Mahmudul Hasan

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RESEARCH INTERESTS

- Computer Vision – Human Activity Recognition, Object Recognition, Video Description, and Tracking.
- Machine Learning – Active Learning, Deep Learning, and Reinforcement Learning.

EDUCATION

Ph.D. Candidate, Computer Science and Engineering, Sep 2011 – May 2016 (Expected)
University of California, Riverside. GPA: 3.86/4.00
Dissertation: Active Learning of Activity Recognition Models.

Master of Science, Computer Science and Engineering, Jul 2009 - Jun 2011
Bangladesh University of Engineering and Technology (BUET). GPA: 3.75/4.00
Thesis: Automatic Detection and Recognition of Vehicle License Plate in Bangla.

Bachelor of Science, Computer Science and Engineering, Mar 2004 - Dec 2008
Bangladesh University of Engineering and Technology (BUET). GPA: 3.85/4.00

TECHNICAL SKILLS

- Programming Skill: **Python, C++, Matlab, Lua, Java, and C#.**
- Deep Learning Tools: Caffe, Torch7, and TensorFlow.
- Operating System: Windows, Mac OS, and Linux.
- Other Expertise**:** MS Office, HTML, CSS, Shell Script, Latex, CMake, JSON, MySQL, etc.

RESEARCH EXPERIENCE

Research Intern, Jun 2015 – Sep 2015
Deep Metadata Group, Comcast Labs, Washington, DC.
Mentors: Jan Neumann and Jonghyun Choi.

- Anomalous event detection and recognition in videos. (Lua, Python, Shell, and Matlab)
  - Processed a large amount of video data for training and testing. Used Torch7 machine learning framework to train and test autoencoder and recurrent neural networks.

Research Intern, Jun 2014 – Sep 2014
Computer Vision Research Group, Metaio Inc. (acquired by Apple Inc.), Dallas, TX.
Mentors: Rajesh Narasimha and Jürgen Sturm

- Human pose estimation in video using deep convolutional neural network. (C++, Python, Shell and Matlab)
  - Processed video data for training and testing. Modified the Caffe tool to implement multi-label regression framework based on deep convolutional neural network.

Graduate Student Researcher, Jun 2012 – Present
Video Computing Group, University of California, Riverside, CA.

- Scalable Active Learning for Activity Recognition and Video Description. (Python and C++) Oct 2015 –
  - Used recurrent neural network with LSTM in order to provide better query suggestions to the annotator that can reduce both time and effort for video annotation.
- Active Learning of Context Aware Recognition Models. (Matlab and C++) Oct 2014 – Apr 2015
  - Used conditional random field graphical model for encoding contextual information and devised a novel algorithm based on entropy and mutual information for performing active learning on such models.

- Continuous Learning of Activity Models using Hybrid Features. (Matlab and C++) Dec 2013 – May 2014
  - Designed and implemented a framework for learning human activity models continuously from streaming videos by taking the advantages of local features, deep and shallow auto-encoders, and active learning.
- Incremental activity modeling and recognition in streaming videos. (Matlab and C++) Aug 2013 – Nov 2013
  - Designed and implemented an online incremental human activity recognition framework by leveraging local spatio-temporal features, ensemble of SVM classifiers, and active learning.
- Human and vehicle tracking in unstable aerial videos. (C++ and Matlab) Mar 2013 – Jul 2013
  - Developed a system for multiple object detection and tracking in unstable aerial videos. Used homography transformation for video stabilization, cascaded classifier for target detection, and Kalman filter for tracking.
- Human activity recognition in surveillance videos. (Matlab, C++ and C#) Jul 2012 – Nov 2012
  - Participated in TRECVID SED challenge for detecting and recognizing human activities from a large corpus of surveillance videos using STIP features, Bag-of-Word based feature encoding, and SVM classifier.

Research Lecturer, May 2009 - Aug 2011

Department of Computer Science and Engineering, East West University, Bangladesh.

- Real time detection and recognition of vehicle license plate in Bangla. (Matlab)
  - Utilized visual symmetry and Canny edge detector for license plate detection. Used feed forward neural network for license plate recognition.
- Automatic traffic sign detection and recognition. (Matlab)
  - Used color segmentation for traffic sign detection and feed forward neural network for recognition.

SELECTED PUBLICATIONS

1. **Mahmudul Hasan,** Jonghyun Choi, Jan Neumann, Amit K. Roy-Chowdhury, and Larry Davis, Learning Temporal Regularity in Video Sequences, Computer Vision and Pattern Recognition (**CVPR)** 2016, Las Vegas.
2. **Mahmudul Hasan,** and Amit K. Roy-Chowdhury, Incremental Learning of Human Activity Models from Videos, Computer Vision and Image Understanding (**CVIU**), Vol. 144, Issue C, pp. 24-35, 2016.
3. **Mahmudul Hasan,** and Amit K. Roy-Chowdhury, Context Active Learning of Activity Recognition Models, International Conference on Computer Vision (**ICCV**) 2015, Santiago, Chile.
4. **Mahmudul Hasan,** and Amit K. Roy-Chowdhury, A Continuous Learning Framework for Activity Recognition Using Deep Hybrid Feature Models, IEEE Transaction on Multimedia (**TMM**), Vol. 17, No. 11, pp. 1-14, 2015.
5. **Mahmudul Hasan,** and Amit K. Roy-Chowdhury, Continuous Learning of Human Activity Models using Deep Nets, European Conference on Computer Vision (**ECCV**) 2014, Zurich, Switzerland.
6. **Mahmudul Hasan,** and Amit K. Roy-Chowdhury, Incremental Activity Modeling and Recognition in Streaming Videos, Computer Vision and Pattern Recognition (**CVPR**) 2014, Columbus, Ohio, USA.

OTHER PUBLICATIONS

7. **Mahmudul Hasan,** Elliot Staudt, and Amit K. Roy-Chowdhury, Integrating Geometric, Motion and Appearance Constraints for Robust Tracking in Aerial Videos, Technical report, eScholarship, 2013.
8. **Mahmudul Hasan,** Yingying Zhu, Santhoshkumar Sunderrajan, Niloufar Pourian, B.S. Manjunath, and Amit Roy Chowdhury, Activity Analysis in Unconstrained Surveillance Videos, In TRECVID 2012.
9. **Mahmudul Hasan,** Shaila Sharmeen, Anisur Rahman, M. Ameer Ali, and Md. Humayun Kabir, Block Based Image Segmentation, In the Proceedings of ACEEE-CNC 2012, Chennai, India.
10. **Mahmudul Hasan,** M. Sajjad Hossain, M. Ameer Ali, Md. Humayun Kabir, and A B M Shawkat Ali, Automatic Road Sign Detection and Recognition, In the Proceedings of IEEE CIS-RAM 2010, Singapore.
11. **Mahmudul Hasan,** M. Ameer Ali, Md. Humayun Kabir, and G. Sorwar, Object Segmentation Using Block Based Patterns, In the proceedings of IEEE TENCON 2009, Singapore.

SELECTED ACADEMIC PROJECTS

- Multiple moving objects tracking in aerial videos. (Matlab and C++) Feb 2013 – Mar 2013
  - Used Gaussian background subtraction for moving object detection and particle filter for target tracking.
- Automated product rating system based on reviews and comments. (Java) Jan 2012 – Mar 2012
  - Used advanced information retrieval method like BM25 for product ranking according to user's preference.
- Implementation of Victim Cache, Stream Buffer, and LRU cache replacement policy. (C++) Mar 2012
  - Reduced data and instruction cache miss rate in SimpleScalar simulator on benchmark datasets.
- Implementation of a Prototype OS. (C++) Jun 2007 – Sep 2007
  - Implemented several parts of an instructional OS (NachOS) such as scheduler, virtual memory, and LRU.
- Implementation of OSI Layers. (Java) Jan 2008 – Apr 2008
  - Implemented all functionalities of Data Link and Network layers of OSI protocol stack.
- Flight Simulator. (C++ and OpenGL) Jan 2008 – Apr 2008
  - Designed and implemented a virtual world containing airport, runway, trees, buildings, airplanes, and houses. Modeled airplane dynamics considering translation and different rotations such as yaw, pitch, and roll.
- System analysis and design of a large company. (C#, MySQL and ASP.NET) Jan 2008 – Apr 2008
  - Used advanced tools such as requirement analysis, use case diagram, sequence diagram, class diagram, etc.

TEACHING EXPERIENCE

Teaching Assistant, Sep 2013 – Dec 2013

Department of Computer Science and Engineering, University of California, Riverside.

- Conducted lab sessions.

Research Lecturer, May 2009 - Aug 2011

Department of Computer Science and Engineering, East West University, Bangladesh.

- Designed course syllabuses and conducted lectures for Structured Programming (C), Objected Oriented Programming (C++ and Java), Data Structures, Algorithms, and Basic Electric Circuits.

AWARDS and HONORS

- Dissertation year fellowship (DYP) award, University of California, Riverside. Sep 2015 – Dec 2015
- Graduate student fellowship, University of California, Riverside. Sep 2011 – May 2012
- Travel grant for attending PhD consortium in ICCV 2015. Dec 2015
- Travel grants to attend TRECVID 2012, CVPR 2014, and ECCV 2014.
- University merit scholarship, Bangladesh University of Engineering and Technology. Mar 2005 – Dec 2008
- Dean's list award, Bangladesh University of Engineering and Technology. Mar 2005 – Dec 2008

INVITED TALKS

- Continuous Learning of Human Activity Models using Deep Nets, Metaio Inc, Dallas, Texas, (Jun 2014).
- Human Pose Estimation from Videos, Samsung Research, Richardson, Texas, (Sep 2014).
- Deep Boltzmann Machine and Recurrent Neural Network, Video Computer Group, UC Riverside, (Jun 2015).
- Active Learning for Activity Recognition Models, Comcast Labs, Washington, DC, (Aug 2015).

PROFESSIONAL SERVICES

- Reviewer of top tier computer vision journals – TIP, CVIU, TMM, and PAMI.
- Reviewer of top tier computer vision conferences – CVPR, ICCV, ACCV, and ICIP.
- Student volunteer in CVPR 2014.
- Member IEEE and CVF

REFERENCES

- Available on request.