Ajjen Joshi

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Education

Boston University | **Boston, MA**

Ph.D., Computer Science 2018

- Thesis: *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

Affectiva | **Boston, MA**

Deep Learning Scientist November 2018 - Present

- Research, prototype and implement computer vision and machine learning algorithms for multimodal human emotion and behavior analysis.

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

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.

Refereed Publications

[1] Ajjen Joshi, Youssef Attia, Taniya Mishra. **Protocol for Eliciting Driver Frustration in an In-vehicle Environment**. IEEE International Conference on Affective Computing and Intelligent Interaction (ACII), 2019. *Poster*.

[2] Ajjen Joshi, Danielle Allessio, John Magee, Jacob Whitehill, Ivon Arroyo, Beverly Woolf, Stan Sclaroff, Margrit Betke. **Affect-driven Learning Outcomes Prediction in Intelligent Tutoring Systems**. IEEE International Conference on Automatic Face and Gesture Recognition (AFGR), 2019. *Poster*.

[3] 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. *Poster*.

[4] 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. *Poster*.

[5] 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*.

[6] 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*.

[7] 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*.

[8] 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*.

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

[10] 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*.

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

[12] 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*.

[13] 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.

[14] 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*.

Academic Talks

[1] **Computational Human Sensing: Applications of Face, Gesture and Affect Analysis.** Connecticut College Computer Science Seminar. New London, CT. 2019.

[2] **Interfaces and Interactions: Towards Personalization using Hierarchical Neural Networks.** Affectiva. Boston, MA. 2018.

[3] **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.

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

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

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

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

[8] **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 (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] Samiha Samrose, Kavya Anbarasu. Affectiva Summer Intern Project on **Mitigating Boredom Using An Empathetic Conversational Agent**. Summer 2019.

[2] Eleni Rally. Affectiva Summer Intern Project on **Analyzing EEG signals of Drowsy Drivers**. Summer 2019.

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

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

[5] Rohit Agrawal, Master's Project on **Enabling Early Gesture Recognition by Motion Augmentation.** Fall 2017. [Publication 3]

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

[7] Huy Le, Senior Undergraduate Research Project on **Building a Library for Data Visualization in Virtual Reality.** Fall 2015. [Publication 13]

Awards

[1] AFGR 2018 Best Reviewer Award (2018)

[2] AFGR 2018 Doctoral Consortium Award (2018)

[3] PETRA 2016 Doctoral Consortium Award (2016)

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

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

[6] Phi Beta Kappa (2012)

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

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

[9] Keck Research Grant (2010)

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

Skills

Programming

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

Other

- **Deep Learning Libraries:** TensorFlow, PyTorch, Caffe

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-Spring 2018)

Github

https://github.com/ajjendj/

Portfolio

https://www.ajjenjoshi.com/