Shoieb Ahmed Chowdhury

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Critical thinker with proven record of managing multiple scientific research projects over 6+ years. Passionate about machine learning and data science. Ability to provide simple solutions to challenging engineering problems by computational modeling, data analysis, and visualization. Demonstrated experience of investigating material properties with analytical, computational, and experimental methods.

EDUCATION

University of Rochester — **Rochester, NY**
Doctor of Philosophy (PhD) in Mechanical Engineering; GPA 3.99/4.0 — *Anticipated December 2022*

University of Oklahoma — **Norman, OK**
Master of Science (MS) in Mechanical Engineering; GPA 4.0/4.0 — *August 2017*
Dolese fellowship recipient

Bangladesh University of Professionals — **Dhaka, Bangladesh**
Bachelor of Science in Aeronautical Engineering; GPA 3.56/4.0 — *January 2014*

TECHNICAL SKILLS

- Programing/Scripting: Python, SQL, MATLAB, Bash, Fortran, Mathematica, VBA
- Experienced with python libraries: Pandas, TensorFlow, Scikit-learn, Keras, NumPy, Streamlit, Plotly
- Skilled in materials and Multiphysics simulation tools: ABAQUS, ANSYS, LAMMPS, SOLIDWORKS, GULP
- Technical experience with mechanical and thermal testing instruments including DMA, DSC, TGA, Instron machine, imaging with both optical and scanning electron microscope

RELEVANT PROJECT EXPERIENCE

- Built a spam email classifier by Support Vector Machine (SVM) resulting in 98.8% accuracy on test set
- Constructed a failing server classifier based on anomaly detection algorithm and a recommender system with collaborative filtering technique
- Improved the test set accuracy of pre-existing neural network up to 95-96% on classification task by Hyperparameter tuning (He Initialization, L2 & Dropout Regularization, Adam Optimization) in Python
- Performed computer vision tasks such as sign language digits recognition by building ResNets, transfer learning with MobileNetV2 for image classification, car detection with YOLO algorithm, image segmentation with U-Net, face recognition system, and art generation by neural style transfer
- Carried out NLP projects for building character level language model, music generation, and emotion recognition on text data with LSTM and GRU architectures, achieved 95% test accuracy on an emoji generator by adding word vectors, synthesized speech dataset and constructed a trigger word detector, made named-entity recognition and automated question answering systems with transformers
- Analyzed international debt statistics by country on World Bank dataset with SQL
- Delivered a capstone project on designing and manufacturing an automated aircraft, coordinating a team of 15+ members. Selected as one of 81 teams worldwide based on design report and flight performance for Cessna/Raytheon Missile Systems student Design/Build/Fly (DBF) competition

WORK EXPERIENCE

University of Rochester — **Rochester, NY**
Graduate Research Assistant — *August 2017 – Present*

PhD project on computational mechanics & simulation of materials: Developing frameworks for mechanical behavior of heterogeneous materials across length scales (micro-nanoscale)

- Designed and developed computational models for mechanical properties of multilayered 2D materials with molecular dynamics (LAMMPS) and finite element (ABAQUS). Model attained >96% accuracy resulting in 2+ publications. Predicted and analyzed properties in the presence of defects and twist angle by applying developed models enhancing theoretical understanding
- Implemented gradient free optimization algorithms and fitted force field parameters for MD models. Gained >94% accuracy in prediction of failure properties compared to experiment
- Wrote custom MATLAB and Python programs for implementing evolutionary algorithms, computational Raman spectrum, atomic strain calculation, and automated tasks with Bash scripting for job submission to HPC cluster by reading and writing from several files increasing efficiency by 80%

- Created a finite element and Micromechanics based mathematical model that achieved 7-18 times improvement in prediction accuracy of elastic field in inhomogeneous material
- Engaged and presented research results weekly/monthly to a team of 10+ collaborators from different backgrounds like physics, electrical engineering, and materials science

University of Oklahoma **Norman, OK**
Graduate Research Assistant *August 2015 – July 2017*
MS thesis: Polydimethylsiloxane (PDMS) /Carbon Nanofiber nanocomposite with Piezoresistive sensing functions

- Developed composite material-based flexible pressure sensor that exceeded the performance of traditional metal sensors by 10 times. Delivered the project within timeframe which included an in-house formula material, manufacturing sensing units, and assembling sensors for the final device
- Devised a novel in-situ mechanical testing experiment within a scanning electron microscope (SEM) that explained the sensing mechanism in terms of fiber alignment and inter-fiber distance
- Integrated a combination of finite element analysis and design of experiment (DOE) based optimization resulting in 217% enhancement in performance of sensor devices
- Performed characterizations using mechanical (Tension, compression, three/four-point bending, creep test, double cantilever tests), thermal testing (DMA, DSC, TGA), and microscopic devices (SEM, Optical) for fiber/polymer composite systems
- Led 3 other projects on manufacturing shape memory polymer, self-healing composite, and nanowire coating on fiber composites resulting in 2+ research papers

Biman Bangladesh Airlines **Dhaka, Bangladesh**
Engineering Trainee *December 2012 – January 2013*
Training on subsystems analysis and maintenance of Boeing 777 and Airbus-A310Aircraft. Gained practical experience on non-destructive testing (NDT) methods, quality assurance, and hangar maintenance

SELECTED COURSEWORKS

Machine Learning	Deep Learning	Continuum Mechanics
Computational Methods	Statistical Mechanics	Scanning Electron Microscopy
Finite Element Method	Composite Materials	

PROFESSIONAL MEMBERSHIPS

Society member at The Minerals, Metals & Materials Society (TMS) and Materials Research Society (MRS)