Personalized Nichesourcing: Acquisition of Qualitative Annotations from Niche Communities

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Abstract. Diversity and profundity of the topics in cultural heritage institutions' collections make experts from outside the institution indispensable for acquiring qualitative annotations. We define the concept of nichesourcing and present challenges in the process of obtaining qualitative annotations from people in these niches. We believe that experts provide better annotations if this process is personalized. We present a framework, called Accurator, that allows to realize and evaluate strategies and applications for personalized nichesourcing.

Keywords: cultural heritage, nichesourcing, annotation framework, qualitative annotations

1 Introduction

Access and retrieval mechanisms for archives and museums typically rely on a rich description of the collection. Most cultural heritage institutions employ professional experts to describe their collections by manually compiling metadata for each item. For large and diverse collections the knowledge of experts from other domains is indispensable. Cultural heritage institutions therefore seek to understand whether and how they can make use of external users to produce these annotations.

The work we present aims at understanding which strategies and techniques lead to high-quality annotations by (crowds of) users that are external to the museum experts. The first challenge in the project is to identify the niche of relevant experts and to motivate them to contribute to the annotation of collection items. Next, personalization mechanisms must make sure that the experts are shown items that correspond to their expertise. The quality of the annotations and annotators is to be evaluated using trust algorithms. As a final challenge, all these aspects must be presented in an appropriate interface.

To evaluate our hypotheses, we develop a framework to support crowd annotation processes, called Accurator.

2 Research Challenges

One of the four main challenges of nichesourcing is finding candidate annotators that are able to produce high quality annotations for collection items. We believe that people participating in a topical community have an active interest in that topic and might be willing to help and share knowledge related it. We refer to these topical communities as *niches* and focus on their manifestation, among others, on the social web. We analyze social data and perform user studies using the Accurator tool to understand what identifies a niche community, what indicates that a person is part of such a community and which properties identify a good candidate to provide qualitative annotations.

The challenge for recommender strategies in Accurator is twofold: keep the expertise needed to annotate the item in the range of the experts knowledge and yet diversify the suggestions to get high quality annotations for as many distinct items as possible. Our aim is to develop recommender strategies that use content patterns from the Linked Data cloud, resulting in a list of recommendations consisting of diverse items. We hypothesize that encountering diverse items to annotate will help keep the expert motivated.

We address issues of determining trust in the expert users and their contributed annotations by modeling the user reputation and tracking their expertise across various topics over time. We believe subjective logic is suitable to model the reputation of users and semantic similarity measures to track and update the users' expertise. Since there is no gold standard for evaluating the annotations, we must rely on a peer reviewing process and other mechanisms such as provenance of the annotation process.

Since external users are not familiar with the professional classification schemes and expert knowledge the institutions target, a fourth main challenge is in breaking down the annotation process must be broken down into facile tasks that can be solved with little effort and without this kind of professional knowledge. We believe that the interface for such a system has to present the task in a straightforward way while motivating the users to spend the time contributing their knowledge. We investigate which design aspects and underlying mechanisms are responsible for the quality and quantity of tags added by users and how to visualize trust and personalization aspects.

3 Accurator framework

To approach these challenges and evaluate our hypotheses, we develop the Accurator framework. Our main assumption is that making use of personalized nichesourcing increases the quality of annotations. We believe that we can identify automatically niche candidate users and create their user profiles. Based on the user profiles we can recommend relevant tasks to the user and apply trust mechanisms to improve the recommendations. Figure 1 shows the Accurator workflow.

The process starts (see Figure 1a) with searching the social web for user-generated content that is relevant for a specific topic. We calculate the relevance

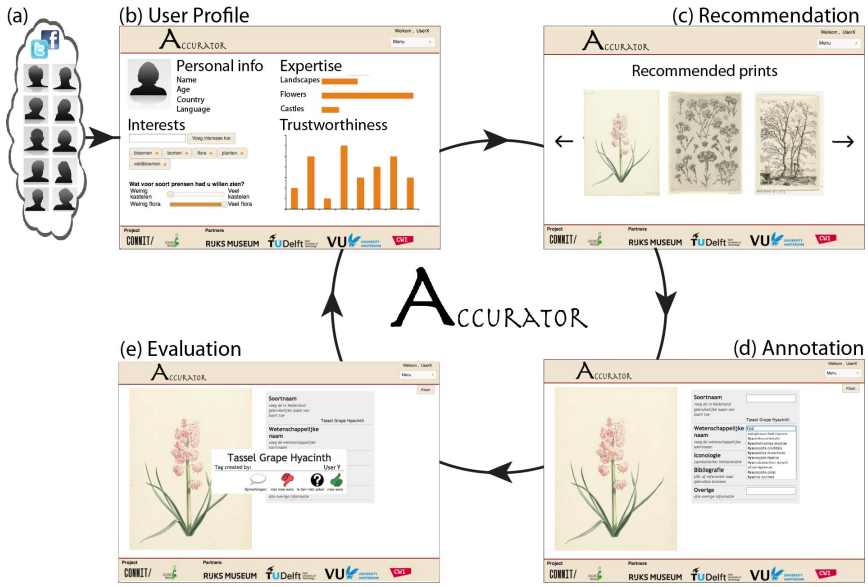

Fig. 1. Accurator personalized nichesourcing workflow

of the content creators with respect to the topic and exploit social relations to identify a topical niche. When a person starts using Accurator, a user profile (see Figure 1b) is built based on available data.

Next (see Figure 1c) is the recommendation of collection items to a user. The recommendation strategy is based on specific patterns in the data, the user profile, and the current annotation quality of an item. Accurator allows to easily change between different strategies to cater for users diversity. The choice of recommended items will affect the calculated interest of that user.

Figure 1d shows the interface where users add their annotations to an item. The presented fields depend on the topic and the user's expertise on that topic. Accurator can be configured to use domain vocabularies to support the user. Figure 1e shows the interface in which users can evaluate the annotations of other users. This task is only available to users who are trustworthy and have a certain level of expertise. The result of a review affects 1) the quality of an annotation, 2) the expertise level of the user and 3) the trustworthiness of another user.

Accurator is built using Cliopatria to store RDF, GWT for the user interface and GAE for hosting. Accurator is now used for experimentation with artwork data from the Rijksmuseum Amsterdam and a demo is available at `http://rma-accurator.appspot.com`.

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