

The Voting Model for People Search

Craig Macdonald

Department of Computing Science

University of Glasgow

Glasgow, G12 8QQ, UK

craigm@dcs.gla.ac.uk

<http://www.dcs.gla.ac.uk/~craigm/thesis>

Abstract

An expert search engine aims to assist users with their expertise need - instead of ranking documents, possible candidate experts in an enterprise organisation with relevant expertise are suggested in response to a query. This thesis investigates people search tasks such as expert search, and how persons can be ranked in response to a query, such that those with relevant expertise to the query are ranked first. The expertise areas of the persons are represented by documentary evidence of expertise, known as candidate profiles. The statement of this research work is that people search tasks in general and expert search in particular can be successfully and effectively modelled using a voting paradigm.

Contributions. The central contributions of this thesis are:

1. **The Voting Model.** We propose the Voting Model - a framework that generates several ways to combine the votes from a ranking of documents, to produce an accurate ranking of candidate persons. Within this framework are many voting techniques, inspired by social choice theory and data fusion techniques.
 2. **Bayesian Belief Network.** We formalise the Voting Model into a Bayesian Belief network, in order to provide an understanding of the semantics of the Voting Model. Moreover, we use this formalisation to show how the model can be extended to integrate other external sources of evidence into the retrieval process.
 3. **Experimental Evaluation:** Using exhaustive experimentation on three expert search test collections, we experiment with and evaluate the main components of the Voting Model: the associations between experts and their expertise evidence documents; and the manner in which votes are combined. Practical issues such as parameter setting and efficiency are also addressed. Moreover, the role of the underlying document ranking and how it affects retrieval performance is thoroughly examined across two chapters of the thesis.
 4. **Query Expansion:** The use of relevance feedback, in the form of query expansion, is also investigated within the expert search task, where the feedback items take the form of aggregates of documents representing the profiles of the candidates.
 5. **Other People Search Tasks:** We apply the Voting Model to other tasks, such as finding bloggers and finding reviewers, demonstrating the generality of the proposed model to the retrieval of people and aggregates of documents in general.
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