Summary Abstract for the 3rd ACM International Workshop on Multimedia Analysis for Ecological Data

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ABSTRACT

The 3rd ACM International Workshop on Multimedia Analysis for Ecological Data (MAED'14) is held as part of ACM Multimedia 2014.

MAED'14, following the previous two workshops of the MAED series (MAED'12 and MAED'13) held as part of, respectively, ACM Multimedia 2012 and ACM Multimedia 2013, is concerned with the processing, interpretation, and visualization of ecology-related multimedia content with the aim to support biologists in their investigations for analyzing and monitoring natural environments.

Categories and Subject Descriptors

H.1.0 [**Information Systems**]: Models and Principles

General Terms

Design, Human Factors, Management

Keywords

Multimedia Content Analysis; Fine-grained categorization; Animal and Plant Identification; Pollution Monitoring; Ecological Multimedia Data Retrieval

1. MOTIVATION

With the recent progress in digital cameras and sensors, as well as in network bandwidth and information storage capacities, the production of multimedia data has become an easy task. This has resulted in a huge amount of multimedia available on the web, in broadcast data streams, or in personal and professional databases. This explosion of multimedia data has created the urgent need for efficient organization, browsing and retrieval tools. It has also generated new possibilities for exploiting multimedia data in diverse and specialised applications that can significantly gain

from the analysis and understanding of such data. Whilst a large number of multimedia analysis and understanding techniques have been developed specifically for investigating events and behaviours in human-centered applications, such as sports and surveillance, relatively little attention has been paid to the understanding of ecology-related multimedia content. On the other hand, ecology is nowadays being considered an interdisciplinary, collaborative and data-intensive science and as such discovering, integrating and analyzing heterogeneous data are of key important for researchers to address complex questions ranging from single particles to animals to the biosphere. This has led to a proliferation of multimedia data content in the last ten years: for instance, the Xeno-canto project[1] has recorded several thousands of bird sounds from all over the world; the Pl@ntNet project[2] has collected massive plant images for analyzing geographic distribution of plants in the Mediterranean area; the Fish4Knowledge project[3] has recorded many Terabytes of video data for monitoring Taiwanese coral reefs. The wide range of cameras continuously capturing birds nests, wolf, badger, fox and also the continuous collection of multimedia data for pollution monitoring are yet other important examples.

Despite the recent technology advances have enabled massive data collection, its analysis usually requires very time-consuming and expensive input by human observers. This analytical "bottleneck" greatly restricts the use of these technologies and demands for efficient organization, browsing and retrieval tools to enable proactive provision of analytical information. The automated analysis of such ecology-related multimedia data presents new challenges and the results are of great interest to the general public (e.g. considering mobile-based plant recognition applications for amateurs) as well as to domain experts. Examples of the latter include biologists working on understanding the natural environment, promoting its preservation, and studying the behaviour and interactions of the living organisms (insects, animals, etc.) that are part of it.

The goal of the 3rd ACM Workshop on Multimedia Analysis for Ecological Data[4] is to bring together the research community and to discuss the most recent progresses in multimedia data analysis in relation to the above challenges.

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[1]http://www.xeno-canto.org/

[2]http://www.plantnet-project.org/

[3]http://www.fish4knowledge.eu

[4]http://maed2014.dieei.unict.it

2. DESCRIPTION

The 3rd ACM International Workshop on Multimedia Analysis for Ecological Data aims at bringing together practitioners and researchers, both in multimedia and in ecology, to share ideas and experiences in designing and implementing novel multimedia analysis techniques and tools for ecological multimedia content. It includes six papers (selected among eleven submissions) describing methods for multimedia data processing with the goal to support researchers in their studies from underwater monitoring to solar radiation investigation.

In the paper of Palazzo and Murabito [5], a semi-supervised approach for fine-grained recognition is presented, which hits one of the most massive datasets in the multimedia-ecological field: we are talking about 20M of fish images, taken in an underwater scenario. This would certainly be one of the most intriguing challenge for verifying how fine-grained recognition systems are capable of doing their job, and identifying subtle differences among diverse species, whose image instances are taken in a noisy, real scenario.

From images to videosequences: in the paper of Katy et al. [3], underwater videos are taken into account, with the aim of recognizing fish species. Here, a whole processing chain is presented, from background subtraction to the recognition module, which turns out to be a very immediate help to researchers (even not scientists in the multimedia field) who have to face a common yet hard task.

From the sea to the mountains, Fedorov et al. [1] present a work on the identification of mountain peaks by edge-matching geo-tagged photographs and synthetic $360°$panoramas created from coarse DEM (Digital Elevation Model) data. This will probably be intriguing since the diffusion of such applications on smartphones is nowadays increasing.

Flying from the mountains to the satellites, the work of Torres and Qiu [6] shows how a crowd-sourcing platform such as Geograph may help in the difficult task of image-based habitat classification, extending previous work and presenting interesting results on thousand of images. The main idea is that higher-level semantic features obtained by crowdsourcing can improve the limitations that visual features have for fine-grained visual categorization.

Nunnari and Fortuna turn from the earth to the sun [4], presenting a technique for identifying the hourly solar radiation, with the interesting possibility of applying the proposed technique for prediction.

Finally, Joly et al. [2] present a more general study on the performance of different identification systems, which can be seen as a function of the ordinariness or rarity of the categories in the dataset taken into account; in other words, the capacity to classify both the most and the less populated categories. This study is performed on three multimedia oriented life species datasets: PlantCLEF, BirdCLEF and FishCLEF.

3. CONCLUDING REMARKS

The ACM International Workshop on Multimedia Analysis for Ecological Data brings together practitioners and researchers, both in multimedia and in ecology, to share ideas and experiences for the analysis of multimedia content for natural environment monitoring. We hope that the selected papers will serve as valuable reference for the future research on this ground-breaking research area.

4. REFERENCES

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