MD MUHTASIM BILLAH

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WORK EXPERIENCE

Graduate Researcher

Washington State University

Aug 2018 – Ongoing Pullman, WA

- Implemented finite volume method (FVM) for solving inverse heat transfer problems using the Bayesian Inference machine learning algorithm.
- Developed and further improved a preexisting probabilistic model based on Metropolis Monte Carlo method written in C++ and Fortran.
- Utilized the stochastic model for studying the key parameters of transcytosis for drug delivery through blood brain barrier (BBB) as an aid for neurodegenerative diseases such as Alzheimer's and Parkinson's.
- Studied design parameters and relevant characteristic properties for manufacturing functional nanoparticle for drug delivery to the brain.

DATA SCIENCE PROJECTS

- Multilabel Classification of Drug from Mechanism of Action (MoA)
  - Employed several DNN architectures i.e. FFNN, ResNet and LSTM.
  - Performed multilabel stratified k-fold cross validation for resampling.
  - Created model ensemble to further minimize the cross entropy loss.
  - Acquired bronze medal in associated Kaggle competition (2020).
- Building End-to-end Recommender Systems for Amazon Products
  - Used Apache Spark to handle large Amazon datasets (233M reviews).
  - Wrote Python and SQL scripts to parse and import data into MySQL.
  - Applied multiple memory based (both user and item based) and model based (SVD, ALS matrix factorization) collaborative filtering methods.
  - Harnessed fast cloud computing environment on AWS EC2 (Linux).
- Cancer Classification & Clustering from Gene Expression Monitoring
  - Performed PCA on 7,123 human genes (found from microarrays data).
  - 85% of the total variance was found to be explained by top 50 genes.
  - Applied k-means clustering for analyzing cancer classes AML and ALL.
  - Employed Elbow and Silhouette Score method for selection of k.
- Female Employment Against Socioeconomic Factors in Bangladesh
  - Processed World Bank data on Bangladesh spanning over 30 years.
  - Utilized statistical testing and diagnostic plots for checking model assumptions, possible outliers, multicollinearity and autocorrelations.
  - Multivariate regression achieved an adjusted R-squared value of 0.99.

SELECTED PUBLICATIONS

- AI Khan, MM Billah, C Ying, J Liu, P Dutta, *Bayesian Method for Parameter Estimation in Transient Heat Transfer Problem*, International Journal of Heat and Mass Transfer (2020) 166, 120746.

RELATED COURSEWORK

Big Data and Cloud Computing | Data Mining and Analysis | Neural Networks | Applied Linear Models | Statistical Theory | Genomic Data Analysis | Design and Analysis of Experiments | Numerical Methods | Statistics for Engineers and Scientists

EDUCATION

Ph.D. Mechanical Engg. GPA: 3.94/4.00

Washington State University **Aug 2022**

High performance computing (HPC), multi-scale probabilistic (Monte Carlo) modeling

M.S. Statistics GPA: 4.00/4.00

Washington State University **Jan 2022**

ETL pipeline, time series, forecasting and predictive modeling, statistical computing

B.S. Mechanical Engg. GPA: 3.55/4.00

BGD U. of Engg. and Tech. **Feb 2017**

TECHNICAL SKILLS

Languages: Python | R | SQL | MATLAB | C | C++ | SAS | Fortran | Bash

Databases: MySQL | PostgreSQL

Libraries/Frameworks: SciPy | Numpy | Pandas | Matplotlib | Seaborn | Plotly | Scikit-learn | TensorFlow | Keras | PyTorch | Spark | dplyr | tidyverse | tidyr | caret | quanteda | ggplot2

Tools: Git | Tableau | AWS/EC2

AWARDS/HONORS

- Bronze medal (top 9%), Kaggle mechanism of action (MoA) detection competition, 2020.
- Best project (1st of 15 teams) award, CptS 415: Big Data, WSU, Fall 2020.
- Dean's List Scholarship, Faculty of Mechanical Engineering, BUET 2017.
- University Merit Scholarship, BUET 2016.
- Dean's List Scholarship, Faculty of Mechanical Engineering, BUET 2016.

CERTIFICATIONS

- Deep Learning Specialist (deeplearning.ai)
- Machine Learning (Stanford University)