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Analysis of GWAP collected tags in the description of heritage materials

TOMISLAV IVANJKO[1,a], SONJA ŠPIRANEC[2]

1Department of Information and Communication Sciences, Faculty of Humanities and Social Sciences, University of Zagreb, Zagreb, Croatia

2Department of Information and Communication Sciences, Faculty of Humanities and Social Sciences, University of Zagreb, Zagreb, Croatia

[a)] *tivanjko@ffzg.hr*

Abstract: This paper explores possible approaches in analysis of folksonomies in subject indexing of heritage materials in order to examine user tags as a method complementing traditional subject access in the online environment. Research was undertaken using crowd sourcing methods, namely Game With a Purpose, where corpora of 14,402 submitted tags on selected 80 heritage objects divided into 4 categories (library, archive, museum and photographs) was gathered for statistical, linguistic and content analysis.

Keywords: **Folksonomies, heritage materials, crowdsourcing, GWAP.**

Introduction

Following the development of World Wide Web and especially with the rise of Web 2.0, a new wave of user participation in creating online resources started. Services such as Flickr, Delicious or YouTube emerged basing their entire business model on user generated content. Apart from uploading content, users were encouraged to describe it by using keywords or labels added to the resource called tags. This process, where users add tags to shared content was gathered under the notion of social tagging (Golder and Hubermann, 2006) and instigated a new approach in knowledge representation – folksonomies (Mathes, 2004). The term itself was coined from the words folk and taxonomy denoting the aspect of user participation in the knowledge organization process, but the adequacy of the term is still a subject of debate (Peters, 2008). Following the development of the research field, much effort was put into defining its structure and the characteristics of tags (Golder and Hubermann, 2006; Heckner, Mühlbacher and Wolff, 2008) where model of analysis and research framework were established. When researching tag characteristics in Croatian language Špiranec and Ivanjko (2012) showed that tags show many characteristics similar to those found in traditional indexing languages (noun, singular), but indicated that more research is needed in researching different environments (education, scientific, heritage) and on a larger tag corpus both on statistic, linguistic and functional levels.

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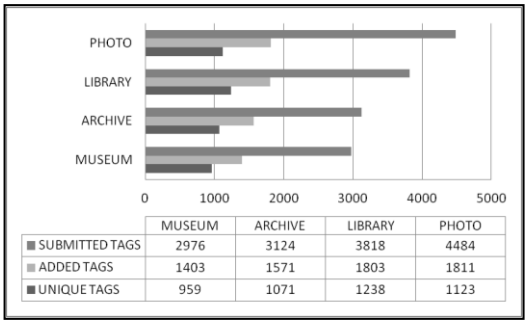
Research

This research aims to shed additional light on the characteristic of tags in Croatian language when users are describing heritage materials. First step of the research was selecting 80 digitized heritage objects for description divided into four categories: archival materials (20), library materials (20), museum exhibits (20) and photographs (20). The segmenting was done in order to create additional points for comparison. The materials were selected from the exhibition catalogue of the exhibition "Croatian Homeland War" held at the Croatian History Museum, so they were all thematically based on the same topic that enabled analysis on the general as well as collection level description. Since there was a large number of materials that needed to be tagged, an application that uses a Game With a Purpose (GWAP) approach was implemented. The open source application Metadata Games (www.metadatagames.org) developed by Dartmouth College was implemented and localized for Croatian language. As authors describe it: "…games and game like activities can be used to attract the public to participate in providing valuable descriptive metadata... [by providing] a game approach that attracts participants to a site and facilitates tagging in an enjoyable way" (Flanagan and Carini, 2012). This approach gave us the opportunity to collect large corpora of tags in a way that users may find enjoyable.

After the materials and the application were ready, a public call was sent through different mailing lists and other means of communication for participants. The application was active from June 1st to July 1st of 2014 and a total of 14,402 tags were submitted to the application. Fig 1 shows the distribution of tags according to different types of materials.



	MUSEUM	ARCHIVE	LIBRARY	PHOTO
SUBMITTED TAGS	2976	3124	3818	4484
ADDED TAGS	1403	1571	1803	1811
UNIQUE TAGS	959	1071	1238	1123

Fig 1. Distribution of submitted, added and unique tags.

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When describing each object users could either add a new tag that none of the other users added before them (increase the vocabulary) or add the same tag as any of the users before (increase frequency). In order to examine the difference between those approaches, tags were divided into 3 categories: submitted tags (all the tags including their frequencies), added tags (submitted tags without frequencies) and unique tags (tags with frequency 1). In order to see the connection between those three tag categories a correlation analysis was conducted. It was shown that there is a strong connection between submitted and added tags (+0,613) and especially between added tags and unique tags (+0,888), but there was a weak connection between submitted tags and unique tags (+0,237). Given the data we can conclude that, based on our sample, after around 1800 added tags to a single collection only the frequencies of tags started increasing but the vocabulary remained the same size. This shows that when collecting user tags for 20 objects of the same topic, one should stop when the threshold of 1,800 added tags is reached, because further tags will only increase frequency but the vocabulary base won't change. Second level of tag analysis was concerned with linguistic characteristics of the gathered tag corpora. The analysis was conducted using the tag categories originally suggested by Heckner, Mühlbacher and Wolf (2008), adapted for Croatian language based on the work of Špiranec and Ivanjko (2012) (Fig 2).

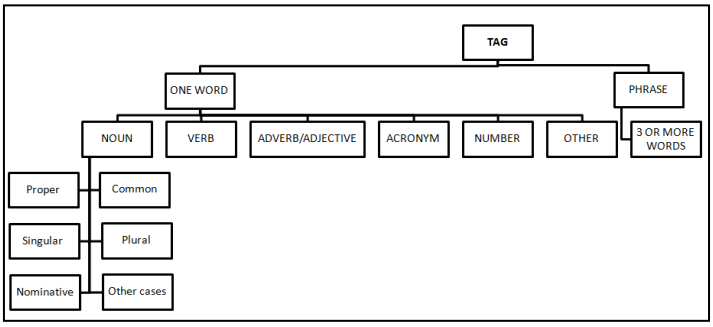

Fig 2. Adapted categories of linguistic analysis based on the work Špiranec and Ivanjko (2012).

It was shown that a typical tag consists from either one or two words (91%), is a noun (82%), common noun (91%), in singular (78%) and in its nominative form (99%). This part of the analysis showed that a typical tag does not differ from linguistic characteristics of a classic descriptor used for subject indexing. The final part of the research was concerned with content analysis of tags added to visual

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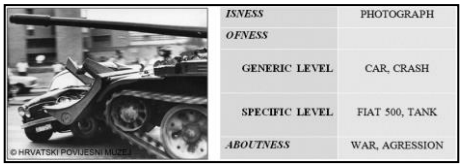
resources (photographs and museum materials), i.e. analysing which level of meaning the tags are added on. These approaches to indexing visual resources stem from the work of Panofsky enriched by Shatford who also applied her ideas to image indexing (Fig 3a, examples from Klenczon and Rygiel, 2014). Combining those two approaches, a model of analysis was constructed to encompass all the levels presented in both models (Fig 3b).

(a)



(b)

Fig 3. Categories of indexing visual resources based on the work of Panofsky and Shatford.

The first level of the proposed model identifies the type of material (*isness*), second level identifies both generic meaning (pre-iconographic) and specific meaning (iconographic), while the third level analyses the meaning on an abstract level (*aboutness*). Based on these categories, an analysis of a total of 3,214 submitted tags on 20 photographs and 20 museum exhibits (visual resources) was conducted. The results showed that the vast majority of tags were added on a general ofness level (80%) with little meaning added on a specific or abstract level.

Conclusion

This paper analysed corpora of 14,402 submitted tags on selected 80 heritage objects divided into 4 categories (library, archive, museum and photographs) gathered using a crowdsourcing method, namely Game With a Purpose. Statistical analysis of gathered corpora has shown that after a certain threshold is achieved, vocabulary base remains steady with only frequencies increasing. Linguistic analysis showed that a typical user tag consists of one word or phrase in singular, while

content analysis identified most user tags as generic descriptors without added specific knowledge.

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