

Raffay Hamid

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RESEARCH INTERESTS

Computer Vision, Machine Learning, Ubiquitous Computing.

EDUCATION

- 2004 - 2008 **Ph.D., Computer Science**
GEORGIA INSTITUTE OF TECHNOLOGY – Atlanta, GA
Advisor: Prof. Aaron Bobick
Dissertation Topic: A Computational Framework For Unsupervised Analysis of Everyday Human Activities
Curricular Minor: Variational Methods with Applications in Computer Vision
- 2002 - 2004 **M.S., Computer Science**
GEORGIA INSTITUTE OF TECHNOLOGY – Atlanta, GA
Advisor: Prof. Aaron Bobick
Dissertation Topic: Unsupervised Activity Analysis for Sensor-Rich Environments
- 1997 - 2001 **B.S., Electrical Engineering**
UNIVERSITY OF ENGINEERING & TECHNOLOGY – Lahore, Pakistan
Advisor: Prof. Masood Ahmad
Dissertation Topic: A Study of Wavelets and Fractal Based Image Compression Techniques

INDUSTRIAL WORK EXPERIENCE

- 2008 - Present **Walt Disney Imagineering – Carnegie Mellon University** Pittsburgh, PA
POSTDOCTORAL RESEARCH ASSOCIATE
Mentor: Prof. Jessica Hodgins
Research Topic: Sports activity analysis and visualization.
- Summer 2007 **Microsoft Research** Redmond, WA
SUMMER RESEARCH INTERN
Mentor: Dr. Cha Zhang
Research Topic: Classifier adaptation for speaker-scale detection for multimedia applications.
Resulted in $[C_1]$.
- Summer 2005 **Mitsubishi Electric Research Lab.** Boston, MA
SUMMER RESEARCH INTERN
Mentor: Dr. Yuri Ivanov
Research Topic: Robust event detection in video.
Resulted in $[J_3]$.
- Summer 2003 **Intel Research Lab.** Berkeley, CA
SUMMER RESEARCH INTERN
Mentor: Prof. Anind Dey
Research Topic: Programming by demonstration for context-aware applications.
Resulted in $[J_4]$.

2001 - 2002 **Techlogix Inc.** Boston, MA
 SIGNAL PROCESSING ENGINEER
 Manager: Dr. Aijaz Baloch
 Research Topic: Vision based automatic occupancy detection system for automobiles.
 Resulted in [C₆].

ACADEMIC RESEARCH EXPERIENCE

2002 - 2008 **Georgia Institute of Technology** Atlanta, GA
 GRADUATE RESEARCH ASSISTANT – Computational Perception Laboratory
 Developed a novel computational framework for unsupervised analysis of everyday human activities. Led teams of graduate and undergraduate students in joint research projects on motion analysis and perceptual scene understanding.

1999-2001 **University of Engineering & Technology** Lahore, Pakistan
 UNDERGRADUATE RESEARCH ASSISTANT – Department of Electrical Engineering
 Led a team of students to study and implement previously proposed Wavelet and Fractal based hybrid methods for Image Compression that exploit self-similarities in Wavelet domain.

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
 Designed and delivered a semester-long series of introductory lectures on Signal and Image Processing. Conducted programming workshops on Signal Filtering and Transforms.

PUBLICATIONS

REFEREED JOURNAL PUBLICATIONS

- [J₁] 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.
- [J₂] R. Hamid, S. Maddi, A. Bobick, I. Essa. “Unsupervised Analysis of Human Activities Using Suffix Trees”. In Submission to *Artificial Intelligence Journal*.
- [J₃] 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. The work was done at Mitsubishi Electronic Research Lab., during summer 2005.
- [J₄] 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. The work was done at Intel Research Lab., Berkeley, during summer 2003.

REFEREED CONFERENCE PUBLICATIONS

- [C₁] 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.

- [C₂] 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.
- [C₃] 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.
- [C₄] 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.
- [C₅] 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.
- [C₆] 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., in collaboration with 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 (with ACM Multimedia, 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 (with IEEE International Conference of Computer Vision & Pattern Recognition 2003).

REFEREED SHORT PAPERS

- [S₁] 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.

THESES & TECHNICAL REPORTS

- [T₁] R. Hamid, “A Computational Framework For Unsupervised Analysis of Everyday Human Activities”. Ph.D. Thesis, CoC, Georgia Institute of Technology, 2008.
- [T₂] R. Hamid, “Unsupervised Activity Analysis for Sensor-Rich Environments”. M.S. Thesis, CoC, Georgia Institute of Technology, 2005.
- [T₃] R. Hamid, C. Zhang, “Gradient-Based Method for Adaptation of Ensemble Classifiers”. MSR-TR-054, 2007.
- [T₄] R. Hamid, Y. Ivanov, “Weighted Ensemble Boosting for Robust Activity Recognition in Video”. MERL-TR-2006-080, 2006.
- [T₅] R. Hamid, A. Dey, C. Beckmann, I. Li, D. Hsu, “a CAPpella: Programming by Demonstration of Context-Aware Applications”. IRB-TR-03-036, 2003.

COMPUTATIONAL SKILLS

Languages: C++ (fluent in concepts of Object Oriented Programming & Data Structures).

Computational Tools: Matlab (expert in toolboxes generally used for Machine Learning, Optimization, Computer Vision, & Signal/Image Processing).

Software Development Kits: Intel OpenCV, Intel Signal & Image Processing Libraries.

STUDENT RESEARCH SUPERVISION

Ramkrishan Kumar, 2009

Player Localization for Sports Visualization (work in submission).

Completed M.S. from UNC Chapel Hill. Currently working at Deutsche Bank.

Franziska Meier, 2009

Sharing Visual Features for Human Action Recognition (work in submission).

Currently, a PhD student at USC.

Siddahrta Maddi, 2006

Suffix Trees for human activity analysis. Resulted in [J_1], [J_2], [C_2],[C_3],[W_1],[W_2]

Completed M.S. in Mathematics from Georgia Tech. Currently, a research engineer at MIT Lincoln Labs.

Samir Batta, 2006.

Learning of activity structure using local event statistics. Resulted in [C_4]

Completed M.S. in Computer Science from Georgia Tech. Currently, a financial software engineer at Goldman Sachs.

Ian Li, 2003.

Developmental environments for context aware applications. Resulted in [J_4]

Currently, a Ph.D. student at CMU.

TALKS & SEMINARS

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

Programming by Demonstration of Context-Aware Applications
Intel Research Lab., Berkeley, CA. August, 2003

PROFESSIONAL ACTIVITIES

Reviewer for International Journal of Computer Vision (IJCV), Journal of Artificial Intelligence, IEEE International Conference on Computer Vision (ICCV), IEEE International Conference on Computer Vision & Pattern Recognition (CVPR), AAAI Conference on Artificial Intelligence, IEEE International Conference on Robotics, Automation (ICRA), ACM Multimedia, and International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI).

BACKGROUND

Born in Lahore Pakistan, on October 17, 1978. Interests include poetry, guitar, photography, and playing squash. Holder of US H-1 visa.