MOLLA HAFIZUR RAHMAN

Graduate Research Assistant

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EXPERIENCE

Graduate Research Assistant

Department of Mechanical Engineering, University of Arknsas, Fayetteville

August 2017 - Present Fayetteville, AR

- Conducted system design experiment and collect user behavioral data through a CAD system. Extract, manipulate and clean data for statistical analysis.
- Developed a novel method of identifying sequential behavior by implementing Markov Model and different clustering algorithms including K-means, Hierarchical Agglomerative, and Network-based approach.
- Implemented deep learning models such as Feed-forward neural network (FNN), Recurrent neural network (RNN) (especially long short term memory unit/LSTM) in order to predict users' future actions. Compare these models with the traditional sequential models (i.e., Markov model and Hidden Markov model)
- Developed a deep learning framework for combining time-independent data and time-dependant data to improve the prediction accuracy.

Mechanical Engineer

Abul Khair Steel Melting Ltd

Jan 2016 - June 2017 Chittagong, Bangladesh

- Led a manufacturing & maintenance team for the smooth operation of fully automated furnace (EAF) of 100 tons capacity.
- Conducted a time-series analysis using previous 5 years data set in **R** for billet production forecasting.
- Collected data from different department and used them to plan and execute breakdown or scheduled maintenance, created troubleshooting and preventive maintenance plans.
- Developed quality assurance technique for reducing waste in material and optimized manufacturing process.
- Addressing design flaws in the melting plant system as well as two 100 tons of electric arc furnaces and developed approaches to address the flaws.

SKILLS

C++, Python, R, Keras, Scikit-learn
Tensorflow, Pytorch, Matlab
AutoCAD, Solidwork, Rhino, 3ds max
ANSYS, Abaqus

EDUCATION / COURSES

Ph.D. in Mechanical Engineering

University of Arkansas, Fayetteville

August 2017 - 2022 (expected)

- ***Courses:*** *Probability theory, Machine Learning, Deep Learning, Decision-Making*

B.Sc. in Naval Architecture & Marine Engineering

Bangladesh University of Engineering and Technology

May 2010 - September 2015

ACHIEVEMENTS

- Best paper award in IDETC/CIE 2019 conference hosted by ASME for the paper "A Deep Learning Based Approach to Predict Sequential Design Decisions".
- Champion of "Adobe Design Challenge" in University of Arkansas.

PROJECTS

Predicting human behavior

- Developed a general framework using clustering methods and design process model to group human who have similar sequential behavior.
- Proposed a deep learning framework to predict human future actions in CAD environment.

Design a waterway

- Surveyed and tested feasibility by collecting infrastructure and cost data to develop a novel transportation network to connect important regions of capital city of Bangladesh.
- Developed a optimized network around a lake and designed cost efficient boats for passengers

Machine learning algorithms on Kaggle MNIST dataset

- Implemented different machine learning algorithm such as k nearest neighbor (KNN), support vector machine (SVM) for classification.
- Implemented deep learning models such as feed-forward neural network (FNN) and convolution neural network (CNN) and achieved state-of-the art prediction accuracy .

PUBLICATIONS

J1 **Rahman, M.H.**, Schimpf, C., Xie, C. and Sha, Z., 2019. *A CAD-Based Research Platform for Data-Driven Design Thinking Studies.* Journal of Mechanical Design, pp.1-44. [**Accepted: July 2019; Impact Factor: 2.783**] Link

C1 **Rahman, M.H.**, Xie, C. and Sha, Z., 2019. *A Deep Learning Based Approach to Predict Sequnetial Design Decisions* In ASME 2019 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference, ASME, 2019[**Best Paper Award**] Link

C2 **Rahman, M.H.**, Gashler, M., Xie, C. and Sha, Z., 2018, August. *Automatic Clustering of Sequential Design Behaviors.* In ASME 2018 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference (pp. V01BT02A041-V01BT02A041).ASME. Link