Ajjen Joshi

http://cs-people.bu.edu/ajjendj
ajjendj@bu.edu | 860-501-8468

Education

Boston University | **Boston, MA**

Ph.D., Computer Science *expected* 2018

- Thesis: *Looking at People - Personalized Face and Gesture Analysis Using Hierarchical Neural Networks*
- Advisors: Dr. Margrit Betke and Dr. Stan Sclaroff

Boston University | **Boston, MA**

M.S., Computer Science 2014

- Thesis: *A Random Forest Approach to Segmenting and Classifying Gestures*
- Advisors: Dr. Margrit Betke and Dr. Stan Sclaroff
- GPA: 3.9/4.0

Connecticut College | **New London, CT**

B.A., Computer Science and Architectural Studies (Double Major) 2012

- Thesis: *Real-time Facial Animation by Gesture Imitation*
- Advisor: Dr. Ozgur Izmirli
- GPA: 3.96/4.0 *Summa Cum Laude*

Experience

Adobe Research | **Cambridge, MA**

Research Intern Summer 2016

- Explored a deep learning approach to automatically generate inbetween frames in 2D handdrawn animations. Advised by Masha Shugrina

Disney Research | **Cambridge, MA**

Research Intern Summer 2015

- Implemented prototype system for performing gesture recognition from glove sensor data and explored development of subject-specific hierarchical Bayesian classifiers. Advised by Dr. Hanspeter Pfister, Dr. Soumya Ghosh

Ballets Russes Arts Initiative | **Boston, MA**

Animator Spring 2015

- Created animations and interactive visual projections for an experimental rendition of "Victory Over the Sun," an iconoclastic futurist Russian opera that first premiered in 1913, directed by Anna Winestein.

Brown University | **Providence, RI**

Research Intern Summer 2011

- Created interactive multimedia installations in Max/MSP/Jitter using the Microsoft Kinect. Advised by Dr. Todd Winkler.

Research Statement

My research interests lie in the intersectional disciplines of computer vision, machine learning, and human computer interaction. I am interested in the personalized analysis of spatio-temporal human signals, generated for instance by eye-gaze, facial expressions and body gestures, in order to facilitate a computational understanding of human behavior and enable intelligent interaction with the computer.

Publications

[1] Andrew Kurauchi, Wenxin Feng, Ajjen Joshi, Carlos Morimoto, Margrit Betke. **EyeSwipe: Towards Fast and Comfortable Text Entry Using Gaze Paths**. *In Submission*.

[2] Rohit Agrawal, Ajjen Joshi, Margrit Betke. **Enabling Early Gesture Recognition by Motion Augmentation**. ACM International Conference on Pervasive Technologies Related to Assistive Environments (PETRA), 2018. *To Appear*.

[3] Ajjen Joshi, Soumya Ghosh, Sarah Gunnery, Linda Tickle-Degnen, Margrit Betke, Stan Sclaroff. **Context-Sensitive Prediction of Facial Expressivity Using Multimodal Hierarchical Bayesian Neural Networks**. IEEE International Conference on Automatic Face and Gesture Recognition (AFGR), 2018. *To Appear*.

[4] Ajjen Joshi, Soumya Ghosh, Margrit Betke, Stan Sclaroff, Hanspeter Pfister. **Personalizing Gesture Recognition Using Hierarchical Bayesian Neural Networks**. IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2017. *Poster*.

[5] Elham Saraee, Saurabh Singh, Kathryn Hendron, Mingxin Zheng, Ajjen Joshi, Terry Ellis, Margrit Betke. **ExerciseCheck: Remote Monitoring and Evaluation Platform for Home Based Physical Therapy**. ACM International Conference on Pervasive Technologies Related to Assistive Environments (PETRA), 2017. *Oral*.

[6] Elham Saraee, Ajjen Joshi, Margrit Betke. **A Therapeutic Robotic System for the Upper Body based on the Proficio Robotic Arm**. IEEE International Conference on Virtual Rehabilitation (ICVR), 2017. *Poster*.

[7] Elham Saraee, Saurabh Singh, Ajjen Joshi, Margrit Betke. **PostureCheck: Posture Modeling for Exercise Assessment using the Microsoft Kinect**. IEEE International Conference on Virtual Rehabilitation (ICVR), 2017. *Poster*.

[8] Ajjen Joshi, Soumya Ghosh, Margrit Betke, Hanspeter Pfister. **Hierarchical Bayesian Neural Networks for Personalized Classification**. Neural Information Processing Systems (NIPS) Workshop on Bayesian Deep Learning, 2016. *Poster*.

[9] Ajjen Joshi, Linda Tickle-Degnen, Sarah Gunnery, Terry Ellis, Margrit Betke. **Predicting Active Facial Expressivity in People with Parkinson's Disease**. ACM International Conference on Pervasive Technologies Related to Assistive Environments (PETRA), 2016. *Oral*.

[10] Ajjen Joshi, Camille Monnier, Margrit Betke, Stan Sclaroff. **Comparing Random Forest Approaches to Segmenting and Classifying Gestures**. Image and Vision Computing (IMAVIS), 2016.

[11] Andrew Kurauchi, Wenxin Feng, Ajjen Joshi, Carlos Morimoto, Margrit Betke. **EyeSwipe: Dwell-free Text Entry Using Gaze Paths**. ACM Conference on Human Factors in Computing Systems (CHI), 2016. *Oral*.

[12] Huy Le, Ajjen Joshi, Margrit Betke. **b3.js: A Library for Interactive Virtual Reality Web 3D Graphs**. IEEE Conference on Virtual Reality and 3D User Interfaces (VR), 2016. *Research Demo*.

[13] Ajjen Joshi, Camille Monnier, Margrit Betke, Stan Sclaroff. **A Random Forest Approach to Segmenting and Classifying Gestures**. IEEE International Conference on Automatic Face and Gesture Recognition (AFGR), 2015. *Oral*.

Talks

[1] **Analysis of Facial Expressivity in Parkinson's Disease Patients using Hierarchical Bayesian Neural Networks.** Tufts University Health Quality of Life Lab Seminar. Medford, MA. 2017.

[2] **Personalizing Gesture Recognition Using Hierarchical Bayesian Neural Networks.** New England Computer Vision Workshop. Boston, MA. 2016.

[3] **Deeptween: A Data-Driven Approach to Automatic Inbetweening in Hand-drawn Animations.** Adobe Research Intern Presentation. Cambridge, MA. 2016.

[4] **Predicting Active Facial Expressivity in People with Parkinson's Disease.** PETRA. Corfu, Greece. 2016.

[5] **Hierarchical Bayesian Models for Subject-specific Gesture Recognition.** Disney Research Intern Presentation. Cambridge, MA. 2015.

[6] **Victory Over the Sun: Panel Discussion (along with Harlow Robinson, Larissa Shmailo and Anna Winestein).** Boston, MA. 2015.

[7] **A Random Forest Approach to Segmenting and Classifying Gestures.** AFGR. Ljubljana, Slovenia. 2015.

Teaching

- Artificial Intelligence (Senior undergraduate course in AI) — Spring 2017
  Rating: 4.65/5 (rated by 32 students)
- Artificial Intelligence (Senior undergraduate course in AI) — Spring 2016
  Rating: 4.68/5, 4.65/5 (rated by 19 students)
- Image and Video Computing (Graduate course in computer vision) — Fall 2014
  Rating: 4.82/5 (rated by 22 students)
- Application Programming (Introductory course in programming) — Fall 2013
  Rating: 4.43/5 (rated by 44 students)

Mentoring

[1] Muhammad Zuhayr Raghib, Master's Project on **Using 3D-CNNs for Student Engagement Prediction in Intelligent Tutoring Systems.** Spring 2018.

[2] Yitian Lin, Master's Project on **Person Identification using Gaze Patterns.** Spring 2018.

[3] Pratikkumar Patel, Master's Project on **Using LSTMs To Improve Text Input Speed In Eye Typing Systems.** Fall 2017.

[4] Rohit Agrawal, Master's Project on **Enabling Early Gesture Recognition by Motion Augmentation.** Fall 2017. [Publication 2]

[5] Srivathsa Rajagopal, Master's Project on **Facial Expression Analysis of US Presidential Debates.** Fall 2016.

[6] Huy Le, Senior Undergraduate Research Project on **Building a Library for Data Visualization in Virtual Reality.** Fall 2015. [Publication 12]

Awards

[1] AFGR 2018 Doctoral Consortium Award (2018)

[2] PETRA 2016 Doctoral Consortium Award (2016)

[3] One of best reviewed papers of Automatic Face and Gesture Recognition (AFGR 2015)

[4] Boston University Computer Science Teaching Excellence Award (2015)

[5] Phi Beta Kappa (2012)

[6] Architectural Studies Award for Outstanding Graduating Senior (2012)

[7] Winthrop Scholar, Connecticut College's highest academic honor (2011)

[8] Keck Research Grant (2010)

[9] Ranked 1st out of 108 students of high school graduating class (2007)

Projects

Completed Self Driving Car NanoDegree Program by Udacity (2017). Projects included:

- Advanced Lane Finding
- Vehicle Detection
- Semantic Scene Segmentation
- End-to-End Behavioral Cloning
- Sensor Fusion using Unscented Kalman Filters
- Localization using Particle Filters
- Model Predictive Control
- Path Planning

Skills

Programming

- Python, C++, Java, Matlab, HTML/CSS, JavaScript, PHP, MySQL, Processing

Other

- **Deep Learning Libraries:** TensorFlow, PyTorch, Caffe
  Animation and Motion Capture: Autodesk Maya, Motionbuilder; Blender
  Design: Adobe Photoshop, Illustrator, InDesign
  Film: Adobe Premiere, FinalCut

Service

- Reviewer/Program Committee
  ECCV '18, CVPR '18, AFGR '18, AFGR '17, PSIVT '17, CVPRW '17, PETRA '17, PETRA '16, Pattern Recognition, Journal of AI Research
- AI@BU Seminar Coordinator (Fall 2016-current)

Github

https://github.com/ajjendj/

Portfolio

https://www.ajjenjoshi.com/