Personalized Nichesourcing: Acquisition of Qualitative Annotations from Niche Communities

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Abstract. A digital collection that can be accessed online, searched and linked to other collections is an important focus for many Cultural Heritage institutions. Diversity and depth of the topics in a collection make experts outside the institution indispensable to acquire qualitative annotations to support these actions. We define the concept of nichesourcing and present the challenges in the process of obtaining qualitative annotations from persons in these niches. Our assumption is that if this process is personalized we get better annotations from the experts. Our main contribution is a framework for nichesourcing, 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 rely on a rich description of the collection. Most cultural heritage institutions therefore employ professional experts to describe their collections by manually compiling metadata for each item. For large and diverse collections, this approach can be insufficient to generate precise and comprehensive data. In these cases the knowledge of experts from other domains is indispensable. Cultural heritage institutions therefore seek to understand whether and how they can exploit the efforts of external users to produce these annotations.

This demo aims at understanding which strategies and techniques lead to high-quality annotations by (crowds of) external experts. The first challenge of the project is to identify the niche of relevant experts and to motivate them to contribute to the annotation of artworks. As a next step, the personalization mechanisms must make sure that the experts are shown items that correspond to

their expertise. The quality of the annotations and annotators will be evaluated using trust algorithms. All these aspects must be presented in an appropriate interface.

To evaluate our hypotheses with user studies, we develop a framework designed to support crowd annotation processes, Accurator. The current state of Accurator shows interfaces for two expert niches: castles and flowers. These interfaces are designed for user studies with experts of the respective fields to find out what elements make up a useful interface for them.

2 Research Challenges

One of the challenges of nichesourcing is finding candidate annotators that will produce good quality annotations for collection items. Besides topical knowledge, properties like availability, willingness to help and being able to share or transfer knowledge are also important. We believe that persons part of a topical community have an active interest in the topic and might be willing to help and share knowledge related to that topic. These topical communities we call niches and manifest themselves, among others, on the Social Web. We will analyze social data and perform user studies using the Accurator framework to understand what identifies a niche community, whether a person is part of such community and which properties identifies a good candidate to provide qualitative annotations.

The challenge for recommender strategies in Accurator is twofold: keep the expertise needed to annotate the artwork in the range of the experts knowledge and yet diversify the suggestions to get high quality annotations for as many distinct artworks as possible. To address these challenges we will investigate the use of content patterns in the Linked Data cloud. Our aim is to develop recommender strategies that use these patterns, resulting in a list of recommendations consisting of diverse artworks. From a data perspective we aim for diversity in recommendations for the following reasons. Firstly, it makes the handling of the inevitably incomplete data more robust, by providing alternative paths to items. Secondly, using the alternative paths, items can be reached which reside in the long-tail. When experts are able to annotate these long-tail items, they will become more accessible in general. From a user perspective diversity is also important, we hypothesize that encountering diverse artworks to annotate will help keep the expert motivated. It will also be hard to cover all the possible expertise areas in the user profile from the beginning, so recommending diverse artworks will help to find not yet recorded areas of expertise.

In order to obtain qualitative annotations from the users of the system, we have to tackle issues of determining trust in the users and their contributed information. We address these issues by modelling the user reputation and tracking their expertise across various topics over time. The right model must be chosen to represent the reputation of the user and also their expertise with respect to a particular topic. We intend to use Subjective logic to model the reputation and semantic similarity between topics to track users expertise. The reputation

model must allow dynamic updates of the characteristics of the user. Since there is no gold standard for evaluating the contributions from the users, we must develop algorithms for analyzing the quality of the annotations from the users in an open environment. This calls for means to track provenance of the annotation process such as usage of terms from vocabularies by the user, typing speed etc. Research must be carried out to investigate the different metrics which will help in identifying good behaviour of the users. Methods which allow peer review of the annotations must also be studied upon to see how effective they are in the cultural heritage domain. Mechanisms will be investigated as to how to visually represent the different trust levels of the information, which will be addressed in collaboration with research on user interface.

The professional annotation of artworks is a complex process that requires familiarity with the used classification schemes and (art-)historical expert knowledge. In most cases, both will not be available in candidate users for nichesourcing projects. Therefore, to enable external users to annotate artworks, this process must be broken down into facile tasks that can be solved with little effort and without expert knowledge of classification schemes. The interface for such a system has to present the task in a straightforward way and motivate the users to contribute their knowledge and time. To gain a better understanding of how to design such an interface, we investigate what design aspects and underlying mechanisms are responsible for the quality and quantity of tags added by users. Additionally, we have to find appropriate ways to visualize the trust and personalization aspects in the user interface.

3 Accurator framework

Our assumptions for the niche sourcing process are the following. We assume that personalizing the niche sourcing process increases the quality of the annotations. We assume we can use specific techniques to identify niches and create user profiles. Based on the user profiles we assume we can recommend relevant tasks to the user and apply trust mechanisms to motivate users, provide feedback and improve the recommendations. We have build the Accurator framework upon these assumptions and use it to solve the aforementioned challenges.

Figure 1a and 1b

Figure 1a illustrated the different parts of Accurator.

List of points to discuss: quality of tags improved by user selection recommendation trust Intuitive and helpful interface for users techniques/tools used wrap up

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