“Multimedia Databases: Fundamentals, Retrieval Techniques, and Applications”

A Short Course for Doctoral students, University of Bologna, Engineering Faculty, Viale Risorgimento 2,

DATE: 5-6-9-10-20/12/2013

<table>
<thead>
<tr>
<th>Instructor and affiliation</th>
<th>Ilaria BARTOLINI (DISI)</th>
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<tr>
<td>Time span</td>
<td>8 h + 2h for the discussion of students’ essays</td>
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<td>Final exam</td>
<td>Discussion of an essay on an agreed topic</td>
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Instructor’s biographical sketch

Ilaria Bartolini got her "Laurea" degree in Computer Science from the University of Bologna in 1997 and in 2002 she received a PhD in Electronic an Computer Science Engineering from the DEIS department of the same University. Since 2005 she has a permanent position as Assistant Professor at the Department of Computer Science and Engineering (DISI), University of Bologna. She is working as an active member of the MultiMedia Database Group (http://www-db.deis.unibo.it/MMDBGroup/) since 1998. In 1998 she spent six months at CWI (Centrum voor Wiskunde en Informatica) in Amsterdam (The Netherlands) as a junior researcher. In 2004 she was a visiting researcher at NJIT (New Jersey Institute of Technology) in Newark, NJ, USA. From January 2008 to April 2008, from September 2010 to November 2010, and from September 2012 to November 2012 she was invited Visiting Professor at the Hong Kong University of Science and Technology (HKUST). Her current research mainly focuses on collaborative filtering, learning of user preferences, similarity and preference query processing in large databases, and retrieval and browsing of image collections. She has participated to several national and international research projects. Ilaria Bartolini has published more than 50 refereed papers in major international journals (including IEEE TPAMI, IEEE TKDE, ACM TODS, DKE, KAIS, and MTAP) and conferences (including VLDB, ICDE, PKDD, and CIKM). She serves as reviewer for the top international journals in the field of computer science, has participated in many program committees for international conferences, and was Chair of many working sessions. Ilaria Bartolini is a member of IEEE and ACM SIGMOD.

Regarding teaching activity, Ilaria Bartolini has been a lecturer in several courses for the Laurea Degree in Computer Engineering and post-graduate masters at Alma Graduate School. From 2005 to 2010 she was in charge of the "Information Systems L-A" course for the Laurea Degree in Computer Engineering of the University of Bologna. Since 2010 she is in charge of the "Web Technologies T" course for the Laurea Degree in Computer Engineering of the University of Bologna.

Course Outline

The course presents the fundamentals in multimedia (MM) databases (data representation and retrieval), by focusing on the requirements of an efficient and effective retrieval process, and providing a set of use cases and applications supporting the significance of the topic.
Objectives

The course aims at providing fundamental skills in MM data and MM DBMS (Data Base Management Systems), together with the illustration of efficient and effective retrieval techniques able to provide users with information of interest in a real-time manner. Several use cases will be presented in order to show how such MM solutions can be profitably applied in a number of real applications.

Learning and assessment modalities

The course will be organized in four slots of two hours each, lecture mode with slide presentations. The course will be taught in either Italian or English at the preference of the convenor. The final assessment consists of a short essay on a topic agreed between the student and the lecturer.

Materials

All materials for the course will be in English. A copy of the slides and references will be provided to the students.

Topics at a glance

- MM data and applications;
- MM data content representations and similarity measures for their retrieval;
- MM DBMS;
- Efficient algorithms for MM data retrieval;
- Results accuracy, use cases, and real applications.

Detailed topics/Schedule

- First lecture (2 h.):
  “MM data and content representations”
  ° MM data and applications;
  ° MM data coding;
  ° MM data content representation.
- Second lecture (2 h.):
  “Similarity measures for MM data retrieval and MM DBMS”
  ° Description models for complex MM objects;
  ° Similarity measures for MM data content;
  ° MM DBMS.
- Third lecture (2 h.):
  “Efficient algorithms for MM data retrieval”
  ° MM query formulation paradigms;
  ° Sequential retrieval of MM data;
  ° Index-based retrieval of MM data;
  ° Distributed algorithms for MM retrieval.
- Fourth lecture (2 h.):
  “Result accuracy, use cases and real applications”
  ° Quality of the results and relevance feedback techniques;
  ° Use cases;
  ° Demos of some applications.