

Chapter 17

Computational Trust in SocialWeb: Concepts, Elements, and Implications

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ABSTRACT

Trust as a major part of human interactions plays an important role in addressing information overload and helping users collect reliable information in SocialWeb applications. This paper examines the current situation and future trends of computational trust for these systems. Achieving this, the authors present an overview of existing social trust mechanisms and identify their strengths and weaknesses through discussion and analysis. In this paper, the authors also provide a comprehensive framework of social trust-inducing factors that contribute to the trust formation process and discuss key research issues and challenges to find future research trends in computing trust in the SocialWeb context.

INTRODUCTION

The Web is providing an ever-growing set of applications and environments where users interact with one another. In this regard, the SocialWeb is introduced as an ecosystem of participation, where value is created by the aggregation of many individual user contributions in generating web content (Gruber, 2008). Web-based social net-

works, online social media sites, and large-scale information sharing communities are prominent examples of social web applications which rely heavily on the opinions, contributions or actions of communities of online users. In these applications, users are both producers and consumers of information (Lytras, 2009). To be assured of the reliability of these user generated contents, users need to know if the source of this information is

DOI: 10.4018/978-1-4666-1553-3.ch017

trustworthy or not. In other words, the trustworthiness of the user providing the information is as important as the reliability of information they provide. In this case, trust is often not an issue of security or reliability, but a matter of opinion and perspective (O'Donovan, 2009; Golbeck, 2009). So the more trust users have earned, the more weight will be given to their opinions. With so much user-interaction and user-generated content, the needs for establishing trust mechanisms online become apparent. If trust can be estimated accurately, the user can then use this trust estimation to make decisions on the information. But, trust in social web is a complex concept influenced by many factors which online systems cannot yet model it completely. It may be affected by history of interactions, similarity in preferences, similarity in background and demographics, information from third parties about the reputation of one another, and each individual's separate life experiences which may impact users' propensity to trust.

In recent years, there has been a lot of research attention towards issues of trust and reputation on the SocialWeb. Many computational models proposed to assess and predict users' trustworthiness in their online social communication. These models come in many flavors and can be classified in several ways. They consider different aspects in computing trust values. Some of them focus on user's reputation and behavior in the system while some others just rely on qualitative assessments based on connections and relationships found in social networks and online communities. They are also different in the sources of information which use as a basis for trust calculation. Most of the work on trust computation just rely on explicit trust information indicated by users and do not pay attention to implicit information such as rating, similarity features and profile information which can be exploited to infer trust value indirectly (Kim et al., 2008).

The objective of this paper is finding out the current situation and future trends of social trust

in computational sense. It also aims at looking for common necessary compositional elements that can be exploited to infer trust value between pairs of users in SocialWeb and summarizing their common weaknesses through comparison, discussion and analysis. The rest of the paper is organized as follows. First, a general overview of trust is provided to illustrate the nature and concept of trust. Based on this overview, characteristics of social trust, various information sources used by trust models and different architecture of these models are elaborated. Following this, we try to identify factors that are pertinent to formation of trust in SocialWeb applications through reviewing relevant studies. Based on existing literature, a framework of trust-inducing factors is proposed to enhance social trust computation. We go through some of the most popular models and algorithms that are proposed for social trust computation and summarizing their weaknesses through comparison. Major challenges to computing with social trust are also discussed. And finally, the paper concludes with limitations and suggestions for further research on social trust to help the community to promote the research of computational trust on the SocialWeb.

THE NATURE AND CONCEPT OF SOCIAL TRUST

Social ecosystems are growing across the web and consistently trust is becoming an important factor for many systems that seek to use social factors to improve functionality and performance. In a virtual environment where participants are usually anonymous and do not engage in direct face-to-face communication, trust can be a significant issue. In this regard, trust is a prerequisite of social behavior, especially on the subject of important decisions. Social trust has been defined in several different ways depending on the research area and the context of the computation. Fukuyama (1995) describes social trust as "the expectations that arise

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