The 6th International Workshop on Multimedia Data Mining (MDM/KDD2005)

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ABSTRACT

In this report, we provide a summary of the issues and research directions on Multimedia Data Mining and the outcomes of the MDM/KDD'05 workshop that was held in conjunction with the 11th ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (KDD 2005), August 21-24 in Chicago IL.

Keywords
Multimedia data mining, multimedia information retrieval, knowledge discovery, semantic image classification, clustering, video analysis.

1. INTRODUCTION

The sixth international workshop on Multimedia Data Mining is a continuation of series of past workshops (MDM/KDD 2000 held in Boston, USA, MDM/KDD 2001 held in San Francisco, USA, MDM/KDD 2002 held in Alberta, Canada, MDM/KDD 2003 held in Washington DC, USA and finally MDM/KDD 2004 held in Seattle, USA) under the auspices of the ACM SIGKDD forums. The theme of this most recent workshop was Mining Integrated Media and Complex Data. The workshop focused on issues specifically related to mining information in integrated form from multi-modality, multi-source, and multi-format data sources. With the current state of the art of multimedia technology, data are collected from several sources, including databases, streaming data, web pages, etc. Furthermore, the collected data appears in multiple forms, including numeric, structured or free text, video, image, speech or in the form of combinations of several types. Therefore, the analysis and mining of this data requires combining various techniques and methods of integration. Hence, submission of papers on the following topics was invited:

- Integration of mining techniques.
- Multimedia mining methods and algorithms.
- Multi-format mining application.
- Data preparation, manipulation, and integration.
- Data presentation, representation of results, and usage of results.
- Multimedia Data warehousing and preparation for knowledge extraction.

A substantial number of high quality papers were submitted to the workshop from five different countries: Azerbaijan, Canada, France, USA and Taiwan. Each paper was reviewed at least by two program committee members. Eight regular papers and six short papers were selected for publication and presentation at the workshop.
The workshop was organized into an opening talk, a session of regular papers, an invited talk and a session of short papers in the morning. In the afternoon, the workshop included two sessions of regular papers. The opening talk that focused on the history of the Workshop and the current state of the art in the field was given by Dr. Latifur Khan. The invited talk "Tools For Non Traditional Data Mining" was given by Professor Christos Faloutsos (CMU, USA). In his talk, chaired by Dr. Latifur Kahn, Prof. Faloutsos discussed the following two problems 1) how to find patterns on multimedia, or multi-modal data, and 2) sensor mining: how to find correlations between numerical measurements in a streaming, 'any-time' fashion.

2. CONTRIBUTED PAPERS

The first session (regular papers), chaired by Dr. Florent Masseglia, included two papers related to image and video mining. The authors of the first paper ("Effective Image and Video Mining: An Overview of Model-Based Approaches" *Missaoui, Palenichka*) were unable to come and present their paper. Their presentation has thus been replaced by "A Framework for a Video Analysis Tool for Suspicious Event Detection" (*Lavee, Khan, Thuraisingham*). The authors presented a framework to aid video analysts in detecting suspicious activity within the tremendous amounts of video data that exists in today s world of omnipresent surveillance video. In the second paper ("OCRS: An Interactive Object-based Image Clustering and Retrieval System") the authors (*Zhang, Chen*) presented an Interactive Object-based Image Clustering and Retrieval System (OCRS). Their system incorporates two major modules: Preprocessing and Object-based Image Retrieval. The former is based on WavSeg to

segment images into meaningful semantic regions (image objects) whereas in the latter Diverse Density is adopted to analyze user's interest and generate the initial hypothesis which provides a prototype for later learning and retrieval.

The second session (short papers) was chaired by Dr. Florent Masseglia. The program of this session was the following:

- "Learning a Distance Metric to preserve the Semantic Content in Mining Graphical Data" (*Rundensteiner, Ruiz, Maniruzzaman, Sisson*)
- "Seeing and Reading Red: Hue and Color-word Correlation in Images and Attendant Text on the WWW" (*Newsam*)
- "A Similarity Measure for Motion Stream Segmentation and Recognition" (*Prabhakaran*)
- "Message Correlation in Automated Communication Surveillance through Singular Value Decomposition" (*Layfield, Khan, Thuraisingham*)
- "Analyzing user's behavior on a video database" (*Mongy, Bouali, Djeraba*)

This session was a good opportunity for the workshop attendees to have an overview of ongoing work by the research teams involved in multimedia data mining.

In the third session (regular papers), chaired by Dr. Florent Masseglia, included two papers that were devoted to multiple queries or processing on complex data. The authors of the first paper ("Collaborative Multi-strategy Classification of Complex Data : Application to per-pixel Analysis of Images" *Gancarski, Wemmert*) presented a new process of collaborative multi-step multi-strategy classification of complex data. They described how to handle in the same system several instances of classifiers in order to make them collaborate. In the second paper ("A Framework to Support Multiple Query Optimization for Complex Mining Tasks") the authors (*Jin, Sinha, Agrawal*) presented their vision on two main feaures that knowledge discovery and data mining systems will have to manage: 1) Sequence of Queries: A user may analyze one or more datasets by issuing a sequence of related complex mining queries and 2) Multiple Simultaneous Queries: Several users may be analyzing a set of datasets concurrently, and may issue related complex queries. They presented a system architecture and new algorithms for this purpose.

The fourth and last session (regular papers), chaired by Dr. Latifur Kahn, included four papers. The first paper ("A multiversion model for multimedia data warehouse" *Arigon, Tchounikine, Miquel*) was related to multimedia data warehousing. The authors presented a Functional Multiversion Multidimensional Model integrating the concept of "version of dimension". This concept defines dimensions with members computed according to various functional versions. This new approach integrates a choice of computation modes of these members into the model, in order to allow the user to choose the best representation of data. In the second paper ("A generalized metric distance between hierarchically partitioned images") the authors (*Manouvrier, Rukoz, Jomier*) presented a generalized metric distance, called Δ-distance, between images represented by a tree structure. This distance allows to retrieve images globally similar to a query image. It takes into account the location of the image visual features and can b performed using a multi-level ltering algorithm. The third paper ("Classify By Representative Or Associations (CBROA): A Hybrid Approach for Image Classification" *Tseng, Lee, Su*) the authors identified two ways of classifying images: 1) Classify by some main object, and 2) Classify by multiple objects with their relations semantics. They proposed a hybrid image classification method, namely CBROA (Classify By Representative Or Associations), that can effectively classify both types of images at the same time. In the last paper ("Multiple Sensor Integration for Indoor Surveillance") the authors (*Petrushin, Wei, Ghani, Gershman*) presented the Multiple Sensor Indoor Surveillance (MSIS) project. This research project at Accenture Technology Labs aimed at exploring a variety of redundant sensors in a networked environment where each sensor is giving noisy information and the goal is to coherently reason about some aspect of the environment. Two concrete problems were discussed: 1) Visualizing events detected by 32 cameras during 24 hours, and 2) Localizing people using fusion of multiple streams of noisy sensory data.

3. CONCLUSION

The contributions of this workshop demonstrate that multimedia data mining is a growing topic with more and more high quality papers devoted to that field. A wide community of researchers is being identified and encouraged to communicate through this workshop.
Overall, the MDM/KDD2005 Workshop can be considered as a success. The opportunity for exchanging ideas and extending the research community in the data mining area was deeply appreciated. A strong commitment to continuing this event on an annual basis was made by all participants. The workshop URL is
http://www-sop.inria.fr/axis/mdm-kdd05

4. ACKNOWLEDGMENTS

Gratitude is extended to the members of the MDM/KDD Workshop Committees for their effort in staging this annual event. The Workshop Program Committee is to be warmly commended for promptly providing the organizers with high quality paper reviews, and for assistance in the organization of the Workshop.

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