

Jelena Tešić

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EDUCATION

Ph.D. Electrical and Computer Engineering

September 2004

Electrical and Computer Engineering Department, University of California, Santa Barbara, CA

Dissertation title: “*Managing Large-scale Multimedia Repositories*”. Advisor: Prof. B.S. Manjunath.

M.S., Electrical and Computer Engineering

December 1999

Electrical and Computer Engineering Department, University of California, Santa Barbara, CA

Curriculum Focus: Digital Signal Processing and Communications.

Dipl.Ing., Electrical Engineering

July 1998

School of Electrical Engineering, University of Belgrade, Belgrade, Serbia

Thesis title: “*Noise reduction in CDMA Receivers.*” Advisor: Prof. Zoran Dobrosavljević.

EXPERIENCE

Research Staff Member

March 2009 – present

Mayachitra Inc., Santa Barbara, CA & Austin, TX

Research focused on design and engineering of searchable large video database of oversight videos, and scalable retrieval algorithms within requirements of Defense Advanced Research Projects Agency (DARPA)-sponsored projects.

- Technical lead: Video Indexing Search and Retrieval System (VISR) design, implementation, and deployment for VIRAT Phase I application; VISR searches quickly and accurately terabytes of unmanned aerial vehicles (UAV)-captured videos;
- Research lead: Efficient algorithm for example-based video querying; developed novel techniques for retrieving and delivering results; conducted project-wide tutorials on the VISR system;

Research Staff Member

May 2004 – February 2009

Intelligent Information Analysis/Multimedia Research group, IBM T.J. Watson Research Center, Hawthorne, NY

Researched and developed algorithms and systems for large multimedia collection management, modeled visual querying system using statistical semantic modeling, implemented methods for effective automated and collaborative tagging. The work has been evaluated in NIST-sponsored benchmarks, client benchmarks and engagements. 6 patents filed.

- Technical lead: Digital Me content track project (one of top 10 IBM Innovation Jam initiative) - led world-wide technical team, developed use cases, demos and prototype systems, briefed executives, interacted with clients and partners.
- System development: led design, implementation and usecase for IBM Multimedia Knowledge Center, authoring tool for multimedia semantic spaces, - user interface, design, functionality, backbone, database design, search algorithm, and usecases.
- Tooling: developed functionalities, such as metadata extraction, near-duplicate detection, label scoring, contextual filtering, metadata extraction, interface improvements (design, tagging, and grouping) for the IBM Multimedia Analysis and Retrieval System (IMARS) custom built C++ codebase.
- Release: led prototype IMARS tool release and updates on alphaWorks (2004-2009), 8 updates and 2000+ total downloads.
- Client demos: design, customization and packaging; assembled live demos of visual semantic classification performance on user’s data, web stream, custom datasets and domains; personalized and extended ontology, classifiers and interface design for various client engagements, prototypes; helped define pilot projects.
- Development: developed scalable automatic classification approach based on the shared model schema (joint work with Rong Yan) for scalable domain-independent visual content modeling;
- Research and development of visual and semantic search query modeling approach for NIST TRECVID evaluations 2004-2008 (IBM top performer); led thread mining, linking and labeling for VACE proposal (funding for VACE III awarded to the team).
- Professional education: MicroMBA, Project Management Fundamentals week-long courses; Leadership & Teamwork 3-day course; Team Genius and Presentation Skills 2-day courses.

Graduate Student Researcher

July 1999 – March 2004

Vision Research Lab, University of California, Santa Barbara, CA

Devised an efficient scheme for interactive nearest neighbor search in large high-dimensional data repositories. Designed and implemented a framework to learn, present, and discover spatial patterns in scientific image/video data. Introduced improvements to clustering, indexing, and approximate similarity retrieval in large multidimensional datasets. Developed a compression scheme that removes redundancies from MPEG7 texture datasets.

Summer Intern

June 2000 – September 2000

Multimedia Asset Management Group, HP Labs, Palo Alto, CA

Proposed, patented and partially implemented an effective multimedia classifying system called *Modular Intelligent Multimedia Analysis System*. The system categorizes multimedia data based on the extracted semantics. 1 patent filed.

Teaching Assistant

September 1998–June 1999, January 2003–June 2003

Electrical and Computer Engineering Department, University of California, Santa Barbara, CA

Outstanding Teaching Assistant award 1998–1999. Conducted Laboratory and discussion classes in *Digital Signal Processing, Digital Image Processing, Computer Vision* and *Signal Analysis*. Assisted and lectured new teaching assistants.

IAESTE Intern

November 1997 – February 1998

Department of Communications, UNICAMP, Campinas, Brazil

Developed an algorithm for efficient multidimensional Electrocardiographic (ECG) data visualization and storage during Holter monitoring using compressed MPEG2 video technology.

Summer Undergraduate Research Fellow

June 1997 – September 1997

Earth and Space Science Division, Jet Propulsion Laboratories, Pasadena, CA

Documented history, and simulated development of Galileo Probe Entry Site Hot Spot motion on Jupiter (1995–1997). Improved existing tool by implementing a series of image processing methods.

Research/Teaching Assistant

September 1996 – July 1998

School of Electrical Engineering, University of Belgrade, Belgrade, Serbia

Conducted research in medical imaging and automated pathogen tissue cell detection. Led Lab and Recitation classes in *Fundamentals of Electrical Engineering* and *Circuit Theory*. Instructed and led student team from University of Belgrade for annual National Competition in *Circuit Theory*, held by Association of Electrical Engineering, 1998.

PATENTS

- “Method and Apparatus for Semantic Assisted Rating of Multimedia Content,” Shahram Ebadollahi, Milind Naphade, Apostol Natsev, John R. Smith, Ioana R. Stanoi, **Jelena Tešić**, and Lexing Xie; filed: March 11, 2008, United States Patent Application Number: 20090234831.
- “Method and Apparatus for Model-Shared Subspace Boosting for Multi-Label Classification,” John R. Smith, **Jelena Tešić**, and Rong Yan; filed December 12, 2007, United States Patent Application Number: 20090157571.
- “Method and Apparatus for Automatic Multimedia Narrative Enrichment,” Murray Campbell, Shahram Ebadollahi, Matthew Hill, Brian Landry, Chung-Sheng Li, Apostol Natsev, Milind Naphade, John Smith, **Jelena Tešić**, and Lexing Xie; filed: June 7, 2007. United States Patent Application Number: 20080306925.
- “Method and Apparatus for Joint Analysis of Social and Content Networks,” John R. Smith and **Jelena Tešić**; filed: May 15, 2007, United States Patent Application Number: 20080288596.
- “Method and Apparatus for Using Multiple Channels of Disseminated Data Content in Responding to Information Requests,” John R. Smith, Ioana R. Stanoi, and **Jelena Tešić**, filed: February 20, 2007, United States Patent Application Number: 20080201314.
- “Method and Apparatus for Classifying Multimedia Artifacts Using Ontology Selection and Semantic Classification,” Milind Naphade, John R. Smith and **Jelena Tešić**; filed: January 8, 2007, United States Patent Application: 20080168070.
- “Modular Intelligent Multimedia Analysis System,” Yining Deng and **Jelena Tešić**; filed: August 28, 2006, United States Patent Application Number: 20070094226.

PROFESSIONAL ACTIVITIES

- *Guest Editor* Special Issue on Collaborative Tagging of Multimedia, IEEE Multimedia Magazine, July-Sep 2008.
- *Referee* for the IEEE Transactions Pattern Analysis and Machine Intelligence, IEEE Multimedia Transactions, IEEE Transactions on Knowledge and Data Engineering, IEEE Multimedia Magazine, Journal of Visual Communication and Image Representation, IEEE Signal Processing Magazines, IEEE Transactions on Neural Networks, IEEE Transactions on Multimedia Computing, Communications, and Applications, ACM Multimedia Systems Journal, and EURASIP Journal on image and Video Processing.

- *Technical Program Committee* for IEEE International Conference on Multimedia and Expo (ICME), IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP), ACM International Conference on Image and Video Retrieval (CIVR), IEEE International Conference on Image Processing (ICIP), SIAM SDM Workshop on Mining Scientific and Engineering, IEEE ICIP IBM Student Paper award.

PANELIST

- *Diversity in Multimedia Retrieval Research*, 8th ACM SIGMM International Workshop on Multimedia Information Retrieval In conjunction with ACM Multimedia, Santa Barbara, CA, October 2006.
- *Experienced TA Panel* for TA Orientation and workshop lecturer on “*TAing Engineering Sections*,” campus-wide Teaching Assistant Orientation, University of California, Santa Barbara, CA, September 2003.

INVITED TALKS

- “*Data Modeling Strategies for Imbalanced Learning*”, NSF IGERT Seminar series, February 2007.
- “*Learning the Semantics of Multimedia Queries from a Small Number of Examples*”, ECE Department Seminar, UC Santa Barbara, November 2005.
- “*Efficient Query Processing in Relevance Feedback*,” ADVENT Seminar Series, Columbia University, New York City, Mitsubishi Electric Research Laboratories, Murray Hill, NJ, and IBM Research, Hawthorne, NY, March 2003.
- “*Issues Concerning Multimedia Mining*,” Methods for Mining Video Data, Invited Session, American Statistical Association Joint Statistical Meetings (JSM), San Francisco, CA, August 2003.
- “*Mining Large Image Datasets*,” Institute for Scientific Computing Research Seminar, Center for Applied Scientific Computing, Lawrence Livermore National Laboratory, CA, October 2001.

HONORS AND AWARDS

- IBM First Plateau Invention Achievement Award in appreciation and recognition of creative contributions to IBM progress, July 2007
- IBM Research Division Technical Group Award has been presented for Image Filtering Benchmark Team Award, February 2007
- IBM First Patent Application Invention Achievement Award for: Method and Apparatus for Classifying Multimedia Artifacts Using Ontology Selection and Semantic Classification, February 2007
- IBM Research Division Award for Multimedia Analysis and Retrieval System, 2006
- IBM Bravo! Dinner for Two Award for Successful completion of TRECVID-2006 benchmark, September 2006
- IBM Award of Distinction for voluntarism, March 2006
- IBM Research Division Award for Semantic Content-based Multimedia Analysis and Retrieval, December 2005
- IBM Research Division Award for TRECVID-2004 Video Retrieval Evaluation, March 2005
- ACM Multimedia, best paper nominee, 2005
- IEEE CVPR student travel grant award, IEEE Computer Society, 2003.
- Presidential Work and Study Award from University of California at Santa Barbara, July 2001.
- Outstanding Teaching Assistant for Department of Electrical and Computer Engineering, University of California Santa Barbara, June 1999
- Summer Undergraduate Research Fellowship Award from Caltech/JPL, Pasadena, CA, 1997.
- Undergraduate Fellowship from Zepter Foundation, Belgrade, 1996–1998.
- Undergraduate Fellowship from Serbian Scientific Development Foundation, Belgrade, 1994–1998.
- Fellowship Award from City of Belgrade, Serbia, 1998.
- Fellowship Award from Soros foundation, Belgrade, Serbia, 1997.

PUBLICATIONS

- [1] Apostol Natsev, John R. Smith, **Jelena Tešić**, Lexing Xie, and Rong Yan, “IBM Multimedia Analysis and Retrieval System - Video Olympics People’s choice award,” in *ACM International Conference on Image and Video Retrieval (ACM CIVR)*, Niagara Falls, Canada, July 2008.
- [2] Apostol Natsev, Wei Jiang, Michele Merler, John R. Smith, **Jelena Tešić**, Lexing Xie, and Rong Yan, “IBM Research trecvid-2008 video retrieval system,” in *NIST TRECVID-2008 Workshop*, Gaithersburg, Maryland, November 2008.
- [3] Apostol Natsev, Alexander Haubold, **Jelena Tešić**, Lexing Xie, and Rong Yan, “Semantic concept-based query expansion and re-ranking for multimedia retrieval,” in *ACM Multimedia*, September 2007.
- [4] Rong Yan, **Jelena Tešić**, and John R. Smith, “Model-shared subspace boosting for multi-label classification,” in *ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (KDD)*, San Jose, California, August 2007.
- [5] **Jelena Tešić**, Apostol Natsev, and John R. Smith, “Cluster-based data modeling for semantic video search,” in *ACM International Conference on Image and Video Retrieval (ACM CIVR)*, Amsterdam, Netherlands, July 2007.
- [6] **Jelena Tešić**, Apostol Natsev, Joachim Seidl, and John R. Smith, “Ibm marvel interactive video threading,” in *ACM International Conference on Image and Video Retrieval (ACM CIVR)*, Amsterdam, Netherlands, July 2007.
- [7] Apostol Natsev, John R. Smith, **Jelena Tešić**, Lexing Xie, and Rong Yan, “IBM Multimedia Search and Retrieval System,” in *ACM International Conference on Image and Video Retrieval (ACM CIVR)*, Amsterdam, Netherlands, July 2007.
- [8] **Jelena Tešić**, Apostol Natsev, Lexing Xie, and John R. Smith, “Data modeling strategies for imbalanced learning in visual search,” in *IEEE International Conference on Multimedia and Expo(ICME)*, Beijing, China, July 2007.
- [9] Lexing Xie, **Jelena Tešić**, and Apostol Natsev, “Dynamic multimodal fusion in video search,” in *IEEE International Conference on Multimedia and Expo(ICME)*, Beijing, China, July 2007.
- [10] Murray Campbell, Alexander Haubold, Apostol Natsev, John R. Smith, **Jelena Tešić**, Lexing Xie, Rong Yan, and Jun Yang, “Ibm research trecvid-2007 video retrieval system,” in *NIST TRECVID-2007 Workshop*, Gaithersburg, Maryland, November 2007.
- [11] James Z. Wang, Nozha Boujemaa, Alberto Del Bimbo, Donald Geman Alberto Del Bimbo, Alex Hauptmann, and **Jelena Tešić**, “Diversity in multimedia retrieval research panel, MIR workshop,” in *ACM Multimedia*, Santa Barbara, California, October 2006.
- [12] **Jelena Tešić** and John R. Smith, “Efficient summarizing of multimedia archives using cluster labeling,” in *International Conference on Image and Video Retrieval (CIVR)*, Tempe, Arizona, July 2006.
- [13] **Jelena Tešić** and John R. Smith, “Semantic labeling of multimedia content clusters,” in *IEEE International Conference on Multimedia and Expo(ICME)*, Toronto, Canada, July 2006.
- [14] Milind Naphade, John R. Smith, **Jelena Tešić**, Shih-Fu Chang, Winston Hsu, Lyndon Kennedy, Alexander Hauptmann, and Jon Curtis, “Large-scale concept ontology for multimedia,” in *IEEE Multimedia Magazine*, July 2006, vol. 13.
- [15] Mike Christel, Milind Naphade, Apostol Natsev, and **Jelena Tešić**, “Assessing the filtering and browsing utility of automatic semantic concepts for multimedia retrieval,” in *IEEE Computer Vision and Pattern Recognition (CVPR), SLAM Workshop*, New York City, June 2006.
- [16] Murray Campbell, Alexander Haubold, Shahram Ebadollahi, Milind R. Naphade, Apostol Natsev, Joachim Seidl, John R. Smith, **Jelena Tešić**, and Lexing Xie, “Ibm research trecvid-2006 video retrieval system,” in *NIST TRECVID-2006 Workshop*, Gaithersburg, Maryland, November 2006.
- [17] Apostol Natsev, Milind R. Naphade, and **Jelena Tešić**, “Learning the semantics of multimedia queries and concepts from a small number of examples,” in *ACM Multimedia*, Singapore, November 2005.
- [18] **Jelena Tešić**, “Metadata practices for consumer photos,” in *IEEE Multimedia Magazine*, July 2005, vol. 12.
- [19] John R. Smith, Milind R. Naphade, Apostol Natsev, and **Jelena Tešić**, “Multimedia research challenges for industry,” in *International Conference on Image and Video Retrieval (CIVR)*, Singapore, November 2005.
- [20] John R. Smith, Murray S. Campbell, Milind R. Naphade, Apostol Natsev, and **Jelena Tešić**, “Learning of semantic concepts in broadcast video,” in *International Conference on Intelligence Analysis*, McLean, VA, May 2005.

- [21] Arnon Amir, Janne Argillander, Murray Campbell, Alexander Haubold, Shahram Ebadollahi, Feng Kang, Milind R. Naphade, Apostol Natsev, John R. Smith, **Jelena Tešić**, and Timo Volkmer, "Ibm research trecvid-2005 video retrieval system," in *NIST TRECVID-2005 Workshop*, Gaithersburg, Maryland, November 2005.
- [22] Arnon Amir, Shih-Fu Chang, Martin Franz, Giridharan Iyengar, John R. Kender, Ching-Yung Lin, Milind R. Naphade, Apostol Natsev, John R. Smith, and **Jelena Tešić**, "Ibm research trecvid-2004 video retrieval system," in *NIST TRECVID-2004 Workshop*, Gaithersburg, Maryland, November 2004.
- [23] **Jelena Tešić**, *Managing Large-scale Multimedia Repositories*, Ph.d. thesis, UC Santa Barbara, 2004.
- [24] Shawn Newsam, **Jelena Tešić**, Lei Wang, and B.S. Manjunath, "Issues in Managing Video Datasets," in *SPIE Int. Symp. On Electronic Imaging, Storage and Retrieval Methods and Applications for Multimedia*, San Jose, California, January 2004.
- [25] **Jelena Tešić**, Sitaram Bhagavathy, and B. S. Manjunath, "Issues Concerning Dimensionality and Similarity Search," in *International Symposium on Image and Signal Processing and Analysis (ISPA)*, Rome, Italy, September 2003.
- [26] Sitaram Bhagavathy, **Jelena Tešić**, and B. S. Manjunath, "On the Rayleigh nature of Gabor filter outputs," in *IEEE International Conference on Image Processing (ICIP)*, Barcelona, Spain, September 2003.
- [27] **Jelena Tešić** and B. S. Manjunath, "Nearest Neighbor Search for Relevance Feedback," in *IEEE International Conference on Computer Vision and Pattern Recognition (CVPR)*, Madison, WI, June 2003.
- [28] **Jelena Tešić** and B.S. Manjunath, "Issues concerning multimedia mining, methods for mining video data, invited session," in *ASA Joint Statistical Meeting (JSM)*, San Francisco, CA, August 2003, Extended abstract.
- [29] **Jelena Tešić**, Shawn Newsam, and B.S. Manjunath, "Mining Image Datasets using Perceptual Association Rules," in *SIAM SDM Workshop on Mining Scientific Datasets*, San Francisco, CA, May 2003.
- [30] **Jelena Tešić**, Shawn Newsam, and B.S. Manjunath, "Scalable Spatial Event Representation," in *IEEE International Conference on Multimedia and Expo (ICME)*, Lausanne, Switzerland, August 2002.
- [31] **Jelena Tešić**, Shawn Newsam, and B.S. Manjunath, "Challenges in Mining Large Image Datasets," in *IPAM Short Program on Mathematical Challenges in Scientific Data Mining*, Los Angeles, CA, January 2002, Extended abstract.
- [32] **Jelena Tešić** and B.S. Manjunath, "Mining image datasets," in *Workshop on Mining Scientific Datasets*, Minneapolis, MN, July 2000, Extended abstract.
- [33] G.S. Orton, B.M. Fisher, K.H. Baines, S.T Stewart, A.J Friedson, J.L Ortiz, M. Marinova, M. Ressler, A. Dayal, W. Hoffmann, J. Hora, S. Hinkley, V. Krishnan, M. Mašanović, **J. Tešić**, A. Tziolas, and K.C. Parija, "Characteristics of the Galileo probe entry site from Earth-based remote sensing observations," *Journal of Geophysical Research*, September 1998.
- [34] D. Dujković **J. Tešić** M. Mašanović I. Rakočević I. Milosavljević B. Reljin, P. Kostić, "Automated segmentation and pathogen cell detection in tissues (in serbian: Segmentacija i izdvajanje objekata u histopatološkom preparatu primenom računara)," in *Zbornik Informatika u medicini, farmaciji i socijalnoj zaštiti (IMF-98)*, Arandjelovac, Serbia, May 1998.

MENTOR

- *Co-leader* of LEGO Robotics workshop in EXITE and Girls TechKnow camps (with Jim Wynne), 2006-2008, and volunteer 2004-2006, IBM T.J. Watson Research Center, NY.
- *Mentor* to 8th grade Bronx students, First Lego League NYC competition 2005-2006 (the team placed in top 10% in the New York City).

REFERENCES

References available upon request