

Ranking Database Results Based on Context

Arthur van Bunningen¹, Ling Feng, Peter Apers, Maarten Fokkinga

University of Twente

Nowadays more and more information becomes available in digital form. To be able to guide users through this wealth of information, a possibility is to only provide users with the information that is relevant to their current situation. From a database perspective, this implies adapting query results to the situation of the user at the time of querying. Challenges raised by this implication are to express the preferences of the user in different situations and to score tuples based on context information. These challenges become especially difficult since most context information results from sensors and is therefore uncertain. Moreover, the preferences of the user might differ in strength. In the field of context awareness, previous research focused on simple preferences in small scale systems using little context information. In the database field, previous research on preferences focused on hard-coded preferences without addressing the demands of context aware systems, such as reasoning, traceability, uncertainty etc. [3]

The work presented distinguishes from these approaches by addressing the demands of context aware systems, but at the same time providing a solution for implanting the system on top of a traditional DBMS (PostgreSQL). To address the issue of uncertain context we use event expressions [2], where we assign each context measurement a probability and a basic event expression. Calculation of the probability of high level context event (e.g., a certain activity) can be done by combining event expressions from measurements attributing to this event as described in [2].

Resulting from these measurements we need to provide the tuples which best satisfy the information need of a user. Augmenting the reasoning that Berger and Lafferty followed for information retrieval [1] we conclude that context has its effect in three places. First, if a query is unexpected given the context of the user, the tuples matching the query answer should be considered more relevant. Second, context affects the “query generation”, which could be used to account for different input methods under different contexts leading to a different formulation of a query under the same information need. Finally, and most important, the context of a user affects the general relevance of a tuple.

In our talk we will focus on the last part, modeling the general relevance of a tuple using context aware preference rules. Such rule states, among a set of alternatives, a particular like or dislike for some of these alternatives under certain contexts, like “*prefer TV on sports programs when the user is dining*”, together with a weight. To accomplish the integration of rules and context information we will assign a basic event expression to the preference rule, so it can be combined with the event expressions of the context measurements. Furthermore, we will address how the scoring of tuples is influenced by uncertainty of the context and combinations of preference rules.

References

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¹Presenter, holds a position as PhD student at the University of Twente.