Md Abdullah Al Hafiz Khan

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EDUCATION

PhD in Information System January, 2014 - May, 2019
University of Maryland, Baltimore County, Baltimore, Maryland, USA *CGPA: 3.79/4.0*
Dissertation Title: *Cross-Domain Scalable Activity Recognition Models in Smart Environments*

Bachelor of Science, Computer Science and Engineering March, 2004 - March, 2009
Bangladesh University of Engineering & Technology, Dhaka, Bangladesh *CGPA: 3.50/4.0* Major: Computer Science & Engineering

EXPERIENCE

Scientist January, 2019 - Current
AI Lab, Philips, MA, USA

- Developed domain knowledge-enhanced bidirectional long short-term memory network-conditional random field (BiLSTM-CRF) model for disease name entity recognition, which also augments a character-level convolutional neural network (CNN), a character-level LSTM network and a deep contextualized word representation model, embedded language model (ELMo) network for input embedding. (Tensorflow, Python)
- Implemented riskscores prediction algorithm (Riskslim) using opensource mixed integer optimization tool. (Pyomo, Python)
- Prototyped rule-based and logistic regression enabled model to detect customer complaint of MX40 device from noisy text data. (Python,Sklearn)

Graduate Research Assistant January, 2014 - December, 2018
University of Maryland Baltimore County

- Research on machine learning, deep learning and transfer learning algorithms to infer human activities using wearable sensors data.
- Devised and developed a novel scalable human activity recognition algorithm using transfer learning enabled Convolutional Neural Network (CNN) utilizing large volume (13 GB) wearable sensors data and achieved accuracy 87%.
- Proposed and developed transfer learning algorithm to detect unlabeled human activities using transfer learning embedded autoencoder and support vector machine and achieved 80% accuracy.
- Extracted various statistical features from time series data. Applied dimensionality reduction techniques and data visualization techniques to inspect the root causes of feature variance for different devices (i.e. smartwatch and smartphone).
- Research enabled applications such as: pervasive wellness tracking, in-store shopping analytics, recommendation and alert systems etc.

Fusing Analysis Research Intern June, 2018 - August, 2018
HP Labs, HP Inc, USA

- Analyzed large volume (40 GB) of infrared thermal camera sensor data and identified 3D parts location to assess the quality of parts printed by 3D printer. (OpenCV, Python, Sklearn)
- Implemented Nominal Logistic Regression to assess the quality of the part printed by 3D printers.
- Developed the Statistical Process Control (SPC) algorithm and detected the root and special causes of the 3D printing process defects from firmware sensors data. (Python,Pandas, Scipy, scikit-learn)

Research Fellow Intern June, 2017 - September, 2017
GE Global Research, USA

- Developed both offline and realtime image stitching tools to inspect GE90 engine. (C/C++)
- Designed user interface and implemented phase correlation algorithm to find overlap between images. (C/C++, OpenCV)

Senior Member, R&D
Commlink Info Tech Ltd. Bangladesh May, 2010 - December, 2013

- Prototyped "Call Monitor" system that monitored and analyzed calls, managed queues, agents etc. Devised asynchronous call channels handling mechanism with the help of WebRTC framework. (Python, Django, MySQL)
- Developed binary Call Details Record (CDR) parser and stored human readable information into database. (C/C++)
- Customized open source SMS gateway (Kannel) and designed "Web SMS Solution" architecture. Coded schedule algorithm and developed web interface. (C++, C#, Asp.net, MSSQL)
- Implemented a "Call Center Solution" where IVR, call conferencing, outbound call campaign etc. managed based on stored data through a web application. (PHP, MySQL, Asterisk)

Software Engineer (Part-timer)
Genweb2 Limited, Bangladesh July, 2012 - November, 2012

- Implemented client-server architecture based messaging passing system using UDP protocol to communicate between devices and server. (C++, Qt)
- Coded 3D simulator for CNC machines. Computed the minimum number of points to draw an arc to reduce CPU and memory usage. (C++, Open GL, Qt)

Software Engineer
Genuity System Limited, Bangladesh January, 2010 - May, 2010

- Devised scheduling algorithm to upload marked files, folders and developed windows application to monitor file changes and developed user interface. (C/C++, MFC)

SKILLS

Machine Learning: Classification (Decision Tree, Random Forests, Support vector machine (SVM), etc.), Clustering, Regression, Feature Engineering, Deep Learning (CNN, Autoencoder, LSTM, etc.).
Statistical Methods: Regression Models, Principal Component Analysis (PCA), Linear Discriminant Analysis (LDA), Transfer Component Analysis and Dimensionality Reduction.
Languages & Techniques: C/C++, Python, Java, PHP, Javascript, C#, PL/SQL, MATLAB.
Frameworks: Tensorflow, Theano, Qt, PyQt, Django, MFC, OpenGL, JQuery, Android.
Database Systems: MySQL, Oracle, Postgresql, MSSQL, NoSQL.
Tools: GIT, SVN, Docker, PyCharm, Eclipse, NetBeans, QtCreator, Android Studio, Visual Studio.

SELECTED PUBLICATIONS

- **Md Abdullah Al Hafiz Khan**, Nirmalya Roy, "UnTran: Recognizing Unseen Activities with Unlabeled data using Transfer Learning". In IEEE IoTDI 2018.
- **Md Abdullah Al Hafiz Khan**, Nirmalya Roy. "Scaling Human Activity Recognition via Deep Learning-based Domain Adaptation". In IEEE PerCom 2018.
- **Md Abdullah Al Hafiz Khan**, David Welsh, Nirmalya Roy. "Firearm Detection Using Wrist Worn Tri-Axis Accelerometer Signals". In IEEE WristSense 2018.
- **Md Abdullah Al Hafiz Khan**, Nirmalya Roy. "TransAct: Transfer learning enabled activity recognition". In IEEE International Workshop on Pervasive Smart Living Spaces (PerLS' 2017).
- **Md Abdullah Al Hafiz Khan**, Nirmalya Roy. "COAR : Collaborative and Opportunistic Human Activity Recognition". In IEEE International Conference on Distributed Computing in Sensor Systems (DCOSS' 2017).
- **Md Abdullah Al Hafiz Khan**, Ruthvik Kukkapalli, Piyush Waradpande, Sekar Kulandaivel, Nilanjan Banerjee, Nirmalya Roy, Ryan Robucci "RAM: Radar-based Activity Monitor". In IEEE International Conference on Computer Communications (InfoCom' 2016). San Francisco, California. April, 2016.
- H M Sajjad Hossain, Nirmalya Roy, **Md Abdullah Al Hafiz Khan**, "Active Learning Enabled Activity Recognition". In IEEE International Conference on Pervasive Computing and Communications (PerCom 2016). Sydney, Australia. March, 2016.
- **Md Abdullah Al Hafiz Khan**, H M Sajjad Hossain, Nirmalya Roy, "Infrastructure-less Occupancy Detection and Semantic Localization in Smart Environments". In 12th EAI International Conference on Mobile and Ubiquitous Systems: Computing, Networking and Services (Mobiquitous' 2015). Coimbra, Portugal. July, 2015.

- **Md Abdullah Al Hafiz Khan**, H M Sajjad Hossain, Nirmalya Roy. "SensePresence: Infrastructureless Occupancy Detection for Opportunistic Sensing Applications". In MDM 2015, Pittsburgh, Pennsylvania.
- Nilavra Pathak, **Md Abdullah Al Hafiz Khan**, Nirmalya Roy, "Acoustic Based Appliance State Identifications for Fine Grained Energy Analytics." In PerCom 2015, St. Louis, Missouri.
- **Md Abdullah Al Hafiz Khan**, Sheung Lu, Nirmalya Roy, Nilavra Pathak, "Demo Abstract: A Microphone Sensor based System for Green Building Applications" In PerCom Demos 2015, St. Louis, Missouri.

Patent Filed

- Sunil Kothari, Tod Heiles, Luke Bockman, Gary J. Dispoto, **Md Abdullah Al Hafiz Khan**, "Detecting three-dimensional (3D) part lift and drag". 2018
- Sunil Kothari, Tod Heiles, Luke Bockman, Gary J. Dispoto, **Md Abdullah Al Hafiz Khan**, Todd Goyen, "Detecting three-dimensional (3D) part drag". 2018
- Sunil Kothari, Kelly Ronk, Anthony Powell, Jun Zeng, **Md Abdullah Al Hafiz Khan**, Tod Heiles, Goffril Obegi, "Custom three-dimensional (3D) print mode generation". 2018

AWARDS

- Received NSF Student Travel Grant for attending IEEE INFOCOM 2016, PerCom 2015, MDM 2015.
- Received Graduate Student Travel Grant for IEEE IoTDI 2018, InfoCom 2016, MDM 2015, PerCom 2015.

REFERENCES

- Available on request.