Ahmed Ashraf

Manitoba Learning and Artificial Intelligence Research **(MLAIR)**
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EDUCATION

2006 – 2010 **Ph.D., Electrical and Computer Engineering**
CARNEGIE MELLON UNIVERSITY, Pittsburgh, PA, USA

2004 – 2006 **M.S., Electrical and Computer Engineering**
CARNEGIE MELLON UNIVERSITY, Pittsburgh, PA, USA

1996 – 2000 **B.Sc., Electrical Engineering**
UNIVERSITY OF ENGINEERING AND TECHNOLOGY (UET), Lahore, Pakistan

EXPERIENCE

2018 – Present **Assistant Professor**
Department of Electrical and Computer Engineering
University of Manitoba, Winnipeg MB, Canada

2013 – 2018 **Post doctoral fellow**
Toronto Rehab Institute
University of Toronto, Toronto ON, Canada

2010 – 2013 **Post doctoral researcher**
Department of Radiology, Perelman School of Medicine
UNIVERSITY OF PENNSYLVANIA, Philadelphia, PA, USA

2000 – 2004 **Computer Vision Engineer**
Techlogix Inc., Lahore, Pakistan

FELLOWSHIPS/AWARDS / TRAINING

2004 – 2010 Fulbright Fellowship
2015 – 2018 AGE-WELL Canadian Networks of Centres of Excellence (NCE) Fellowship
1996 – 2000 National Talent Scholarship during undergraduate program.
2016 – 2017 Innovators of Tomorrow, a 12-Month Training Program administered by AGE-WELL
2018 Vector Institute for Artificial Intelligence post-graduate Award

RESEARCH INTERESTS

- Artificial Intelligence, Deep Learning, Image Understanding, Computer Vision
- Machine Learning for Biomedical Imaging
- Robotics
- AI for Climate Change

FUNDING/GRANTS

2019 – 2022 $225,000 **New Frontiers** in Research Fund **(Acceptance Rate: 7%)** with Dr. Pooneh Maghoul
Deep Learning and Artificial Intelligence methods for Satellite Imaging to understand the effect of climate change and melting permafrost on northern infrastructure

2018 – 2021 $ 75000 University of Manitoba Start up funds
Research focus:
1) Algorithms for hybrid deep neural networks that can simultaneously accept multi-modality, multi-format biomedical data, such as imaging, genetic profiles, and non-imaging data
2) Algorithms for interpretability and explainability of deep learning models.
3) Algorithms for unsupervised learning.

2019 Mitacs Globalink For One Summer Research Student
Project: Deep Learning for tractography and streamline estimation in brain diffusion weighted MRI imaging.

STUDENTS/TRAINEES

CURRENT STUDENTS

2019 –Present : Najmeh Saffar, Masters student in the department of ECE, University of Manitoba. Project: Hybrid Neural Architectures for Biomedical Imaging

May –Aug 2019: Frank Yu, NSERC Fellow, ECE, University of Manitoba. Project: Anomaly Detection and Density Estimation through deep adversarial networks

May –Aug 2019: Arka Saha, Mitacs Gloablink Student, Project: Deep learning for tractography

2019 – Present: Soumik Ferhan, Department of Biomedical Engineering (BME), Uniersity of Manitoba. Co-advised with Dr. Chase Figley. Project: Machine Learning methods for finding a mapping between structural and functional brain connectivity.

PAST STUDENTS

2012 – 2014: Majid Mahrooghy, Post doctoral fellow, University of Pennsylvania (DCE-MRI Image Analysis)

2016 – 2018: Azin Asgarian, Masters Student, University of Toronto (Computer Vision/Transfer Learning)

2015: Pranay Lohia, Mitacs Globalink Student (Computer Vision for Fall Detection)

2016: Anqi Yang, Mitacs Globalink Student (Expression Recognition from Partially Visible Faces)

TEACHING

Winter 2019: Deep Learning with Convolutional Neural Networks, ECE, University of Manitoba (Graduate Course)

Winter 2019: Introduction to Robotics, ECE, University of Manitoba (Undergraduate Course)

Fall 2018: Introduction to Image Understadning, Computer Science, University of Toronto (Undergraduate)

Spring 2009: Signals and Systems, ECE, Carnegie Mellon University (Undergraduate Course)

Fall 2008: Signals and Systems, ECE, Carnegie Mellon University (Undergraduate Course)

PEER REVIEW SERVICE

Reviewer for the following Journals/Conferences:
IEEE Transactions on Medical Imaging (TMI)
IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI)
Springer Journal of Machine Learning and Cybernetics
Elsevier Computer Methods and Programs in Biomedicine
IEEE Conference on Computer Vision and Pattern Recognition (CVPR)
ICCV/ECCV/MICCAI/ICML, *Voting Member: Research Ethics Board, University-Health-Network Toronto (2015-2018)*

PUBLICATIONS

Peer reviewed Journal papers

1. V. Khoshdel, A. Ashraf, J. LoVetri, "Enhancement of Multimodal Microwave-Ultrasound Breast Imaging using a Deep-Learning Technique", *Biosensors*, 2019
2. Babak Taati, Shun Zhao, A. Ashraf, Azin Asgarian, M Erin Browne, Kenneth M Prkachin, Alex Mihailidis, Thomas Hadjistavropoulos, "Algorithmic Bias in Clinical Populations–Evaluating and Improving Facial Analysis Technology in Older Adults with Dementia", *IEEE Access*, 2019
3. M. Erin Browne, Thomas Hadjistavropoulos, Kenneth Prkachin, A. Ashraf, Babak Taati, "Pain Expressions in Dementia: Validity of Observers' Pain Judgments as a Function of Angle of Observation", Journal of Non-verbal Behavior, 1-19, 2019
4. T Hadjistavropoulos, ME Browne, KM Prkachin, B Taati, A. Ashraf, A Mihailidis, "Pain in severe dementia: A comparison of a fine-grained assessment approach to an observational checklist designed for clinical settings", European Journal of Pain, 22(5):915-925, 2018
5. A. Ashraf and B. Taati. "Automated video analysis of handwashing behavior as a potential marker of cognitive health in older adults". *IEEE Journal of Biomedical and Health Informatics (J-BHI)*, 20(20) 682-90, 2016
6. Majid Mahrooghy, Ahmed B Ashraf, Dania Daye, Elizabeth S McDonald, Mark Rosen, Carolyn Mies, Michael Feldman, Despina Kontos, "Pharmacokinetic tumor heterogeneity as a prognostic biomarker for classifying breast cancer recurrence risk", *IEEE Transactions on Biomedical Engineering (TBME)*, 62(6):1585-1594, 2016
7. A. Ashraf, B. Gaonkar, C. Mies, A. DeMichele, M. Rosen, C. Davatzikos, D. Kontos "Breast DCE-MRI Kinetic Heterogeneity Tumor Markers: Preliminary Associations With Neoadjuvant Chemotherapy Response". *Translational Oncology*, 2015, 8(3):154-162.
8. A. Ashraf, S. Gavenonis, D. Daye, C. Mies, M. Feldman, M.A. Rosen, and D. Kontos, "Identification of intrinsic radio-phenotypes for breast cancer tumors: Preliminary associations with prognostic gene expression profiles.", *Radiology, 2014,* ***(Impact Factor: 6.34)***

   RSNA Interview Link: https://www.youtube.com/watch?v=v0saQxG8kds
9. A. Ashraf, S. Gavenonis, D. Daye, C. Mies, M. Feldman, M.A. Rosen, and D. Kontos, "A Multichannel Markov Random Field Framework for Tumor Segmentation with an Application to Classification of Gene Expression-based Breast Cancer Recurrence Risk.", *IEEE Transactions on Medical Imaging (TMI), April 2013,* ***(Impact factor: 4.5)***
10. Simon Lucey, A. Ashraf, "Nearest neighbor classifier generalization through spatially constrained filters", Pattern Recognition, January 2013, 46(1):325-331Simon Lucey, Ahmed Bilal Ashraf, "Nearest neighbor classifier generalization through spatially constrained filters", *Pattern Recognition*, January 2013, 46(1):325-331
11. Simon Lucey, Rajitha Navarathna, A. Ashraf, and Sridha Sridharan , "Fourier Lucas Kanade Algorithm", *IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI), 2012* ***(Impact factor: 4.8)***
12. A. Ashraf**,** Simon Lucey, Tsuhan Chen , "Reinterpreting the application of Gabor filters as a manipulation of the margin in the Support Vector Machines", *IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI)*, 2010, 32(7):1335-41 ***(Impact factor: 4.8)***
13. A. Ashraf, S. Lucey, J. F. Cohn, T. Chen, K. M. Prkachin, and P. E. Solomonl, "The Painful Face II– Pain Expression recognition Using Active Appearance Models", *International Journal of Image and Vision Computing, Nov, 2009, 27(12):1788-1796*

Peer reviewed Conference full papers

14. Ahmed Ashraf, Shehroz Khan, Nikhil Bhagwat, Mallar Chakravarty, Babak Taati, "Learning to unlearn: Building immunity to dataset bias in medical imaging studies", ML4H: Machine Learning for Heatlh, Neural Information Processing 2018
15. Ahmed Ashraf, Anqi Yang, Babak Taati, "Expression recognition using partially occluded faces", Face and Gesture Recognition, 2019 [Best poster Award]

16. Azin Asgarian, Ahmed Ashraf, David Fleet, and Babak Taati, "Subspace selection to suppress confounding source domain information in AAM transfer learning", International Conference on Biometrics (IJCB), 2017
17. M Mahrooghy, Ahmed Ashraf, Dania Daye, C Mies, M Feldman, M Rosen, D Kontos, "Heterogeneity Wavelet Kinetics from DCE-MRI for Classifying Gene Expression Based Breast Cancer Recurrence Risk", *Medical Image Computing and Computer-Assisted Intervention–MICCAI* 2013, 295-302
18. Ahmed Ashraf, S. Gavenonis, D. Daye, C. Mies, M. Feldman, M.A. Rosen, and D. Kontos, "A Multichannel Markov Random Field approach for Automated Segmentation of Breast Cancer Tumor in DCE-MRI Data Using Kinetic Observation Model", *Medical Image Computing and Computer Assisted Intervention (MICCAI), 2011,* 14(Pt 3):546-53.
19. Ahmed Ashraf, Simon Lucey, Tsuhan Chen, "Fast Image Alignment in the Fourier domain*", IEEE International Conference on Computer Vision and Pattern recognition (CVPR) 2010, pp* 2480 -2487
20. Ahmed Ashraf, Simon Lucey, Tsuhan Chen, "Learning patch correspondences for Improved Viewpoint invariant Face recognition*", IEEE International Conference on Computer Vision and Pattern recognition (CVPR), 2008, pp 1-8 (ORAL)*
21. Ahmed Ashraf, S. Lucey, J. F. Cohn, T. Chen, K. M. Prkachin, and P. E. Solomon, "The Painful Face –Pain Expression Recognition Using Active Appearance Models", *ACM International Conference on Multimodal Interfaces, 2007, pp 9-14 (ORAL)*

Other conference full papers

22. Babak Taati, Pranay Lohia, Avril Mansfield, Ahmed Ashraf, "Video analysis to aid the study of human gait and falls – preliminary results and proof of concept", *Engineering in Medicine and Biology* (2017)
23. Ahmed Ashraf, B. Gaonkar, A. DeMichele, C. Mies, C. Davatzikos, M. Rosen, and D. Kontos, Pre-treatment prediction of neoadjuvant chemotherapy response in breast cancer patients using DCE-MRI kinetic statistics. In Proc. Workshop on Breast Image Analysis (BIA), *Medical Image Computing and Computer Assisted Intervention (MICCAI), 2011*
24. J. Jayandar, K. G. Vosburgh, E. Gombus, Ahmed Ashraf, D. Kontos, S. C. Gavenonis, F. A. Jolesz, K. Pohl, "Automatic segmentation of breast carcinomas from DCE-MRI using a statistical learning algorithm". *9th IEEE International Symposium on Biomedical Imaging (ISBI), 2012, pp 122-125*
25. Wei Yu, Ahmed Ashraf, Yao-Jen Chang, Congcong Li, Tsuhan Chen, "3D Augmented Markov Random Field for Object Recognition", IEEE International Conference on Image Processing (ICIP), 2010, pp 3889-3892

Conference Abstracts

26. Ahmed Ashraf, S. Gavenonis, D. Daye, C. Mies, M. Feldman, M.A. Rosen, and D. Kontos, "Prediction of prognostic tumor gene expression signatures via kinetic analysis of DCE-MRI for assessing breast cancer recurrence" *In: 97th Scientific Assembly and Annual Meeting of the Radiological Society of North America (RSNA), 2011*
27. Ahmed Ashraf, Lilie Lin, S. C. Gavenonis, C. Mies, E. Xanthopoulos, D. Kontos, "Predicting axillary lymph node metastasis from kinetic statistics of DCE-MRI breast images", *SPIE Medical Imaging, Computer Aided Diagnosis, 2012*
28. D. Daye, S. Gavenonis, B. M. Keller, Ahmed Ashraf, C. Mies, M. Feldman, D. Kontos, "Breast MRI tumor features as predictive markers of breast cancer recurrence" *In: 98th Scientific Assembly and Annual Meeting of the Radiological Society of North America (RSNA), 2012*

Book Chapter

29. Simon Lucey, Ahmed Ashraf, Jeff Cohn, "Investigating Spontaneous Facial Action Recognition through AAM representations the face", *Face recognition book, K.Kurihara, ed. Pro Literatur Verlag, Mamendorf, Germany,* 2007