Syed Ashiqur Rahman, Post-doctoral Researcher, University of Pittsburgh

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Experience

Post-doctoral Researcher at University of Pittsburgh *Feb 2020 - till-date*
- Research with Dr. Jishnu Das on Machine Learning, Bioinformatics

Graduate Research Assistant at West Virginia University *Jan 2012 - Dec 2019*
- Research with Advisor Dr. Donald Adjeroh on Deep Learning, Machine Learning, Health Informatics

Graduate Teaching Assistant at West Virginia University *Aug 2015 - Dec 2019*
- CS 350: Operating Systems, grading, software lab (in C++)

Course Instructor, Dept. of CSE at Daffodil International University *Jan 2009 - Dec 2011*
- Taught Undergraduate Courses (Algorithm, Data Structures, Programming)
- Coach of ACM Programming Team

Radio Frequency Engineer, R&D-Team at Ericsson Ltd. Bangladesh *Jan 2008 - Jan 2009*
- Optimized radio network design in the full R&D cycle (field data collection to deployment & Integration)

Education

Ph.D. in Computer Science, West Virginia University *Graduated: December 2019*
- Dissertation Topic: *Quantifying Human Biological Age: A Machine Learning Approach*
- Advisor: Dr. Donald Adjeroh, Professor, Department of Computer Science, West Virginia University
- CGPA: 3.93 in scale of 4.00

B. Sc. in Computer Science and Engineering *Graduated: December 2007*
University of Dhaka, Dhaka, Bangladesh
- CGPA: 3.87 in scale of 4.00

ML Courses during PhD

Machine Learning, Advanced Data Mining, Pattern Recognition, Cyber Security & Big-Data, Deep Learning.

Technical Skills

Programming Languages
R (v3.62), Python (v2.7, v3.6), Java, SQL, C/C++, Shell Scripting, HTML, Javascript, Matlab

APIs and libraries
Keras, Tensorflow, ScanPy, Seurat, Scikit-learn, SciPy, NumPy, MySQL, Hadoop, MapReduce, SPSS

Tools
RStudio, PyCharm, VSCode, Adobe Illustrator, Git, LaTeX, Weka, SVN, Cytoscape, Inkscape

Operating Systems
macOS Big Sur, Ubuntu 16.04, Redhat Linux, Windows 10

Selected Projects

Using interpretable machine learning approaches to uncover immune signatures of Covid-19 outcome using Python, R
- Applied machine learning model, a latent factor based regression, and a causal graphical model to infer predictive performance and molecular mechanistics for ICU Covid-19 patients (cytokine and chemokine)
- Showed inference beyond prediction for the ICU patients bifurcating between survivors and non-survivors

Non-Spike protein and endemic coronavirus antibodies associated with outcomes in severe Covid-19 using Python, R
- Applied a machine learning model and a latent factor based regression model to infer predictive performance and molecular mechanistics for ICU Covid-19 patients using Antibody-omic profiling.

Network-based integration of epigenetic landscapes unveils molecular programs underlying human T follicular helper cell (Tfh) differentiation using Python, R
- Combined epigenomic datasets and integrated them with the reference human protein interactome using a novel network propagation approach
- Uncovered subnetworks integral to Tfh cell differentiation

A network-based approach to identify expression modules underlying rejection in pediatric liver transplantation using Python, R
- Discovered pre and post transplant molecular signatures of liver transplant outcome from whole blood transcriptomes using machine learning
- Combined transcriptomic data with high-quality human protein interactome network to identify differentially regulated functional sub-components of the network

A machine learning approach to identify expression modules underlying rejection in kidney transplantation using Python, R
- Showed discrimination between clinical outcomes using kidney-compartment specific protein abundances combined with modularity of the underlying protein interactome network

Anthropometric measurements to MakeHuman using Python, R, Keras, Tensorflow
- Built a plugin to generate MakeHuman 3D models from NHANES body measurements
- Generated 3D models are now being used for health profiling applying Deep Learning techniques

Mini-places Challenge : Scene Recognition by CNN using Python, Keras, Tensorflow
- Used MiniPlaces datset for scene recognition using Deep CNN
- Achieved improved performance in compare to baseline refNet1

Vehicle Brand Identification using Matlab, SIFT, SURF, SVM
- Images were collected from west virginia university (WVU) parking lot. This is part of an intelligent traffic system where statistics of the various car passing in a given zone is of interest.

Surface-based Body Shape Index (SBSI) and its relation with all-cause mortality using R, Survival Statistical Models (CoxPH, Kaplan-Meier)
- Introduced a new body measurement index called SBSI
- SBSI is linear with age, and increases with increasing mortality, performs better than BMI

Convolutional LSTM estimates biological age from human physical activity using R, Keras
- Introduced an innovative 3D architecture to find patterns in human physical activity
- Proposed 3D approach beats the 1D and 2D deep learning based methods

Selected Publications

Journal
- VS Mahajan, **SA Rahman**, VV Viswanadham, GJ Yuen, N Sun, H Mattoo, SS Pillai, J Das, "Network-based integration of epigenetic landscapes unveils molecular programs underlying human T follicular helper cell differentiation", bioRxiv, 2021 (under review in Cell Reports).
- **SA Rahman**, P Giacobbi, L Pyles, C Mullett, G Doretto, D Adjeroh, "Deep learning for biological age estimation", Briefings in Bioinformatics, 2020.
- **SA Rahman**, D Adjeroh, "Deep Learning using Convolutional LSTM estimates Biological Age from Locomotor Physical Activity", Nature Scientific Reports, 2019.
- **SA Rahman**, D Adjeroh, "Centroid of Age Neighborhoods: A New Approach to Estimate Biological Age", Journal of Biomedical and Health Informatics, 2019.
- **SA Rahman**, D Adjeroh, "Surface-Based Body Shape Index and Its Relationship with All-Cause Mortaltiy, PLoS ONE 10 (12), 2015.

Conference
- **SA Rahman**, D Adjeroh, "Estimating Biological Age from Physical Activity using Deep Learning with 3D CNN", IEEE International Conference on Bioinformatics and Biomedicine, 2019.
- **SA Rahman**, D Adjeroh, "Centroid of Age Neighborhoods: A Generalized Approach to Estimate Biological Age, The IEEE-EMBS International Conference on Biomedical and Health Informatics, 2019.

Honors & Awards

News
- Our collaborative research received $4 million grant from National Science Foundation and was highlighted in WVU's College of Engineering. [https://www.statler.wvu.edu/news/2019/10/09/]

Professional Services
- SBP-BRiMS Program Committee, 2019
- SBP-BRiMS Student Chair, 2015

Travel Grants
- IEEE BHI Student Travel Award (NSF), 2019
- CITeR Student Travel Award, 2018
- SBP-BRiMS Student Travel Award, 2016, 2014

Merit Scholarships
- Full Tuition Waiver Scholarship, B.Sc. program in Computer Science, University of Dhaka
- Ministry of Education, Government of Bangladesh
  - Excellence in Higher Secondary Certificate Exam, 2001-2005
  - Excellence in Secondary School Certificate Exam, 1999-2001

Extra Curricular Activities
- WVU Intramural Pingpong Champion, 2015
- Chess Champion in High School

Reference

Available upon request.