

Shazia Akbar

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Professional Summary

Skilled researcher specializing in machine learning and artificial intelligence, seeking opportunity for growth and development with an established organization applying such skills in real-world applications. Experience working with international collaborators and developing bespoke applications which harness machine learning technology.

Skills

- Experience working in **multidisciplinary** field and strong foothold in A.I. community (local and international)
- **Problem solver** with experience working on challenging real-world problems which utilize state-of-the-art machine learning technology
- Excellent communication and publication skills
- **Programming skills:** Python, C++, C, Java
- **Machine learning/Data analytics tools:** TensorFlow, Theano, R, SPSS

Experience

Sunnybrook Research Institute, Toronto, Canada

2016 - 2019

Medical Biophysics, University of Toronto, Toronto, Canada

Vector Institute Affiliate, Toronto, Canada

Postdoctoral Fellow

- Collaborated with pathologists, oncologists and graduate students in the Medical Biophysics program at the University of Toronto to develop bespoke deep learning algorithms to analyze medical images.
- Developed an automated pipeline to analyze a dataset of over 2TB of microscopic images of breast tissue.
- Organized a global image analysis challenge, BreastPathQ, in collaboration with NCI, AAPM and FDA.
- Authored professional scientific papers for publishing in peer-reviewed journals.

NYU School of Medicine, New York. U.S.

2015 - 2016

Postdoctoral Fellow

- Conducted independent research in 3D segmentation of the aorta in MRI scans using deep neural networks.
- Collaborated with radiologists to design and implement an MRI pulse sequence for pediatric patients.

Toshiba Medical Visualization Systems, Edinburgh, U.K.

2014

Image Analysis Research Intern (3 months)

- International collaboration with Japan to build a pipeline for extracting texture features from CT scans for Big Data analysis.
- Harnessed a in-house C++ API and expanded it to include optimized computer vision algorithms.

NCR Corp., Dundee, U.K.

2010 - 2011

Technology and Research Intern

- Built novel and bespoke computer vision algorithms for improving ATM security.
- Designed an automated system to automatically identify food produce in plastic bags on self-service checkouts including implementation plans and system designs for international collaborators and senior staff members.

Education

PhD: Tumour Localisation in Histopathology Images <i>University of Dundee, Dundee, U.K.</i>	2011 - 2015
BSc Applied Computing Hons (1st class) <i>University of Dundee, Dundee, U.K.</i>	2008 - 2011

Accomplishments

Experimental Design

- Developed the “transition module” to prevent overfitting in deep neural networks.
- Designed 2 weakly-supervised learning frameworks to predict patient outcome from thousands of large-scale images.
- Planned and carried out a 3 year research project investigating novel context image descriptors.

Leadership

- Co-organized a global image analysis challenge, BreastPathQ, in collaboration with Sunnybrook, NCI and AAPM.
- Organized an “AI in Health” workshop for 14 students at the Toronto Deep Learning and Reinforcement Learning summer school.
- Volunteered to organize a machine learning journal club, currently ongoing at Sunnybrook Research Institute, Toronto.

Selected Honours and Awards

Member of winning team for ICPR I3A HEp2 Cell and Specimen global image analysis challenge	2014
Google Anita Borg Finalist 2012 (Europe, Middle East and Africa)	2012
Alex Carmichael Research Prize for Outstanding First Year Doctoral Student	2012
BCS Award for Top Student in Applied Computing, University of Dundee	2011

Selected Publications

Full list of publications available at <http://www.shaziaakbar.co.uk/publications/>

S. Akbar, and A. L. Martel, Cluster-based learning from weakly labeled bags in digital pathology, *Machine Learning for Health, NeurIPS 2018*, 2018.

S. Akbar, M. Peikari, S. Salama, S. Nofech-Mozes, and A. L. Martel, The transition module: A method for preventing overfitting in convolutional neural networks, *Computer Methods in Biomechanics and Biomedical Engineering: Imaging & Visualization*, 2018.

S. Manivannan, W. Li, **S. Akbar**, R. Wang, J. Zhang, and S. J. McKenna, An automated pattern recognition system for classifying indirect immunofluorescence images of HEp-2 cells and specimens, *Pattern Recognition*, vol. 51, pp. 12-26, 2016.

S. Akbar, L. B. Jordan, C. A. Purdie, A. M. Thompson, and S. J. McKenna, Comparing computer-generated and pathologist-generated tumour segmentations for immunohistochemical scoring of breast tissue microarrays, *British Journal of Cancer*, vol. 113, pp. 1075-1080, 2015.

Presentations

“Deep Learning in Medicine,” Xanadu A.I., Toronto, Canada [invited]	2018
“Multiple Instance Batch Learning as a Means for Dealing with Imprecise Labels,” IMaging Network Ontario 2018, Toronto, Canada	2018

- “Deep Learning in Digital Pathology,” Dundee, U.K. [invited] 2018
- “Determining Tumor Cellularity in Digital Slides using ResNet,” SPIE Medical Imaging 2018, Houston, U.S. 2018
- “The image analysis pipeline: from hand-crafted features to deep learning,” Terry Fox Institute Symposium 2017, Toronto, Canada 2017
- “Generalizing Deep Learning Models for Histology Data,” Pathology Informatics 2017, Pittsburgh, U.S. 2017
- “Transitioning Between Convolutional and Fully Connected Layers in Neural Networks,” Deep Learning Medical Image Analysis Workshop, MICCAI 2017, Quebec City, Canada 2017
- “Tumour Localisation in Histopathology Images,” SMIAL Seminar, Sunnybrook Health Sciences Centre, Toronto, Canada [invited] 2016