

Raffay Hamid

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PROFESSIONAL INTERESTS

Computer Vision, Machine Learning, and Data Mining

EDUCATION

- 2004 - 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
Curricular Minor: Variational Methods for Computational Perception
GPA: 3.9/4.0
- 2002 - 2004 **M.S., Computer Science**
GEORGIA INSTITUTE OF TECHNOLOGY – Atlanta, GA
GPA: 3.9/4.0
- 1997 - 2001 **B.S., Electrical Engineering**
UNIVERSITY OF ENGINEERING & TECHNOLOGY – Lahore, Pakistan
GPA: 86/100

WORK EXPERIENCE

- 2008 - Present **Disney Research Pittsburgh** Pittsburgh, PA
POSTDOCTORAL RESEARCH ASSOCIATE – in conjunction with CMU
Advisor: Dr. Jessica Hodgins
Developing computational systems for automatic sports analysis and visualization.
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 perceptual analysis of everyday human activities.
Resulted in [J_2 , J_3 , C_3 , C_4 , C_5 , C_6 , W_1 , W_2 , T_1 , T_2].
- Summer 2007 **Microsoft Research** Redmond, WA
SUMMER RESEARCH INTERN
Mentor: Dr. Cha Zhang
Worked on adaption of speaker/non-speaker classifiers for multimedia applications.
Resulted in [C_2].
- 05/16/2005 **Mitsubishi Electric Research Lab.** Boston, MA
SUMMER RESEARCH INTERN
Mentor: Dr. Yuri Ivanov
Explored classifier combination strategies for ensemble learning.
Resulted in [J_4].

- 05/12/2003 **Intel Research** Berkeley, CA
 SUMMER RESEARCH INTERN
 Mentor: Dr. Anind Dey
 Built a programming-by-demonstration based framework for context aware applications.
 Resulted in [J₅].
- 05/14/2001 **Techlogix Inc.** Lahore, Pakistan
 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 [C₈].

ACADEMIC TEACHING EXPERIENCE

- Fall 2003 **Georgia Institute of Technology** Atlanta, GA
 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.
- Spring 2002 **University of Engineering & Technology** Lahore, Pakistan
 VISITING LECTURER – Department of Electrical Engineering
 Course: Image & Signal Processing
 Delivered a semester-long series of lectures on fundamentals of Signal and Image Processing.

COMPUTATIONAL SKILLS

Languages: C/C++ (More than 8 years of experience).

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

PUBLICATIONS

REFEREED JOURNAL PUBLICATIONS

- [J₁] R. Hamid, R. Kumar, I. Essa, J. Hodgins. “A Computational Framework for Sports Visualization using Multiple Cameras”. **In preparation.**
- [J₂] R. Hamid, S. Maddi, A. Bobick, I. Essa. “Unsupervised Analysis of Human Activities Using Suffix Trees”. **In submission** to Artificial Intelligence Journal.
- [J₃] 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.
- [J₄] 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.
- [J₅] 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.

REFEREED CONFERENCE PUBLICATIONS

- [C₁] 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.
- [C₂] 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.
- [C₃] 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.
- [C₄] 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.
- [C₅] 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.
- [C₆] 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.
- [C₇] 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.
- [C₈] 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

- [W₁] 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.
- [W₂] 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.
- [W₃] 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.

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.

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

- Real-Time Rendering of Offside Line in Soccer Games
Disney Research Pittsburgh, Pittsburgh, PA. April, 2009
- 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.
- Representing Activities as Bags of Event n -Grams
University of Engineering & Technology, Lahore, Pakistan. December, 2004
- 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
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STUDENT MENTORSHIP

- Jeffrey Panza
Disney Research Intern 2010
Bokeh Panoramas for Dynamic Scenes.
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 (work in preparation).
Currently, a PhD student at USC.

Siddahrta Maddi

M.S., Mathematics, Georgia Tech. 2006

Suffix Trees for human activity analysis. Resulted in $[J_2, J_3, C_3, C_4, W_1, W_2]$.

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.

Ian Li

Summer Undergraduate Program in Engineering Research at Berkeley (SUPERB), 2003.

Programming by Demonstration for context aware applications. Resulted in $[J_5]$.

Currently, a Ph.D. student at CMU.

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

AAAI 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 playing squash. Holder of US H-1 visa.

REFERENCES**Dr. Jessica Hodgins (Postdoc Advisor)**

Director - Disney Research Pittsburgh
Professor - Robotics Institute & School of Computer Science
Carnegie Mellon University
E-mail: jkh@cs.cmu.edu
TEL: +1 (412) 268-6795

Dr. Aaron Bobick (Ph.D. Advisor)

Director - School of Interactive Computing
Professor - College of Computing
Georgia Institute of Technology
E-mail: afb@cc.gatech.edu
TEL: +1 (404) 894-8591

Dr. Cha Zhang

Research Scientist - Microsoft Research
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