# ARITRA CHOWDHURY

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## EDUCATION

- **Ph.D. in Computer Science**, Rensselear Polytechnic Institute, Troy, New York, U.S.A.
  Graduation date: June 2018**,** CGPA: 3.71, Adviser: Bülent Yener.
- **M.S. in Computer Science**, Rensselear Polytechnic Institute, Troy, New York, U.S.A.
  Graduation Date: May 2016**,** CGPA: 3.71, Adviser: Bülent Yener.
- **B.E in Electronics and Telecommunication Engineering**, Jadavpur University, Kolkata, India.
  Graduation date: June 2013**,** CGPA: 3.58

## EXPERIENCE

- *GE Research, Niskayuna, NY (Research Scientist – Image Analytics, Jun 2019-)*
  - Developed emergent languages paradigm for applications by publishing 3 papers at top conferences, as a part of the third wave AI initiative.
  - Developed end to end computer vision systems for multiple GE businesses like Healthcare, Aviation, Transportation and Power. This includes building and deploying deep learning algorithms for object detection, pose estimation, variational autoencoders and real time instance segmentation.
- *GE Healthcare, San Ramon, CA (Senior Data Scientist, Sep 2018-Jun 2019)*
  - Developed toolkit for deep learning in healthcare. The toolkit helps with developing of AI models at scale by making the process of building data pipelines for training fast and efficient. Published paper at *NeurIPS 2019.*
- *IBM Research, Almaden, CA (Summer Research Intern, May 2017-Aug 2017)*
  - Reduced annotation burden in cell segmentation tasks by using active learning with convolutional neural networks.
- *GE Research, Niskayuna, NY (Summer Research Intern, May 2016-Aug 2016)*
  - Built artificial parametric 3D models of blood vessels for performing data augmentation on neuropathological image samples for blood vessel characterization using Convolutional neural networks. Paper published at *ISBI 2017*. US Patent published.

## FEATURED PROJECTS

- **Emergent Languages (Jun 2019-):** Helping introduce emergent languages paradigm for action recognition, cell classification and autoencoders. (paper)
- **FastEstimator (Sep 2018-Jun 2019):** Building a high-level open source deep learning framework that can help build complex deep learning systems easily. (website, paper)
- **Error analysis of machine learning pipelines for scientific datasets (Aug 2016-Jun 2018):** Quantifying error contribution and propagation along machine learning pipelines for small datasets from biology and material science (paper)
- **Virtual 3D models for blood vessel characterization using convolutional neural networks (May 2016-Aug 2016):** Building parametric 3D models of blood vessels and using 2-D slices for performing data augmentation in training convolutional neural networks. This work was performed on a summer internship at GE Global Research. (paper)
- **Image driven machine learning methods for microstructure recognition (Sep 2015-June 2016):** Exploration of computer vision, machine learning and deep learning techniques for automatic recognition of microstructures in materials. This is a project in collaboration with the Material Science department at RPI. (paper)

## TECHNICAL SKILLS

- Programming Language: Python (Advanced), C++ (Intermediate)
- Packages: Keras, Tensorflow, Pytorch, Scikit-learn, Scikit-image, Opencv, ImageJ
- Areas: Machine learning, computer vision, biomedical image analysis, deep learning

## PUBLICATIONS

- Chinmaya Devaraj, Aritra Chowdhury, Arpit Jain, James R. Kubricht, Peter Tu, Alberto Santamaria-Pang, "From Symbols to Signals: Symbolic Variational Autoencoders", *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), 2020.*
- Aritra Chowdhury, James R. Kubricht, Anup Sood, Peter Tu, Alberto Santamaria-Pang, "ESCELL: Emergent Symbolic Cellular Language", *IEEE International Symposium on Biomedical Imaging (ISBI), 2020.*
- Alberto Santamaria-Pang, James R. Kubricht, Chinmaya Devaraj, Aritra Chowdhury, Peter Tu, "Towards Semantic Action Analysis via Emergent Language", *IEEE International Conference on Artificial Intelligence and Virtual Reality (AIVR), 2019*.
- Xiaomeng Dong, Junpyo Hong, Hsi-Ming Chang, Michael Potter, Aritra Chowdhury, Purujit Bahl, Vivek Soni, Yun-Chan Tsai, Rajesh Tamada, Gaurav Kumar, Caroline Favart, V Ratna Saripalli, Gopal Avinash, "FastEstimator: A Deep Learning Library for Fast Prototyping and Productization", *Systems for ML workshop, NeurIPS 2019.*
- Aritra Chowdhury Malik Magdon-Ismail, Bulent Yener, "Quantifying error contribution from computational steps, algorithms and hyperparameter choices in image classification pipelines", *ArXiv, 2019.*
- Aritra Chowdhury Malik Magdon-Ismail, Bulent Yener, "Quantifying contribution and propagation of error from computational steps, algorithms and hyperparameters in image classification pipelines", *ArXiv, 2019.*
- Aritra Chowdhury, Sujoy K. Biswas, Simone Bianco, "Active deep learning reduces annotation burden in automatic cell segmentation", *BioRxiv, 2017*.
- Aritra Chowdhury et al., "Blood vessel characterization using virtual 3D models and convolutional neural networks in fluorescence microscopy", *IEEE ISBI, 2017.*
- Aritra Chowdhury, Alberto Santamaria-Pang, Christopher J. Sevinsky, Bülent Yener, "A computational study on convolutional feature combination strategies for grade classification in colon cancer using fluorescence microscopy data", *SPIE Medical Imaging Conference, 2017*.
- Aritra Chowdhury, Elizabeth Kautz, Bülent Yener, Daniel Lewis, "Image driven machine learning methods for microstructure Recognition", *Computational Materials Science, Elsevier.*
- Aritra Chowdhury, Kareem S. Aggour, Steven M. Gustafson, Christopher J. Sevinsky, Bülent Yener, "A Machine Learning Approach to Quantifying Noise in Medical Images", *SPIE Medical Imaging Conference, 2016.*
- Tongtao Zhang, Aritra Chowdhury, Nimit Dhulekar, Jinjing Xia, Kevin Knight, Heng Ji, Bulent Yener and Liming Zhao, "From Image to Translation: Processing the Endangered Nyushu Script" *ACM Transactions on Asian and Low-Resource Language Information Processing.*
- Aritra Chowdhury, Swagatam Das, "Automatic shape independent clustering based on ant dynamics." *Swarm and Evolutionary Computation, Elsevier.*
- D. Maity, A. Chowdhury, S. Surender Reddy, B. K. Panigrahi, A.R. Abhayankar, M . K. Mallick" Joint Energy and Spinning Reserve Dispatch in Wind-Thermal Power System Using IDE-SAR Technique." *Symposium Series on Computational Intelligence*, 2013, *IEEE*.
- Arghya Sur, Aritra Chowdhury, Jaydeep Ghosh Chowdhury, Swagatam Das," Automatic Clustering based on Cluster Nearest Neighbour Distance Algorithm." *Frontiers in Intelligent Computing Theory and Applications Conference 2012, Springer.*
- Jaydeep Ghosh Chowdhury, Aritra Chowdhury, Arghya Sur, Swagatam Das," Design of Non-uniform Circular Antenna Arrays using Coordinated Bacterial Dynamics and Opposite Numbers." *Swarm, Evolutionary and Memetic Computing Conference 2012, Springer.*
- Jaydeep Ghosh Chowdhury,Aritra Chowdhury, Arghya Sur," Large Scale Optimization based on Coordinated bacterial Dynamics and Opposite numbers." *Swarm, Evolutionary and Memetic Computing Conference 2012, Springer.*
- Aritra Chowdhury, Sandip Bose, Swagatam Das," Automatic Clustering based on Invasive Weed Optimization Algorithm." *Swarm, Evolutionary and Memetic Computing Conference 2011, Springer.*