Personalised Video Retrieval: Application of Implicit Feedback and Semantic User Profiles

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Abstract

A challenging problem in the user profiling domain is to create profiles of users of retrieval systems. This problem even exacerbates in the multimedia domain. Due to the Semantic Gap, the difference between low-level data representation of videos and the higher concepts users associate with videos, it is not trivial to understand the content of multimedia documents and to find other documents that the users might be interested in. A promising approach to ease this problem is to set multimedia documents into their semantic contexts. The semantic context can lead to a better understanding of the personal interests. Knowing the context of a video is useful for recommending users videos that match their information need. By exploiting these contexts, videos can also be linked to other, contextually related videos. From a user profiling point of view, these links can be of high value to recommend semantically related videos, hence creating a semantic-based user profile. This thesis introduces a semantic user profiling approach for news video retrieval, which exploits a generic ontology to put news stories into its context.

Major challenges which inhibit the creation of such semantic user profiles are the identification of user's long-term interests and the adaptation of retrieval results based on these personal interests. Most personalisation services rely on users explicitly specifying preferences, a common approach in the text retrieval domain. By giving explicit feedback, users are forced to update their need, which can be problematic when their information need is vague. Furthermore, users tend not to provide enough feedback on which to base an adaptive retrieval algorithm. Deviating from the method of explicitly asking the user to rate the relevance of retrieval results, the use of implicit feedback techniques helps by learning user interests unobtrusively. The main advantage is that users are relieved from providing feedback. A disadvantage is that information gathered using implicit techniques is less accurate than information based on explicit feedback.

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This thesis focuses on three main research questions. First of all, implicit relevance feedback, which is provided while interacting with a video retrieval system, is studied as information source to bridge the Semantic Gap. Therefore, implicit indicators of relevance are identified by analysing representative video retrieval interfaces. Studying whether these indicators can be exploited as implicit feedback within short retrieval sessions, video documents are recommended based on implicit actions performed by a community of users. Secondly, implicit relevance feedback is studied as potential source to build user profiles and hence to identify users' long-term interests in specific topics. This includes studying the identification of different aspects of interests and storing these interests in dynamic user profiles. Finally, this feedback is exploited to adapt retrieval results or to recommend related videos that match the users' interests. The research questions are analysed by performing both simulation-based and user-centred evaluation studies. The results suggest that implicit relevance feedback can be employed in the video domain and that semantic-based user profiles have the potential to improve video exploration.

The thesis is available for download at `http://theses.gla.ac.uk/`.