Chapter 12
A Survey of Trust Use and Modeling in Real Online Systems

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ABSTRACT

This chapter discusses the concept of trust and how trust is used and modeled in online systems currently available on the Web or on the Internet. It starts by describing the concept of information overload and introducing trust as a possible and powerful way to deal with it. It then provides a classification of the systems that currently use trust and, for each category, presents the most representative examples. In these systems, trust is considered as the judgment expressed by one user about another user, often directly and explicitly, sometimes indirectly through an evaluation of the artifacts produced by that user or his/her activity on the system. We hence use the term "trust" to indicate different types of social relationships between two users, such as friendship, appreciation, and interest. These trust relationships are used by the systems in order to infer some measure of importance about the different users and influence their visibility on the system. We conclude with an overview of the open and interesting challenges for online systems that use and model trust information.

INTRODUCTION

The Internet and the Web are pretty new creations in human history, but they have already produced a lot of changes in the lives of people who use them. One of the most visible effects of these two artifacts is that nowadays everyone with an Internet connection has the possibility to easily create content, put it online, and make it available to everyone else, possibly forever. If we are to compare this with the situation of some dozens of years ago, the difference is striking. In fact, until recently, only a tiny fraction of the world population had the possibility to "publish" content and distribute it to the public: for instance, few were the authors of books and few the musicians able to publish their music. Conversely, now everyone with an Internet connection can easily publish his/

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her thoughts on the Web: opening and keeping a blog, for instance, is both very easy and cheap today (actually it is offered for free by many Web sites, for example, blogger.com). Likewise, any band can record its songs in a garage, convert them to MP3 format, and create a Web site for the band to place their song files for the global audience. Moreover, in the future, we can only expect to have these capabilities extended, both on the axis of types of content that can easily be created and shared, and in terms of the range of people that are currently excluded for different reasons, such as location (many countries in the world still have to get the benefit of reliable and cheap Internet connections), age, education level, income.

This phenomenon has been described as the "The Mass Amateurisation of Everything" (Coates, 2003), and we believe this term describes effectively the new situation. However, the easy publishing situation creates a problem, namely "information overload," a term coined in 1970 by Alvin Toffler in his book *Future Shock*. Information overload refers to the state of having too much information to make a decision or keep up to date about a topic. In fact, while it is good to have as many points of view as possible on any topic, it is impossible for a single human being to check them all. So we are faced with the challenge of filtering out the vast majority of the flow of daily created information and experience just the small portion that our limited daily attention and time can manage.

At the present time, it is unreasonable (and luckily almost impossible) to have a centralized quality control authority that decides what is good content, and thus worth our attention, and what instead must be ignored. But of course not all the content has the same degree of worthiness and interestingness for a specific person. What can be done is to infer the quality and value of the content from the "quality" of the content creator. However there is a problem: it is impossible for anyone to have a first-hand opinion about every other single creator of content. Until a few years ago, before the widespread availability of Internet, it was normal for most of the people to interact just with the people who were living physically close by. Geography was used to shape communities, and a person was able to decide about the neighbors trustworthiness in a lifelong ongoing process based on direct evidence and judgments and opinions shared by trusted people, for example by parents. Physical clues like the dress or the perceived sincerity of the eyes were also used to make decisions about trusting someone or not. Moreover, local authorities had some real power to enforce law in case of unacceptable and illegal behavior.

Instead, nowadays, as an example, it is a realistic possibility for a man in Italy to buy a used guitar from a woman in Taiwan and they will never see each other in the eyes, or even talk. Also, the fact they live in different countries with different law systems makes it very difficult to enter into a legal litigation unless for really huge problems. Thanks to the Internet, we live in the so-called "global village," and in this new and totally different context we need new tools. To date, the most promising solution to this new situation is to a have a decentralized collaborative assessment of the quality of the other unknown people, that is, to share the burden to evaluate them. It is in fact the case that most of the community Web sites nowadays let a user express her opinions about every other user, asking how much she finds her interesting and worth her attention. We call these expressed opinions trust statements. For example, on Epinions (http://epinions.com), a site where users can review products, users can also specify which other users they trust, that is, "reviewers whose reviews and ratings they have consistently found to be valuable" (Epinions.com web of trust FAQ, n.d.) and which ones they do not. Similar patterns can be found in online news communities (for example, on slashdot.org, on which millions of users post news and comments daily), in peer-to-peer networks (where peers can enter corrupted items), in e-marketplace sites