Chapter 14
A Perspective on the Credibility Engineering of Web Applications

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ABSTRACT
The social aspects pertaining to a service provided by an organization are at least as significant as the technical aspects. The issue of credibility is a growing concern for the consumers of (persuasive) Web Applications in a variety of domains. Therefore, understanding the notion of credibility and addressing it systematically is crucial for an organization’s reputation. In this chapter, based on a given taxonomy of credibility, an approach to address one class of credibility, namely the Active Credibility, of Web Applications is considered. To that regard, a viewpoint-oriented framework for the active credibility engineering of Web Applications is proposed, and the managerial, societal, and technical viewpoints of it are analyzed in some detail. A few directions for extending the framework are outlined.

INTRODUCTION
The Web continues to evolve since its inception more than a decade and half ago, and the Semantic Web (Hendler, Lassila, & Berners-Lee, 2001) and the Social Web (O’Reilly, 2005) are two of its recent directions being commonly pursued. The Semantic Web provides the technological infrastructure for better knowledge representation, interpretation, and reasoning; the Social Web opens new vistas for interaction, participation, and collaboration. In spite of the significant prospects offered by these advancements and their confluence (Lassila & Hendler, 2007), there are certain caveats.

The trends in the implementation of certain structural, behavioral, and creational properties in Web Applications present new challenges related to the quality of those Web Applications from a user’s viewpoint. There are a number of examples that highlight the problem. The presence of personalized advertisements (such as ‘Ads by Google’) can, at times, have only peripheral relevance rather than clear benefits to a user; on the other hand, non-personalized interstitial advertisements (such
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as ‘Skip This Ad’) are usually distracting and uninvited. There is no a priori guarantee that the rating and suggestion of a product or a service by a recommender system is impartial and accurately reflects the interests of a user. For example, an implementation of a recommender system built-in some search engines could, by misuse of meta-information or otherwise, skew the results not necessarily in favor of a user. There is no a priori guarantee that the implementation of a recommender system rates and suggests a product or a service is impartial and accurately reflects the interests of a user. The potential for the distribution of inaccurate medical information from unqualified sources and the presence of implicit advertising of drugs has had an acute impact on the consumer perception of health-related Web Applications (Walther, Wang, & Loh, 2004). It has been observed in recent surveys (Consumer Reports WebWatch, 2005) that uninvited solicitation and misuse of information provided by consumers with little repercussions for the perpetrators is a matter of grave concern.

The situation described above is only exacerbated in the context of a Social Web Application whereby some ‘transfer of control,’ a consumer becomes a co-producer or ‘prosumer.’ For example, Wikipedia is one of the projects under the auspices of the Wikimedia Foundation, is based on a Wiki, and is created by contributions of many in an open collaborative global effort. The challenges to the quality of such projects have been of interest in recent studies (Cusinato et al., 2009).

The trustworthiness of information remains one of the critical constants in the evolution of the Web. Indeed, credibility is a necessary condition for trustworthiness of a Web Application in general and information provided by it in particular. It also needs to be approached in a systematic and feasible manner to be achievable. The rest of the chapter is centered on this theme, and is organized as follows. First, the background necessary for later discussion and a brief outline of related work is provided. Next, a viewpoint-oriented framework for the active credibility engineering within the context of Web Applications is introduced. Then, challenges and directions for future research are outlined. Finally, concluding remarks are given.

BACKGROUND AND RELATED WORK

In this section, necessary background on credibility is given and relevant previous work as it pertains for further discussion is reported.

For the sake of this chapter, a Web Application is defined as a Web Site that behaves like an interactive software system specific to a domain. It typically has a large-size that requires a non-trivial infrastructure: a systematic development process, a team with high-level of knowledge and skills, deployment of additional software on the client- and/or server-side, and a schedule comprising of several weeks or months from inception to completion. In this chapter, the terms consumer and user are interchangeable unless otherwise stated.

Definition of Credibility and Related Concepts

For the sake of this chapter, credibility is considered to be synonymous to (and therefore interchangeable with) believability (Fogg & Tseng, 1999). Even though applicable to more general contexts, for the sake of this chapter, credibility engineering in the context of the Web is defined as the discipline of ensuring that a Web Application will be perceived as credible by its stakeholders and doing so throughout the life cycle of the Web Application.

The approach towards credibility engineering of Web Applications in this chapter rests on the following spectrum of theoretical and practical considerations: understanding credibility, assessing the impact of credibility on stakeholders, proposing means for addressing credibility, incor-