

# Ejaz Ahmed

3364, A.V. Williams  
College Park – 20740  
Maryland, USA

website: [www.umiacs.umd.edu/~ejaz/](http://www.umiacs.umd.edu/~ejaz/)  
email: [ejaz@umd.edu](mailto:ejaz@umd.edu)  
phone: 240-505-8749

## Objective

---

I am seeking a full time research position in the field of computer vision to apply and enhance my research and technical skills.

## Interests

---

- Computer Vision: Object Detection, Object Segmentation, Object Tracking, Re-Identification, Feature Analysis, Multi-class classification, Interactive Vision.
- Machine Learning : Deep Learning, Dimensionality Reduction, Linear Subspaces, Clustering
- Parallel Computing for Vision (GPU/CUDA Programming)

## Education

---

Degree	Institution	Period	GPA
PhD in Computer Science Advisor: Prof. Larry Davis	University of Maryland, College Park	Sep'10 - Present	4.0/4.0
MS in Computer Science Advisor: Prof. Larry Davis	University of Maryland, College Park	Sep'10- May'13	4.0/4.0
BTech.(Honors) in Computer Science Honors Advisor: Prof. P.J. Narayanan	International Institute of Information Technology, Hyderabad (IIIT-H)	Sep'06 – Apr'10	9.31/10

## Projects and Publications

---

- **Deep Learning for Tracking and Re-Identification**

This work was done during summer 2014 internship at [Mitsubishi Electric Research Laboratories \(MERL\)](http://www.merl.com) with [Dr. Michael Jones](#) and [Dr. Tim Marks](#). We have proposed a deep convolutional architecture for the problem of person re-identification.

**Tools used:** C/C++, CUDA, CAFFE, OpenCV, MATLAB

- **Filters Selection for Object Detection**

This work was done during fall 2013 internship at [TTI Chicago](http://www.tti.chicago.edu) with [Prof. Greg Shakhnarovich](#) and [Dr. Subhransu Maji](#). In this work we describe an automatic mechanism for selecting a diverse set of discriminative filters.

*Ejaz Ahmed, Gregory Shakhnarovich, and Subhransu Maji. Knowing a Good HOG Filter When You See It: Efficient Selection of Filters for Detection. European Conference on Computer Vision (ECCV), 2014 (oral).*

**Tools used:** C/C++, Python, MATLAB

- **Interactive Part Selection**

In this work we show that humans can help build better detectors by including their knowledge of good filters. We show this by building an interactive framework for poselet selection.

*Ejaz Ahmed, Subhransu Maji, Gregory Shakhnarovich, and Larry S. Davis. Using Human Knowledge to Judge Part Goodness: Interactive Part Selection. Conference on Computer Vision and Pattern Recognition Workshops. (CVPRW), 2014.*

- **Semantic Object Segmentation**

This work was done during summer 2013 internship at [Adobe Research, San Jose](#) with [Dr. Scott Cohen](#) and [Dr. Brian Price](#). The goal of this work is to greatly reduce user effort required to select an object. This is accomplished by enabling the user to simply name the desired object either verbally or typing into a search box.

*Ejaz Ahmed, Scott Cohen, and Brian Price. Semantic Object Selection. Conference on Computer Vision and Pattern Recognition. (CVPR), 2014.*

**Tools used:** C/C++, Python, MATLAB

- **Composite Discriminant Factor Analysis**

In this work we have proposed a linear dimensionality reduction method, Composite Discriminant Factor (CDF) analysis, which searches for a discriminative but compact feature subspace that can be used as input to classifiers that suffer from problems such as multi-collinearity.

*Vlad I. Morariu, Ejaz Ahmed, Venkataraman Santhanam, David Harwood, and Larry S. Davis. Composite Discriminant Factor Analysis. IEEE Winter Conference on Applications of Computer Vision (WACV), 2014.*

**Tools used:** C/C++, Python, MATLAB

- **Real Time Object Tracking**

In this work we have developed a multiple object tracking algorithm which first selects discriminative features that separate objects from background and then applies an iterative algorithm to track the objects in subsequent frames. The whole process is done in parallel on GPU(CUDA) which gives us increase in performance (68 fps for 320 X 240 video as compared to 11 fps when done on CPU).

*Prakhar Jain, Ejaz Ahmed, and Dasari Pavan Kumar, "Tracking for Entertainment and Interaction" at ACM SIGGRAPH Symposium on Interactive 3D Graphics and Games 2009 (I3D), Boston.*

**Tools used:** C/C++, CUDA, OpenCV

- **Interactive Segmentation**

Batch Cut: This work attempts to address the problem of object-segmentation from a collection of images. We propose a supervised learning paradigm in which user interacts with a small number of representative images. Based on this training target object from remaining images of the collection are segmented.

KinSeg: This work presents an interactive segmentation framework that incorporates both color and depth information of a scene obtained by a Kinect camera. We use scene knowledge to automatically determine the relative contribution of the depth and color terms to the energy function. A globally optimal segmentation is obtained by solving this problem using Graph Cuts.

Fast GrabCut: In this work we developed a fast GPU version of grabcut segmentation algorithm.

**Tools used:** C/C++, openCV, CUDA(grabCut)

- **Real Time 3D Video Segmentation**

In this work we track objects across multiple frames and create object and background models. Few frames are clubbed together and 3D GraphCuts is applied on them to segment the object. Such 3D GraphCuts ensure coherency and continuity of segmented object across frames. Since this task is computationally intensive and also parallelizable, we are doing this using CUDA GPU.

*Ejaz Ahmed, Prakhar Jain, and P.J. Narayanan, "Real Time Object Segmentation from Videos" submitted at Indian Conference for Academic Research by Undergraduate Students 2010 (ICARUS), Kanpur.*

**Tools used:** C/C++, CUDA, OpenCV

- **GPU Stereo**

In this project various stereo algorithm were studied and implemented. Primary focus was given to coarse-to-fine stereo algorithm and its adaptive variants. This project was done as an intern at [INRIA Grenoble](#), France in the summer of 2010. Internship involved understanding of algorithms and their implementation on GPU/CUDA.

**Tools used:** C/C++,CUDA, OpenCV

- **Fast GIST**

In this project we have parallelized the GIST feature exploiting the computation power of the GPU with the help of Nvidia CUDA.

**Tools Used:** C/C++, CUDA, MATLAB

## Skill Set

---

---

<b>Programming Languages</b>	: C/C++, Python, R, : MATLAB, CUDA(Compute Unified Device Architecture)
<b>Libraries and APIs</b>	: OpenCV, CAFFE (deep learning), OpenGL
<b>Parallel Computing</b>	: CUDA, openMP, MPI
<b>DBMS</b>	: Mysql, sqlite3

## Work Experience

---

---

- Research Intern at [Mitsubishi Electric Research Laboratories \(MERL\)](#) with [Dr. Michael Jones](#) and [Dr. Tim Marks](#). May'14 - August'14.
- Research Intern at [TTI Chicago](#) with [Prof. Greg Shakhnarovich](#) and [Dr. Subhansu Maji](#). September'13 - December'13.
- Research Intern at [Adobe Research, San Jose](#) with [Dr. Scott Cohen](#) and [Dr. Brian Price](#). June'13 - August'13.
- Research Assistant at [University of Maryland, College Park](#) under [Prof. Larry Davis](#). January'11 – Present.
- Summer Intern at [INRIA \(Grenoble\)](#) with [Dr. Frédéric Devernay](#). May'10 - July'10.
- Summer Intern at [Center for Visual Information Technology](#) with [Prof. P.J.Narayanan](#). May'09 - July'09.
- Summer Intern as a core technician in the development of [www.gaboli.com](#), an e-education portal. May'08- July'09.

## Teaching Experience(TA)

---

---

- Introduction to Computer Systems (CMSC 216) under Prof. Alan Sussman, Fall'10, at UMD.
- Artificial Intelligence under Prof. Anoop Namboodiri, Spring'10, at IIIT-H.
- Computer System Organization under Prof. P.J. Narayanan, during Spring'09, at IIIT-H.
- Computer Programming under Prof. C.V. Jawahar, during Monsoon'09, at IIIT-H.
- Maths-I under Prof. C.N. Kaul, Monsoon'08, at IIIT-H.

## Graduate Coursework

---

---

Image Segmentation, Image Understanding, Statistical Pattern Recognition, Machine Learning, High Performance Computing, Computational systems biology and functional genomics, Linear Subspaces and Manifolds in Computer Vision and Machine Learning, Computational Geometry, Database Management Systems

.....  
End of curriculum vitae