

Assessing Credibility of Weblogs

Victoria L. Rubin and Elizabeth D. Liddy*

School of Information Studies

*Center for Natural Language Processing

Syracuse University

Syracuse, NY 13244-1190, USA

{vlrubin, liddy}@syr.edu

Abstract

Credibility is a perceived quality and is evaluated with at least two major components: trustworthiness and expertise. Weblogs (or blogs) are a potentially fruitful genre for exploration of credibility assessment due to public disclosure of information that might reveal trustworthiness and expertise by webbloggers (or bloggers) and availability of audience evaluations. The objectives of the planned exploratory study are to compile a list of factors that users take into account in credibility assessment of blog sites, order them in terms of users' perceived importance, and determine which factors can be recognized and evaluated with Natural Language Processing (NLP) techniques. With partial automation in mind, we propose an analytical framework for blog credibility assessment based on four profile factors: 1) the blogger's expertise and the amount of offline identity disclosure, 2) the blogger's trustworthiness (or the overtly stated value system including beliefs, goals, and values), 3) information quality, and 4) appeals of a personal nature. We describe a multi-stage study that combines a qualitative study of credibility judgments of blog-readers with NLP-based analysis of blogs. The study will elicit and test credibility assessment factors (Phase I), perform NLP-based blog profiling (Phase II), and content-analyze blog-readers' comments for partial profile matching (Phase III).

Introduction

In order to implement an automation of weblog credibility assessment, we need to know how users assess credibility of blogs. To learn this, we need to first clarify several key concepts. For instance, what is credibility, and how is it generally assessed? How does blog credibility assessment compare to credibility assessment of other types of websites? Can findings from credibility assessment studies of other types of websites be used as a starting point for blog credibility assessments? And which specific credibility assessment factors can be accessible for automation with NLP algorithms?

Credibility

Credible information is believable information (Stanford et al., 2002). Credibility is viewed as a perceived quality that is evaluated simultaneously with at least two major components: trustworthiness and expertise. The trustworthiness component refers to goodness or morality of the source and can be described with terms such as well-intentioned, truthful, or unbiased. The expertise component refers to perceived knowledge of the source and can be described with terms such as knowledgeable, reputable, and competent (Tseng and Fogg, 1999).

People assess the reliability of information in terms of the information source, mode of knowing, and match against prior expectations (Chafe, 1986). The information source in the blogging context is two-fold: the blogger's self-reported image (or profile) and the information posted in the entries (e.g., news digests, opinions, or reactions to other postings). While judgments of credibility are inevitably complex, readers generally evaluate whether the source is honest and competent and whether the provided information is complete, accurate, unbiased and appropriate (Van House, 2004).

Each of the credibility assessment components is a challenge to computational approaches in NLP given the subtleties of how it might be expressed. However, we hypothesize that some information about the information source can be directly accessible with NLP tools due to a blog's high level of self-disclosure and the availability of blog-readers' comments.

NLP-based Automation

Wassmer and Eastman (2005) used credentials, advertising, and design analysis for their experimental system that automatically assessed website credibility. The system produced a credibility measure on a 0 to 10 scale, and was tested on nine medical domain websites with the results comparable to those produced by human searchers and analysts. The study observed that while an absolute

factor of credibility – the accuracy of information – requires exhaustive fact-checking and is currently computationally unsuitable, a combination of several indicative heuristics can produce a satisfactory system. Wassmer and Eastman’s study also calls for NLP sophistication in the process of credibility assessment automation (2005).

Analysis and identification of natural language patterns for subtle but discernable text properties (such as likes and dislikes, attitude, affect, subjective opinions, attribution, and the writer’s certainty) have been a part of a recent trend of text analysis and text understanding in NLP, Information Retrieval, and Machine Learning (Shanahan, Qu, and Wiebe, 2005). NLP-based user profiling has also been previously applied to making generalizations about users’ interests (Bloedorn and Mani, 1998) and modeling users’ malicious e-mailing behaviors (Stolfo et al., 2003).

For the purposes of credibility assessment, it seems feasible to automatically extract and systematize natural language statements pertaining to a blogger’s overtly stated beliefs, goals, biases, opinions, preferences, ownership and purchasing habits. For instance, consider the following excerpts that testify to the availability of such natural language statements for simple NLP extraction rules:

(1) I don't care much for political correctness; I do care for accuracy and honesty (what people actually do rather than what they believe or say). (www.kk.org)

(2) I love music boxes. I can be a bit of a perfectionist. One of my philosophies in life is "life-long learning". I don't like social masks. (www.amorelicious.com)

(3) I had never got the hang of academic writing. The personal voice on blogs appealed to me so much more. (www.rebeccablood.net from nycblogger webring)

NLP rules can capture regularities and variations of expressions pertaining to the first person, the blogger, for example, “do/don’t love/like/care (much) for”, “appealed to me (so much more)”, and “(one of) my philosophy/(-ies) in life is”. Therefore, it is possible to compile the actual values for the blogger’s preferences, goals, etc. into an information structure that captures weighted credibility assessment factors, similar to user interest profiles (Bloedorn and Mani, 1998). Also, a heuristic method for matching bloggers’ and blog-readers’ profiles can be developed in an attempt to predict how credible a particular blog-reader may find a particular blog.

Blogs

This study explores the construct of credibility as a type of trusting relationship that is created between an individual blogger and a blog-reader. We identify bloggers and blog-readers as two groups actively involved in the processes of information exchange, credibility building, and assessments. The information exchange is based on shared topics of interest and match between information needs and information availability. However, in such an information exchange people tend to doubt information from others who have conflicting goals and values (Van House, 2004). Bloggers build their audience credibility by publicly disclosing their personal and professional lives, and by offering their perspective on life and current events. It is also conventional to reveal aspects of one’s offline identity as a sign of trust and in order to attract readers (Rak, 2005).

In studying credibility, an interesting and differentiating feature of weblogs is that they are meant to be inherently biased as an alternative media. Blog-readers admittedly often distrust traditional media and see blogs as a viable alternative, particularly since they believe bloggers do not hide their biases (Johnson and Kaye, 2004).

Another blog feature - “blogrolling”, or hyperlinking to bloggers’ favorite sites, can be used as a credibility assessment component. In this vote-casting system, hyperlinks act as votes, citations, or references to relevant pages on the Web. It serves as a “web of trust” to mimic the way people share by word-of-mouth. The principle is commonly employed for relevance ranking, for instance, in Google’s PageRank search algorithm (Bowman and Willis, 2003).

In this study we will explore how these distinctive features of blogs can be used beneficially for NLP and Machine Learning analysis to allow for automation of blog credibility assessment. Thus, the objectives of this study are: 1) to compile a list of factors that users take into account in credibility assessment of weblog sites; 2) to order these factors in terms of their perceived importance to users, and; 3) to suggest which factors can be accessed and computed with NLP-techniques.

Methods

We developed a four factor preliminary analytical framework for blog-readers’ credibility assessment of blog sites (Table 1). The hypothesized framework was based on elements from evidentiality theory (Chafe, 1986); large-scale health and financial website credibility assessment surveys (Stanford et al., 2002); Van House’s apparently unpublished observations on weblog credibility (2004); and the authors’ previous experiences with blogging

(Rubin, Stanton, and Liddy, 2004) with one active webbing: www.nycbloggers.com (with self-reported 6157 blogs as of 31 January 2006); and three additional personal topic-oriented blog sites: www.amorelicious.com, www.kk.org, and www.absoblogginlutely.net.

- 1) Blogger's Expertise and Offline Identity Disclosure
 - a) Name and geographic location
 - b) Credentials
 - c) Affiliations (personal and institutional)
 - d) Blogrolls (i.e., hyperlinks to other sites)
 - e) Stated competencies
 - f) Mode of knowing
- 2) Blogger's Trustworthiness and Value System
 - a) Biases
 - b) Beliefs
 - c) Opinions
 - d) Honesty
 - e) Preferences
 - f) Habits
 - g) Slogans
- 3) Information Quality
 - a) Completeness
 - b) Accuracy
 - c) Appropriateness
 - d) Timeliness
 - e) Organization (by categories or chronology)
 - f) Match to prior expectations
 - g) Match to information need
- 4) Appeals and Triggers of a Personal Nature
 - a) Aesthetic appeal (i.e., design layout, typography, and color schemes)
 - b) Literary appeal (i.e., writing style and wittiness)
 - c) Curiosity trigger
 - d) Memory trigger (i.e., shared experiences)
 - e) Personal connection (e.g., the source is an acquaintance or a competitor of the blog-reader)

Table 1. Blog Credibility Assessment Factors

In Phase I, we will test the applicability of these factors in the blog context and modify the analytical framework accordingly. We will use two possible sources for accessing blog-readers evaluations and value systems that may contribute to credibility assessment: their comments to blog postings or their prompted judgments about the specifics of what makes a particular blog site credible.

The study will invite 5-10 subjects who are frequent blog-readers to participate. We will ask study participants to search for and submit 3 – 5 credible blog sites for a specific information need of their choice, e.g. a viewpoint on a current issue. We aim to collect approximately 30 blog sites as the sample data.

Once the blog sites have been selected, we will ask the participants to review their nominated sites, and to reflect and comment freely on how their credibility judgments were made using the traditional think-aloud protocol (Van Someren, Barnard, and Sandberg, 1994). This may generate additional factors to be incorporated in the analytical framework. In a follow-up session, we will ask participants to rank-order all factors by level of importance and relevance using the Q-Sort technique (McKeown and Thomas, 1988).

In Phase II, we will perform NLP analysis of the self-disclosed information in the sample data of the 15-30 blog sites collected earlier in order to create blogger profiles based on the most highly ranked blogger-related factors. Each factor in the profile will then be assessed in terms of NLP's ability for recognition with rule-based algorithms, as well as its potential as a candidate for Machine Learning.

In Phase III, we will content-analyze comments made to the blogging sites with the most complete profiles to determine a match between the profiles of a particular blogger and blog-readers who find the blog credible.

Conclusions

This work in progress proposes to combine a rule-based NLP exploration of blog texts with a multi-stage qualitative exploration of blog credibility assessment factors. The contribution is in combining a linguistic / NLP-based analysis of actual texts on blogging sites with a qualitative analysis of blog-readers' judgments of credibility, and ultimately in the potential for producing an empirically verifiable analytical framework. Once the factors that contribute to blog credibility are completed and tested, we can focus specific computational efforts on scanning large amounts of information for blogger-profiling and automating credibility assessment.

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