Multimed Tools Appl (2013) 64:1–5
DOI 10.1007/s11042-012-1178-x

GUEST EDITORIAL

Editorial preface: special issue on multimedia data annotation and retrieval using web 2.0

Richard Chbeir · Vincent Oria

Published online: 19 July 2012

1 Introduction

Currently, more than 80 % of the information exchanged on the Web carry personal data and are primarily of multimedia nature (video, audio, images, etc.). Two main reasons are behind this phenomenon: 1) each of the major players on the Internet (individual users, companies, local and/or regional authorities, etc.) is both data producer and data consumer at the same time, and 2) the use of various tools of Web 2.0 (blogs, social networks, etc.) allows to ease sharing, accessing, and publishing information on the Web. While such tools provide users many easy-to-use functionalities, several issues, however, remain unaddressed. For instance, how to automate the processes of annotation and description of some photos using the annotations/descriptions provided by the user friends on his/her blog/wiki/social network? How to provide the user with more effective and expressive means to multimedia information retrieval? How to protect a multimedia data repository (e.g., photo album) while several related information about the same content is already published (by some user friends) on the same or other blog/wiki/social network?

This special issue seeks to assess the current approaches and technologies, as well as to outline the major challenges and future perspectives, related to the use of Web 2.0 in providing automatic annotation and easing retrieval and access control of multimedia data. It aims to provide an overview of the state of the art and future directions in this field, by including interdisciplinary contributions from various research groups. All the papers we received for this special issue have been submitted to an independent peer reviewing and reviewed by at least three experts.

2 Organization

The structure of this issue is divided into 9 papers as follows.

The first paper is entitled "**Topic Based Photo Set Retrieval Based on User Annotated Tags**", in which *Sangjin Lee* and *Jonghun Park* address the storage and retrieval of user

R. Chbeir (✉)
Bourgogne University, Dijon, France
e-mail: Richard.chbeir@u-bourgogne.fr

V. Oria
New Jersey Institute of Technology, Newark, USA
e-mail: vincent.oria@njit.edu

generated web objects and propose a new approach that can effectively measure topical relevance of sets against a user query by utilizing the tags attached to web objects. The main idea of the proposed approach is to prefer the set which covers as many query related subtopics as possible. In particular, in order to compute the topical relevance while addressing the problem of noisy tags, the notion of tag significance score is introduced based on tag co-occurrence frequency. The authors consider a problem domain of photo set search at flickr.com where individual photos are annotated with texts such as titles and tags. Experimental results show that the proposed method outperforms the previous approaches for photo set retrieval.

The second paper is entitled "**Semantics-Based Information Extraction for Detecting Economic Events**" by *Alexander Hogenboom, Frederik Hogenboom, Flavius Frasincar, Kim Schouten*, and *Otto van der Meer*. As today's financial markets are sensitive to breaking news on economic events, accurate and timely automatic identification of events in news items is crucial. Unstructured news items originating from many heterogeneous sources have to be mined in order to extract knowledge useful for guiding decision making processes. Hence, the authors propose the Semantics-Based Pipeline for Economic Event Detection (SPEED), focusing on extracting financial events from news articles and annotating these with meta-data at a speed that enables real-time use. In the provided implementation, the authors use some components of an existing framework as well as new components, e.g., a high-performance Ontology Gazetteer, a Word Group Look-Up component, a Word Sense Disambiguator, and components for detecting economic events. Through their interaction with a domain-specific ontology, the novel, semantically enabled components constitute a feedback loop which fosters future reuse of acquired knowledge in the event detection process.

The third paper, "**Bidirectional-Isomorphic Manifold Learning at Image Semantic Understanding & Representation**", authored by *Xianming Liu, Hongxun Yao, Rongrong Ji, Pengfei Xu*, and *Xiaoshuai Sun*, focuses on the problem of understanding web image content. In essence, the description of images is usually imprecise at the semantic level, which is caused by the noisy and redundancy information in both text (such as surrounding text in HTML pages) and visual (such as intra-class diversity) aspects. This paper considers the solution from the association analysis for image content and presents a Bidirectional- Isomorphic Manifold learning strategy to optimize both visual feature space and textual space, in order to achieve more accurate comprehension for image semantics and relationships. To achieve this optimization between two different models, Bidirectional-Isomorphic Manifold Learning utilizes a novel algorithm to unify adjustments in both models together to a topological structure, which is called the reversed Manifold mapping. The authors also demonstrate its correctness and convergence from a mathematical perspective. Image annotation and keywords correlation analysis are applied. Two groups of experiments are conducted: the first group is carried on the Corel 5,000 image database to validate our method's effectiveness by comparing with state-of-the-art Generalized Manifold Ranking Based Image Retrieval and SVM, while the second group carried on a web-downloaded Flickr dataset with over 6,000 images to testify the proposed method's effectiveness in real-world application. The promising results show that the proposed model attains a significant improvement over state-of-the-art algorithms.

Authored by *Sara Memar, Lilly Suriani Affendey, Norwati Mustapha, Shyamala C. Doraisamy*, and *Mohammadreza Ektefa*, the fourth paper addresses "**An integrated semantic-based approach in concept based video retrieval**". Here, an integrated semantic-based approach for similarity computation is proposed with respect to enhance the retrieval effectiveness in concept-based video retrieval. The proposed method is based on the integration of knowledge-based and corpus-based semantic word similarity measures in order to retrieve video shots for concepts whose annotations are not available for the system. The TRECVID 2005 dataset is used for evaluation purpose, and the results of applying proposed method are then compared against the

individual knowledge-based and corpus-based semantic word similarity measures which were utilized in previous studies in the same domain. The superiority of integrated similarity method is shown and evaluated in terms of Mean Average Precision (MAP).

The fifth paper is dedicated to "**A web 2.0 archive to access, annotate and retrieve manuscripts**". Reim *Doumat, Elöd Egyed-Zsigmond*, and *Jean-Marie Pinon* deal here with the design and the implementation of a web archive in order to enable users to annotate easily and remotely manuscript documents using web 2.0 application. User annotations are considered important to enrich the archive contents with essential information nevertheless not all users are experts in the manuscript domain. Accordingly, users need a kind of assistance during the search and annotation processes. The proposed assistant in the provided archive is a recommender system; it relies on registered traces of the user interaction with the documents to generate suggestions.

Authored by *Roberto De Virgilio, Flavius Frasincar, Walter Hop*, and *Stephan Lachner*, the sixth paper addresses "**A Reverse Engineering Approach for Automatic Annotation of Web Pages**". In essence, the Semantic Web is gaining increasing interest to fulfill the need of sharing, retrieving, and reusing information. Since Web pages are designed to be read by people, not machines, searching and reusing information on the Web is a difficult task without human participation. To this aim adding semantics (i.e., meaning) to a Web page would help the machines to understand Web contents and better support the Web search process. One of the latest developments in this field is Google's Rich Snippets, a service for Web site owners to add semantics to their Web pages. In this paper, the authors provide a structured approach to automatically annotate a Web page with Rich Snippets RDFa tags. Exploiting a data reverse engineering method, combined with several heuristics, and a named entity recognition technique, the proposed method is capable of recognizing and annotating a subset of Rich Snippets' vocabulary, i.e., all the attributes of its Review concept, and the names of the Person and Organization concepts. The authors implemented tools and services and evaluated the accuracy of the approach on real E-commerce Web sites.

In "**Discovering Relationship Types between Users using Profiles and Shared Photos in a Social Network**", *Elie Raad, Richard Chbeir*, and *Albert Dipanda* propose a new approach to discover the relationship types between a user and her contacts in a social network. This is of key importance for many applications in the domain of photo sharing, privacy protection, information enriching, etc. The approach is based, on one hand, on information extracted from users' profiles and their shared photos, and, on the other hand, on a set of predefined rules validated by the main user before being mined and derived according to her preferences and social network content. The contribution of this method is twofold: 1) it is user-based enabling the user to set her preferences and give her feedbacks on the derived rules and results, and 2) it is multi-criteria that exploits and combines several attributes and features from user profiles and shared photos respectively. It also allows the user to define new relationship types. The authors conducted a set of experiments to validate their approach. The obtained results show the accuracy of the approach in different scenarios.

The eighth paper is titled "**A virtual globe tool for searching and visualizing geo-referenced media resources in social networks**" and authored by *Arturo Beltrán, Carlos Abargues, Carlos Granell, Manuela Núñez, Laura Díaz*, and *Joaquín Huerta*. Here, the authors address new challenges and research opportunities in spatial-based discovery media resources over varied sources, since location context is being increasingly supported in most of these social networks and services. Here, the authors present a virtual globe tool for searching and visualizing geo-referenced media resources. The proposed approach is based on the integration of search technologies, description languages for annotating collections of geo-referenced media resources and visualization techniques. The combination of these

techniques is materialized in a virtual globe-based tool to facilitate searching and presentation of geo-referenced media resources available in different social networks.

The last paper of this special issue is "**Classification improvement of local feature vectors over the KNN algorithm**", by *Mahmoud Mejdoub* and *Chokri Ben Amar*. Here, the authors focus on the KNN classification algorithm which is particularly suited to be used when classifying images described by local features. In this paper, the authors propose a novel image classification approach, based on local descriptors and the KNN algorithm. The proposed scheme is based on a hierarchical categorization tree that uses both supervised and unsupervised classification techniques. The unsupervised one is based on a hierarchical lattice vector quantization algorithm, while the supervised one is based on both feature vectors labeling and supervised feature selection method. The proposed tree improves the effectiveness of local feature vector classification and outperforms the exact KNN algorithm in terms of categorization accuracy

3 Conclusion

To conclude, we hope this special issue motivates researchers to take the next step beyond building models to implementing, evaluating, comparing, and extend proposed approaches. Many people worked long and hard to help this issue become a reality. We would first like to gratefully acknowledge and sincerely thank all the reviewers for their timely and insightful valuable comments and criticism of the manuscripts that greatly improved the quality of the final versions. Of course, thanks are due to the authors, who provided excellent articles and timely extended revisions. Finally, we are grateful to the editors of the Journal of Multimedia Tools and Applications for their trust in us, their efforts, patience, and painstaking editorial work during the production of this special issue.

Richard Chbeir received his PhD in Computer Science from the University of INSA-FRANCE in 2001. The author became a member of IEEE since 1999. He is currently an Associate Professor in the Computer Science Department of the Bourgogne University, Dijon-France. His research interests are in the areas of multimedia information retrieval, XML and RSS Similarity, access control models, multimedia document annotation. Dr. CHBEIR has published in international journals and books (IEEE Transactions on SMC, Journal of Methods of Information in medicine, JDIM, etc.), conferences (ACM SAC, Visual, IEEE CIT, FLAIRS, PDCS, etc.), and has served on the program committees of several international conferences (IEEE SITIS, ACM SAC, IEEE ISSPIT, EuroPar, etc.). He is currently the Chair of the French Chapter ACM SIGAPP.

Vincent Oria received a diplôme d'ingenieur from the Institut National Polytechnique Houphouet-Boigny (formerly INSET) in Yamoussoukro, Côte d'Ivoire(Ivory Coast), in 1989 and a Ph.D. in computer science from the Ecole Nationale Supérieure des Télécommunications (Telecom-Paritech), Paris, France, in 1994. His research interests include multimedia databases, spatio-temporal databases and Recommender Systems.

From 1994 to 1996, he worked as a researcher at ENST, Paris; from 1996 to 1999, he was a post-doctoral fellow at the University of Alberta, Edmonton, Canada. From January 2000 to May 2006, he was an assistant professor of computer science at the New Jersey Institute of Technology and since June 2006 he is an Associate Professor in the same department. He has held visiting professor positions at various institutions including National Institute of Informatics (Tokyo, Japan), ENST (Paris, France), Université de Paris-IX Dauphine (Paris, France), INRIA (Roquencourt, France), CNAM (Paris, France), Chinese University of Hong Kong (Hong Kong China) and the Université de Bourgogne (Dijon, France). He is an associate editor the journals Multimedia Tools and Application (MTAP), the International Journal of Multimedia Data Engineering and Management (IJMDEM) and International Journal of Multimedia Information Retrieval. He has served on a number of multimedia and database conference program committees including ACM Multimedia (MM), ACM World Wide Web (WWW) and IEEE International Conference on Data Engineering (ICDE).