

# Aiming for User Experience in Information Retrieval

## Towards User-Centered Relevance (UCR)

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### Research Proposal

The goal of an Information Retrieval (IR) system is to solve the information need of its user. Research on how this goal can best be achieved has mainly been dominated by the concept of relevance. What is relevant or not is generally performed by domain experts on the basis of topical similarity; i.e., topicality. Several studies have shown there is more to relevance than topicality; e.g., topicality, novelty, reliability, understandability, and scope [3]. As [2] concludes: “*relevance, in the wider context, is a subjective, multidimensional, dynamic and situational phenomenon*” (p. 63). The multi-faceted notion of relevance pleads for a human-centered approach. Essentially, an IR system should solve the information need of its user, with its user.

To enable the operationalization of the pivotal role of the user in solving the information need, we adopt a framework of User eXperience (UX). UX is a fuzzy concept, often defined as technology use beyond its instrumental value (e.g., topicality for IR). Several aspects of UX have been identified; e.g., usability, beauty, hedonic, emotions, temporality, situatedness, enjoyment, motivation, and challenge. Together, these aspects explain part of the UX [1] and are intrinsically related to persistence and effort in information problem solving. Hence, we hypothesize that solving an information need is fostered with an enhanced UX. We propose to focus on emotional factors: addressing the antecedents and consequences of, ideally, positive emotions.

At least two clear lines of research on emotion in IR can be identified. One line of research shows the effect of difficulty (or challenge) compared to the skills of the user. Namely, experienced difficulty leads to negative emotions. A second line of research is occupied with reading the emotional value of a text, image, or video. The emotional value of an Information Object (IO) can be considered the most direct antecedent to emotional experience. Accordingly, we pro-

pose a retrieval model, which adjusts the (ranking of the) search results in a way optimal to the UX by evaluating the emotional value and difficulty of an IO; i.e., User-Centered Relevance (UCR).

The goal of the proposed research is to find an optimal relationship between UCR and topicality  $T$ , understandability  $U$ , and emotional value  $E$ . For this, a set of (textual) features is suggested, indicative of topicality  $T$ , complexity (readability  $C_1$ , entropy  $C_2$ , semantic coherence  $C_3$ ), and emotional value (emotional keyword spotting  $E_1$ , lexical affinity  $E_2$ ). This leads to the following models:

$$R \rightarrow \{T, U, E\} \quad \text{UCR}; \quad (1)$$

$$U \rightarrow \{C_{1..3}\} \quad \text{Understandability}; \quad (2)$$

$$E \rightarrow \{E_{1,2}\} \quad \text{Emotional value.} \quad (3)$$

In these models the user plays a central role: for topicality  $T$ , this is through the query; for emotional value  $E$ , the user's preferences will influence the final experienced emotion, and the understandability  $U$  is not only dependent upon the complexity  $C$  of the IO but also on the skills and knowledge of the user.

In order to create models 1-3, data is needed about when a document is perceived as understandable and is of positive emotional value as well as how this relates to UCR. Although some of the aspects of UCR (e.g., understandability) can be added directly to the interaction, we propose user studies to find the relative contribution of the different aspects to UCR. The suggested approach is to let a diverse set of stimuli (IOs) and searches be rated by subjects. One of the most salient challenges is in having a representative set of IOs and queries, and to cope with the difference between users and situations.

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### References

- [1] M. Hassenzahl and N. Tractinsky. User experience - a research agenda. *The American Journal of Psychology*, 25(2):91–97, 2006.
- [2] I. Ruthven. Integration approaches to relevance. In A. Spink and C. Cole, editors, *New Directions in Cognitive Information Retrieval*, pages 61–80. Springer Netherlands, 2005.
- [3] Y. C. Xu and Z. Chen. Relevance judgment: What do information users consider beyond topicality? *J. Am. Soc. Inf. Sci. Technol.*, 57(7):961–973, 2006.