused on understanding influence and leverage its effects.

It has been shown that influential individuals called "influencers" or "influentials" can maximize the effects of influence as they are able to influence a disproportionately high number of users. With this knowledge Keller and Berry (2003) defined criteria to identify these influencers. They defined five categories that make up an influential individual: Activists, Connectedness, Impact, Active minds, Trendsetters. This definition ignores the model of influence between two individuals and merely focuses on identifying overall influential individuals.

Generally, social influence is described between sources and targets over time. The most common approach in sociology is to narrow this down to the influence of one individual over another

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