Soft Deference: How the Web Is Changing the Way We Trust

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EXTENDED ABSTRACT

Deference in the *World Wide Web*

In this paper I argue that, because of its very nature, the *Web* is making *deferential practices* pervasive in knowledge acquisition processes, and is accordingly reshaping the way in which we judge the *epistemic authority* of a source. As information consumers, we *defer* to external sources of knowledge in situations in which either (i) we lack the necessary competence to ground judgments and decisions (in which case deference is a *necessary* condition) or (ii) in cases in which deference provides a *sufficient* solution satisfying the requirements of a given judgment or decision problem. The massive availability of information in the *World Wide Web* is making deferential practices of both kinds a constitutive part of our knowledge acquisition capabilities.

Given that acquaintance with information sources is increasingly mediated by technology, the problem of understanding how we determine whether a source of information is trustworthy becomes crucial. In this paper, I defend the view that, being populated with explicit indicators of epistemic reliability or representations of collective endorsement of sources, the ecology of the *Web* is contributing to a radical externalization of the processes involved in trust assessment.

This externalization in turn raises new challenges to the understanding of conditions under which knowledge acquired by deference from unfamiliar sources can be considered trustworthy. The aim of this paper is to shed light on phenomena that social epistemology and cognitive science will be urged to look at in the near future.

Foraging in rich electronic environments

Whenever humans engage in information search activities in the *Web*, as soon as background knowledge or past experience is insufficient to decide whether to defer or not to a source of information, the crucial question is how to identify *trustworthy deferees*. These are common situations in which *experienced credibility* [4]—the most common ground for deferential behavior—cannot be relied upon, and hence the trustworthiness of external sources is *a priori* unknown and needs to be estimated.

It has been suggested [12, 13] that in information search tasks, humans tend to estimate the cognitive profitability of unfamiliar sources by relying on *predictive judgments* based on available proximal information about the source (the so called "informations scent"), rather than by relying on extensive *evaluative judgments* of the source itself.

This paper aims at elucidating some of the consequences of this phenomenon. Web technology is inducing source evaluation strategies that are *predictive* rather than *evaluative*. Given the increasing number of potential cheaters (sources that should not be trusted insofar as they are not epistemically reliable), the typical time constraints on information search tasks and the massive availability of tools that produce rich proximal information about sources [8, 9], predictive judgments arguably represent the only viable solution to the problem of identifying good deferees.

The question is then to understand whether the *World Wide Web* affords sufficiently reliable proximal information to determine *whom to trust* (i.e. what sources to use as deferees without running the risk of being deceived) on the basis of predictive judgments. I review in the first part ot this paper a number of technology-mediated reputational indicators that are likely to be used as proxies for judgments of epistemic reliability. I suggest that a study of such indicators emerging from collective user behavior [5] and their use to account for human predictive strategies of information reliability in the *Web* is a central issue that cognitive science as well as information technology research still have to investigate.

Why externalization favors shallow judgments

It has been argued that the distinctive mark of human cognition, as opposed to cognition in other species, consists in its unique ability of shaping the physical and social environment so as to externalize the solution of demanding cognitive problems.[2, 14] Development of knowledge-oriented technologies to decrease the cognitive effort required by information search is a prominent demonstration of this ability: the ecology of the *Web* [6] is the result of technological transformations that enhance and constrain the way in which we acquire information. The second part of this paper is devoted to an analysis of the consequences of the externalization of reliability assessment made possible by such technologies. The fact that we increasingly delegate the check of source reliability to technology-mediated judgments has two major consequences:

1. First, judgments tend to become targeted at evaluating the appropriate technology that allows effective source selection rather than at evaluating the

sources themselves.

2. Second, delegating cognitive workload to source selection technologies tends to make judgments of trustworthiness *shallow*, more easily biasable and less likely to lead to long-term belief fixation.

The first consideration implies that technologies that work as source selectors (search engines, news aggregators, feed aggregators) are progressively assuming the authority of *computational experts*. By relying on content filtered, ranked, or selected by these technologies, i.e. by delegating to these devices the burden of checking the authority of the available information sources [1, 7], we integrate these devices as part of ou extended cognitive system [3]. Such a delegation implies that strategies to identify reliable sources of information tend to be replaced by second-order strategies to identify *predictors* of reliable sources filtered by source selection technologies or to improve the relevance/accuracy of these technology.

The second major consequence of this externalization is that it naturally tends to privilege *shallow* judgments and decision strategies over more costly and effortful estimations, so that one may be tempted to consider these processes as *modular* (i.e. domain specific, encapsulated, substantially bottom-up and relatively prone to errors), albeit not innate. The main benefit of delegating cognitive workload to external devices (i.e., the fact of limiting the amount of computational effort needed to negotiate particularly demanding problems), is possibly the main source of cognitive costs and biases (i.e. the fact of taking for granted technology-mediated solutions that lead to systematic error or inaccurate decisions). It has been argued [10, 11] that shallow decision strategies like those mediated by source selection technology are only possible under low-involvment conditions and hardly lead to beliefs that resist subsequent revision. I conclude by discussing the scope of such shallow, technology-mediated decision strategies, that underpin what I call *soft deference*, i.e. temporary deferential attitudes towards external sources that can be revised on demand and do not lead to permanent changes in one's belief system.

Keywords

authority; epistemic deference; trust; persuasion; information search; search engines; hci; information foraging.

References

[1] S. Brin and L. Page. The anatomy of a search engine. In *Proceedings of the Seventh International World Wide Web Conference*, pages 107--117. Amsterdam: Elsevier, 1998.

[2] A. Clark. *Natural born cyborgs: Minds, technologies and the future of human intelligence*. Oxford: Oxford University Press, 2003.

[3] A. Clark and D. Chalmers. The extended mind. *Analysis*, 58(1):7--19, January 1998. ISSN 0003-2638. URL http://www.ingentaconnect.com/content/bpl/anal/1998/00000058/00000257/art00096.

[4] B. J. Fogg and H. Tseng. The elements of computer credibility. In *CHI '99: Proceedings of the SIGCHI conference on Human factors in computing systems*, pages 80--87, New York, NY, USA, 1999. ACM Press. ISBN 0201485591. doi: 10.1145/302979.303001. URL http://portal.acm.org/citation.cfm?id=303001.

[5] C. Heintz. Web search engines and distributed assessment systems. In S. Harnad and I. E. Dror, editors, *Distributed Cognition: Special issue of Pragmatics & Cognition*, volume 14. 2006.

[6] B. Huberman. *The Laws of the Web, Patterns in the Ecology of Information*. Cambridge, MA: MIT Press, 2001.

[7] J. M. Kleinberg. Authoritative sources in a hyperlinked environment. In *Proceedings of the ACM-SIAM Symposium on Discrete Algorithms*, 1998.

[8] J. Nielsen. Alertbox: Information foraging: Why google makes people leave your site faster. Website, June 30 2003. URL http://www.useit.com/alertbox/20030630.html.

[9] J. Nielsen. Alertbox: When search engines become answer engines. Website, August 16 2004. URL http://www.useit.com/alertbox/20040816.html.

[10] R. E. Petty and J. Cacioppo. The elaboration likelihood model of persuasion. *Advances in Experimental Social Psychology*, 19:123--205, 1986.

[11] R. E. Petty and D. T. Wegener. The elaboration likelihood model: Current status and controversies. In S. Chaiken and Y. Trope, editors, *Dual-Process Theories in Social Psychology*. Guilford Press, New York, 1999.

[12] P. Pirolli. Rational analyses of information foraging on the web. *Cognitive Science*, 29:343--373, 2005.

[13] P. Pirolli and S. Card. Information foraging. *Psychological Review*, 106(4):643--675, 1999.

[14] K. Sterelny. Cognitive load and human decision, or, three ways of rolling the rock up hill. In P. Carruthers, S. Laurence, and S. Stich, editors, *The Innate Mind: Culture and Cognition*. Cambridge University Press, Cambridge, 2006.