

Raffay Hamid

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PROFESSIONAL INTERESTS

Computer Vision and Machine Learning

EDUCATION

- 2003 - 2008 **Ph.D., Computer Science**
GEORGIA INSTITUTE OF TECHNOLOGY – Atlanta, GA
Advisor: Dr. Aaron Bobick
Thesis: A Computational Framework For Unsupervised Analysis of Human Activities
GPA: 3.9/4.0
- 2002 - 2005 **M.S., Computer Science**
GEORGIA INSTITUTE OF TECHNOLOGY – Atlanta, GA
Relevant Course work: Computer Vision, Machine Learning, Optimization, Numerical Analysis, Partial Differential Equations, Computational Algorithms for Bioinformatics
GPA: 3.9/4.0
- 1997 - 2001 **B.S., Electrical Engineering**
UNIVERSITY OF ENGINEERING & TECHNOLOGY – Lahore, Pakistan
GPA: 86/100
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WORK EXPERIENCE

- 2011 - Present **eBay Research Labs.** San Jose, CA
STAFF RESEARCH SCIENTIST
Responsibilities include designing and prototyping Computer Vision and Machine Learning systems to demonstrate viability of online-commerce related research. Latest effort resulted in an image-based search feature in eBay Mobile Fashion App.
- 2008 - 2010 **Disney Research** Pittsburgh, PA
POSTDOCTORAL RESEARCH ASSOCIATE
Advisor: Dr. Jessica Hodgins
Developed real-time systems for visualization and analysis of multi-player sports. The framework was developed in C++, using STL and OpenCV. Processing for multiple cameras was parallelized using Microsoft OpenMP.
Resulted in $[J_1, C_1]$.
- 2002 - 2008 **Georgia Institute of Technology** Atlanta, GA
GRADUATE RESEARCH ASSISTANT – Computational Perception Laboratory
Advisor: Dr. Aaron Bobick
Proposed a novel framework for unsupervised discovery, classification, and analysis of everyday human activities. Sequence representations, particularly n -grams and Suffix Trees were used to represent human activities. The development of this framework was done in both C++ and MATLAB.
Resulted in $[J_2, C_3, C_4, C_5, C_6, W_1, W_2, T_1, T_2]$.

Summer 2007	Microsoft Research SUMMER RESEARCH INTERN Mentor: Dr. Cha Zhang Worked on adaptation of speaker/non-speaker classifiers for multimedia applications. The work was done for the development of Microsoft RoundTable. Resulted in [C ₂].	Redmond, WA
Summer 2005	Mitsubishi Electric Research Lab. SUMMER RESEARCH INTERN Mentor: Dr. Yuri Ivanov Explored classifier combination strategies for ensemble learning. Resulted in [J ₃].	Boston, MA
Summer 2003	Intel Research SUMMER RESEARCH INTERN Mentor: Dr. Anind Dey Built a programming-by-demonstration based framework for context aware applications. Resulted in [J ₄].	Berkeley, CA
2001 – 2002	Techlogix Inc. SOFTWARE ENGINEER Manager: Dr. Aijaz Baloch Worked on vision based occupancy detection system for automobiles. The work was done for General Motors and Eaton Inc. Resulted in [C ₈].	Lahore, Pakistan

ACADEMIC TEACHING EXPERIENCE

Fall 2003	Georgia Institute of Technology GRADUATE TEACHING ASSISTANT – College of Computing Course: CS8803-Mathematical Foundations for Computational Perception Designed and delivered graduate-level lectures on Optimization Methods, Signal Analysis, and Filtering Techniques. Assisted in designing and grading assignments.	Atlanta, GA
Spring 2002	University of Engineering & Technology VISITING LECTURER – Department of Electrical Engineering Course: Image & Signal Processing Delivered a semester-long series of lectures on fundamentals of Signal and Image Processing.	Lahore, Pakistan

COMPUTATIONAL SKILLS

Languages: C/C++ (More than 10 years of experience).

Tools: Matlab (Fluent with toolboxes used for Machine Learning, Optimization, & Computer Vision). OpenCV, Standard Template Library, Boost, Microsoft Foundational Classes, Intel Signal & Image Processing Libraries.

PUBLICATIONS

BOOK CHAPTERS AND JOURNAL PUBLICATIONS

[B₁] R. Hamid. “Ensemble Learning Methods for Human Activity Recognition”. In Ensemble Learning: Methods and Applications – Springer, New York, 2012, pp: 251–272.

[J₁] R. Hamid, R. Kumar, J. Hodgins, I. Essa. “A Computational Framework for Sports Visualization using Multiple Cameras”. **In preparation.**

[*J*₂] R. Hamid, S. Maddi, A. Johnson, A. Bobick, I. Essa, C. Isbell. “A Novel Sequence Representation for Unsupervised Analysis of Human Activities”. *Artificial Intelligence Journal* 173(14) : 2009. Citations: 32 .

[*J*₃] Y. Ivanov, R. Hamid. “Weighted Ensemble Boosting for Robust Activity Recognition in Video”. *International Journal of Machine Vision and Graphics*, 4(2), 2007. **Also appeared** in proceedings of International Conference on Computer Vision & Graphics, 2006.

[*J*₄] A. Dey, R. Hamid, C. Beckmann, I. Li, D. Hsu. “a CAPpella: Programming by Demonstration of Context-Aware Applications”. *ACM SIGCHI, Conference on Human Factors in Computing Systems*, 2004. **Also appeared** in *CHI Letters* 6(1), 2005. Citations: 144 .

REFEREED CONFERENCE PUBLICATIONS

[*C*₁] R. Hamid, R. Kumar, M. Grundmann, K. Kim, I. Essa, J. Hodgins. “Player Localization Using Multiple Static Cameras for Sports Visualization”. In *Proceedings of IEEE International Conference on Computer Vision & Pattern Recognition* 2010.

[*C*₂] C. Zhang, R. Hamid, Z. Zhang. “Taylor Expansion Based Classifier Adaptation: Application to Person Detection”. In *Proceedings of IEEE International Conference on Computer Vision & Pattern Recognition* 2008.

[*C*₃] R. Hamid, S. Maddi, A. Bobick, I. Essa. “Structure from Statistics: Unsupervised Analysis of Activities Using Suffix Trees”. In *Proceedings of IEEE International Conference of Computer Vision*, 2007. Citations: 29.

[*C*₄] R. Hamid, S. Maddi, A. Johnson, A. Bobick, I. Essa, C. Isbell. “Discovery and Characterization of Activities from Event-Streams”. In *Proceedings of International Conference on Uncertainty in Artificial Intelligence*, 2005. Citations: 12.

[*C*₅] R. Hamid, A. Johnson, S. Batta, A. Bobick, C. Isbell, G. Coleman. “Detection and Explanation of Anomalous Activities - Representing Activities as Bags of Event *n*-grams”. In *Proceedings of IEEE International Conference on Computer Vision & Pattern Recognition* 2005. Citations: 78.

[*C*₆] R. Hamid, A. Bobick, A. Yezzi. “Audio-Visual Flow - A Variational Approach to Multi-Modal Flow Estimation”. In *Proceedings of IEEE International Conference on Image Processing* 2004.

[*C*₇] R. Amar, S. Dow, R. Gordon, R. Hamid, C. Sellers, “Mobile ADVICE: An Accessible Device for Visually Impaired Capability Enhancement”. *Extended Abstract in ACM SIGCHI, Conference on Human Factors in Computing Systems*, 2003.

[*C*₈] R. Hamid, A. Baloch, A. Bilal, and N. Zaffar. “Object Segmentation Using Feature Based Conditional Morphology”. In *Proceedings of International Conference on Image Analysis and Processing*, 2003. The work was done at Techlogix Inc., for General Motors.

REFEREED WORKSHOP PUBLICATIONS

[*W*₁] R. Hamid, S. Maddi, A. Bobick, I. Essa. “Unsupervised Analysis of Activity Sequences Using Event-Motifs”. In *Proceedings of ACM International Workshop on Video Surveillance and Sensor Networks* 2006. Citations: 18.

[*W*₂] R. Hamid, S. Maddi, A. Johnson, A. Bobick, I. Essa, C. Isbell. “Unsupervised Activity Discovery and Characterization From Event-Streams”. In *Proceedings of the Learning Workshop at Snowbird*, 2005.

[*W*₃] R. Hamid, Yan Huang, Irfan Essa. “ARGMode - Activity Recognition using Graphical Models”. In *Proceedings of IEEE Workshop on Detection and Recognition of Events in Video* 2003. Citations: 42.

 THESES & TECHNICAL REPORTS

[T₁] R. Hamid, “A Computational Framework for Unsupervised Analysis of Everyday Human Activities”. Ph.D. Thesis, College of Computing, Georgia Institute of Technology, 2008.

[T₂] R. Hamid, “Unsupervised Activity Analysis for Sensor-Rich Environments”. M.S. Thesis, College of Computing, Georgia Institute of Technology, 2005.

[T₃] R. Hamid, A. Dey, C. Beckmann, I. Li, D. Hsu, “a CAPpella: Programming by Demonstration of Context-Aware Applications”. Intel Research Berkeley, IRB-TR-03-036, 2003.

[T₄] R. Hamid, B. Zeb, M. Furqan, “Wavelets and Fractal Based Image Compression Techniques”. University of Engineering and Technology Lahore, 2000.

 INDUSTRIAL PATENTS

A system for content-based image retrieval to facilitate mobile commerce (patent filed 2011).

 ACADEMIC HONORS & AWARDS

Awarded National Merit Scholarship from the Government of Pakistan	1994 - 2001
Awarded Best Undergraduate Research Project at UET, Lahore	2001
Graduated with highest honor from UET, Lahore (ranked in top 5% students)	2001

 SELECTED TALKS & SEMINARS

Fleeting Glimpses of Timeless Lahore

San Jose State University, School of Arts, San Jose, CA. March, 2012

A Discovery Based Perspective Towards Human Activity Analysis

Carnegie Mellon University, Pittsburgh, PA. July, 2008

Natural Language Processing Techniques for Unsupervised Analysis of Human Activities

Yahoo! Research & Data Mining Group, Sunnyvale, CA. June, 2008

Unsupervised Analysis of Human Activities in Everyday Environments

Sarnoff Corporation., Princeton, NJ. May, 2008

Novel Sequence Representations for Unsupervised Analysis of Everyday Human Activities

Intel Research Lab., Pittsburgh, PA. April, 2008

Improved Speaker Scale Detection for Multimedia Applications

Microsoft Research., Redmond, WA. August, 2007

Weighted Ensemble Boosting for Robust Activity Recognition

Mitsubishi Electric Research Lab., Boston, MA. August, 2005

A computational Framework for Perceptual Analysis of Human Activities

International Workshop on Frontiers of IT, Islamabad, Pakistan. December, 2005.

Programming by Demonstration of Context-Aware Applications

Intel Research Lab., Berkeley, CA. August, 2003

Feature Based Conditional Morphology for Object Segmentation

All Pakistan Annual SOFTECH Colloquium, Lahore, Pakistan, 2002

GRADUATE STUDENT MENTORSHIP

Jeffrey Panza
 Disney Research Intern 2010
 Bokeh Panoramas for Dynamic Scenes using Synchronized Camera-Arrays.
 Completed M.S. from CMU.

Ramkrishan Kumar
 Disney Research Summer Intern 2009
 Player Localization for Sports Visualization. Resulted in [J_1 , $C1$].
 Completed M.S. from UNC Chapel Hill. Currently working at Deutsche Bank.

Franziska Meier
 Disney Research Summer Intern 2009
 Sharing Visual Features for Human Action Recognition.
 Currently, a PhD student at USC.

Ahmad Ahmadi, Visiting MS Student from the University of Munich, 2007
 Unsupervised discovery of activity-phases in surgical rooms.
 Currently, a PhD student at the University of Munich.

Siddahrta Maddi
 M.S., Mathematics, Georgia Tech. 2006
 Suffix Trees for human activity analysis. Resulted in [J_2 , C_3 , C_4 , W_1 , W_2].
 Currently, a research engineer at MIT Lincoln Laboratory.

Samir Batta
 M.S., Computer Science, 2006.
 Learning of activity structure using local event statistics. Resulted in C_5
 Currently, a financial software engineer at Goldman Sachs.

PROFESSIONAL ACTIVITIES
Journal Reviews:

Journal of Artificial Intelligence
 International Journal of Computer Vision
 IEEE Transactions on Multimedia
 IEEE Transactions on Neural Systems & Rehabilitation Engineering

Conference Reviews:

ACM Multimedia
 ACM Human Robot Interaction
 ACM International Conference on Ubiquitous Computing
 AAI Conference on Artificial Intelligence
 IEEE International Conference on Computer Vision
 IEEE International Conference on Computer Vision & Pattern Recognition
 IEEE International Conference on Robotics & Automation
 European Conference on Computer Vision
 International Conference on Medical Image Computing & Computer Assisted Intervention
 International Conference on Pattern Recognition
 International Joint Conference on Artificial Intelligence
 International Conference on Uncertainty in Artificial Intelligence
 Asian Conference on Computer Vision

Miscellaneous:

Member of IEEE Computer Society.
 Invited adjudicator at the annual Science competition for African American high school students, held at Morehouse College, Atlanta, GA. 2006.

Organizer, Computer Vision and Machine Learning reading group - Computational Perception Lab. Georgia Institute of Technology. 2003-2004.

Student President, IEEE Society of Signal and Image Processing, University of Engineering and Technology, Lahore, Pakistan. 1999.

BACKGROUND

Born in Lahore Pakistan, on October 17, 1978. Interests include photography, poetry, music, and squash.

REFERENCES

Dr. Dennis DeCoste

Research Director - eBay Research Labs.

E-mail: dennis.decoste@gmail.com

Postal Address: 2145 Hamilton Ave., San Jose, CA 95125, USA

Dr. Jessica Hodgins (Post-doctorate Advisor)

Director - Disney Research Pittsburgh

Professor - Robotics Institute & School of Computer Science

Carnegie Mellon University

E-mail: jkh@cs.cmu.edu

Postal Address: 4270 Forbes Ave., Pittsburgh, PA 15213, USA

Dr. Aaron Bobick (Ph.D. Advisor)

Professor - College of Computing

Georgia Institute of Technology

E-mail: afb@cc.gatech.edu

Postal Address: 85 Fifth Street NW Atlanta, GA 30308, USA

Dr. Cha Zhang

Research Scientist - Microsoft Research

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Postal Address: One Microsoft Way, Redmond, WA 98052, USA