Jishan Ahmed

Curriculum Vitae

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LinkedIn
Google Scholar

Educational Background

August 2023 **Ph.D. in Data Science**, *Bowling Green State University*, Bowling Green, OH

May 2018 **M.A. in Mathematics**, *Ball State University*, Muncie, IN

January 2012 **M.S. in Applied Mathematics**, *University of Dhaka*, Dhaka, Bangladesh

July 2010 **B.S. in Mathematics**, *University of Dhaka*, Dhaka, Bangladesh

Professional Experience

Teaching Experience

July 2023–Present **Data Science Assistant Professor**, *Department of Mathematics, Weber State University (WSU)*, Ogden, Utah

Courses Probability & Statistics I, Factor and Cluster Analysis, Applied Data Mining & Predictive Analytics, Statistical Analysis of Big and Small Data, Advanced Statistical Learning

January 2023–May 2023 **Teaching Instructor**, *Department of Applied Statistics and Operations Research, Schmidthorst College of Business, Bowling Green State University*, Bowling Green, OH

Courses Business Analytics

August 2018–August 2019 **Math Teacher**, *Seton Catholic High School*, Richmond, Indiana

- Adopted data-driven tools to automatically generate a personalized learning plan for each student
- Used data to reflect on effectiveness of lessons and academic progress to improve instruction and practice
- Collaborated with peers to enhance the work environment and support instructional planning
- Consulted with a diverse group of parents thereby increasing their engagement and student success

August 2016–May 2018 **Teaching Graduate Assistant**, *Department of Mathematical Sciences, Ball State University*, Muncie, Indiana

Courses Taught Mathematics and its Applications, Quantitative Reasoning

July 2012–August 2016 **Teaching Assistant Professor**, *Department of Mathematics, University of Barisal*, Barisal, Bangladesh

Courses Taught Calculus, Real Analysis, Numerical Analysis, Business Mathematics, Mathematical Statistics, Introduction to Programming with Python, Introduction to C Programming, FORTRAN Programming

Industry Experience

January 2020 –May 2023 **Graduate Research Data Analyst**, *Office of Institutional Research (OIR)*, Bowling Green State University, Bowling Green, OH

- Design machine learning models to forecast enrollment, retention, graduation, and finances
- Create data visualizations and dashboards using Tableau and Power BI
- Extract data from the PeopleSoft system and IR operation data system (ODS) using SQL queries
- Communicate insights to the director of the (OIR) using data visualizations that support institutional improvement, effectiveness, and efficiency

May 2022–August 2022 **Healthcare Analytics Summer Intern**, *Medical Advantage*, Novi, MI

- Generated insights to understand how patient-centered medical home capabilities reduce the risk of malpractice
- Built machine learning models that use medical claims, EMR, and ADT data to identify potential missed hierarchical condition categories to capture patients' risk more accurately by primary care physician practices
- Built machine learning models that predict patients' future 12 months cost to better prioritize patients for chronic case management and transition of care services by primary care physician practices

August 2019–December 2019 **Graduate Research Assistant**, *Graduate College, Bowling Green State University*, Bowling Green, OH

- Developed predictive models for student tuition
- Created reports and data visualizations using Microsoft Excel
- Maintained Slate application system

Research Projects

PhD Dissertation

Topic Cost-Aware Machine Learning and Deep Learning for Extremely Imbalanced Data (Link)

- Introduced the novel oversampling technique for imbalanced data and a modified focal loss function to enhance deep learning models for hard drive failure prediction
- Employed survival analysis to uncover key factors influencing hard drive longevity

Advisor Dr. Robert C. Green II, Department of Computer Science Bowling Green State University

Graduate Research Projects

Topic Comparative Analysis of Random Forest (RF) and Artificial Neural Networks (ANN) Classifiers for the Wisconsin Breast Cancer Dataset (WBCD) (Link)

- The performance of RF, and ANN algorithms were evaluated using 10-fold cross-validation
- The ANN achieved better performance with 97.67% accuracy, as compared to the RF algorithm for WBCD

Advisor Dr. Munni Begum, Department of Mathematical Sciences, Ball State University

Topic Numerical Study of Computational Fluid Dynamics Problems in the One Dimensional Case (Link)

- Implemented Runge-Kutta discontinuous Galerkin method to solve the Euler equations in one-dimensional case

Advisor Dr. Paulo Correia, Department of Mathematics, University of Évora, Évora, Portugal

Funding Agency European Union (EU)

Topic Numerical Solutions of 1-D BVP by Different Methods: A Comparative Study

- Cubic spline method, finite element method (FEM), and finite difference method (FDM) were implemented to solve one dimensional boundary value problems.
- Cubic spline, and FEM methods performed better compared to the FDM method with the same number of knots.

Advisor Dr. Shafiqul Islam, Department of Mathematics, University of Dhaka

Other Projects

Topic Comparing Computational Complexity and Efficiency of Parallel Random Forest Algorithms Implemented in Python and R (Link)

- Implemented two parallel Random Forest classifier algorithms using the python and R
- Training times were measured on the HIGGS data set to analyze the multiprocessing efficiency and computational complexity of the implemented algorithms

Topic Machine Learning Techniques for Classification of Kidney Transplant Pairs (Link)

- Implemented random forest, logistic regression, and artificial neural networks techniques on kidney transplant data to classify pairings as either successful (should last for life of the recipient) or not

Topic Jarque–Bera Test and its Competitors for Testing Normality – A Power Comparison (Link)

- Reproduced the results of the paper, "Jarque –Bera Test and its Competitors for Testing Normality – A Power Comparison"

Undergraduate Research Project

Topic Articulation Points in Communication Networks (Link)

- Implemented Depth First Search (DFS) algorithm to find all the articulation points in a graph

Advisor Professor Sajeda Banu, Department of Mathematics, University of Dhaka

Poster Presentations

November 25-28, 2014 **The First Commonwealth Science Conference**, *Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR)*, Bangalore, India

March 7-8, 2014 **TWAS Regional Conference of Young Scientists on "Recent Trends in Physical and Biological Sciences"**, *Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR)*, Bangalore, India

Talks

September 23, 2024 **The False Promise of ChatGPT: Uncovering the Truth Behind Large Language Models**, *Math Factor Seminar Series, Mathematics Club*, Ogden, Utah

May 3, 2024 **Fundamentals of Large Language Models and Ethical Implications**, *AI Learning Community Workshop, Weber State University*, Ogden, Utah

February 26, 2024 **The Cocktail Party Problem: Solving with Independent Component Analysis (ICA)**, *Math Factor Seminar Series, Mathematics Club*, Ogden, Utah

August 18, 2022 **Machine Learning for Healthcare**, *Medical Advantage*, Novi, MI

August 11, 2022 **Mining Association Rules in Large Databases**, *Medical Advantage*, Novi, MI

Conferences/Workshops Attended

December 15-18, 2024 **IEEE BigData Conference Workshop**, *Washington DC*, USA

December 12, 2024 **Fostering Success for International Students Workshop**, *Center for Excellence in Teaching and Learning, Weber State University*, Ogden, Utah

September 5-6, 2024 **2nd Annual Business & Generative AI Workshop**, *Wharton San Francisco*, San Francisco, CA

Aug 12, 2024 **Creating Content in Canvas Workshop**, *Weber State University*, Ogden, Utah

July 8-14, 2024 **SciPy 2024 Conference**, *Tacoma, WA*, USA

June 26-28, 2024 **National Workshop on Data Science Education**, *University of California, Berkeley (Online)*, USA

June 14, 2024 **The Basics of Large Language Models Workshop**, *UC Davis DataLab (Online)*, USA

Jun 5, 2024 **Understanding the LLM Development Cycle: Building, Training, and Fine-tuning**, *ACM Tech Talk (Online)*, USA

May 3, 2024 **AI Learning Community Workshop**, *Weber State University*, Ogden, Utah

May 8, 2017 **Pearson Advanced MyMathLab Training**, *Department of Mathematics, Ball State University*, IN, USA

November 29, 2016 **Pearson MyMathLab Training**, *Department of Mathematics, Ball State University*, IN, USA

August 17, 2016 **Pearson MyMathLab Training**, *Department of Mathematics, Ball State University*, Mumbai, India

July 6- 17, 2015 **Summer School on Current Research in Finite Element Methods**, *CIMPA-INDIA Research School, Indian Institute of Technology Bombay*, Mumbai, India, (Link)

February 15, 2012 **An Introduction to FreeFem++**, *Department of Mathematics, University of Évora*, Évora, Portugal

Academic Awards

- Graduate Research Assistantship, 2019-2023. Bowling Green State University, USA
- Graduate Teaching Assistantship, 2016-2018. Ball State University, USA
- Graduate Merit Fellowship, 2016-2018. Ball State University, USA
- Outstanding Graduate Student Award, 2018. Mathematical Sciences, Ball State University, USA
- Centre International de Mathématiques Pures et Appliquées (CIMPA) travel grant, 2015. CIMPA, France
- Best Poster Presentation, 2014. The First Commonwealth Science Conference, Bangalore, India
- Commonwealth Science Conference (CSC) Travel Grant, 2014. The Royal Society, England
- The World Academy of Sciences (TWAS) Travel Grant, 2014. TWAS, Italy
- Erasmus Mundus Scholarships, 2011. European Union
- Government Scholarships (High school and Undergraduate levels), 2002-2010. Ministry of Education, Bangladesh

Mentoring

Graduate

- Sarath Kumar Madapana, Data Science MS student at Bowling Green State University, OH

Undergraduate

- Shaharina Shoha, University of Barisal (Current Status: Mathematics Graduate Student at Western Kentucky University, KY)
- Shake Ibna Abir, University of Barisal (Current Status: Mathematics Graduate Student at Western Kentucky University, KY)
- A.M. Mohiuddin, University of Barisal (Current Status: Mathematics PhD Student at South Asian University Delhi, India)
- Jewel Howlader, University of Barisal (Current Status: Mathematics PhD Student at South Asian University Delhi, India)
- Md Sajib, University of Barisal (Current Status: Mathematics MS Student at South Asian University Delhi, India)

High School

- Jonah Falcone, Seton Catholic High School (Current Status: Double Major in Mathematics and Philosophy at University of Notre Dame, IN)

Peer-Reviewed Articles

[AG24a] Jishan Ahmed and R.C. Green. "Leveraging survival analysis in cost-aware deepnet for efficient hard drive failure prediction". In: *Neural Computing and Applications* (Oct. 2024), pp. 1–16. DOI: 10.1007/s00521-024-10479-6.

[AG24b] Jishan Ahmed and Robert C. Green. "Cost aware LSTM model for predicting hard disk drive failures based on extremely imbalanced S.M.A.R.T. sensors data". In: *Engineering Applications of Artificial Intelligence* 127 (2024), p. 107339. ISSN: 0952-1976. DOI: https://doi.org/10.1016/j.engappai.2023.107339. URL: https://www.sciencedirect.com/science/article/pii/S0952197623015233.

[Sah+23] Mrinal Saha et al. "Leveraging machine learning to evaluate factors influencing vitamin D insufficiency in SLE patients: A case study from southern Bangladesh". In: *PLOS Global Public Health* 3.10 (Oct. 2023), pp. 1–21. DOI: 10.1371/journal.pgph.0002475. URL: https://doi.org/10.1371/journal.pgph.0002475.

[AG22] Jishan Ahmed and Robert C. Green II. "Predicting severely imbalanced data disk drive failures with machine learning models". In: *Machine Learning with Applications* 9 (2022), p. 100361. DOI: https://doi.org/10.1016/j.mlwa.2022.100361.

[Ahm+21] Jishan Ahmed et al. "Effect of environmental and socio-economic factors on the spreading of COVID-19 at 70 cities/provinces". In: *Heliyon* 7.5 (2021), e06979. DOI: https://doi.org/10.1016/j.heliyon.2021.e06979.

[Ahm17] Jishan Ahmed. "Numerical Solutions of Third-Order Boundary Value Problems associated with Draining and Coating Flows". In: *Kyungpook Mathematical Journal* 57.4 (2017). DOI: 10.5666/KMJ.2017.57.4.651.

Manuscripts Under Review

[Ahm+22] Jishan Ahmed et al. "Explainable Machine Learning Approaches to Assess the COVID-19 Vaccination Uptake: Social, Political, and Economic Aspects". In: (2022). DOI: 10.20944/preprints202206.0115.v1.

Journal Referee

- Heliyon
- Expert Systems with Applications
- Journal of Statistical Research (JSR)
- PLOS ONE
- Machine Learning with Applications
- Engineering Applications of Artificial Intelligence
- IEEE Transactions on Neural Networks and Learning Systems
- SciPy Conference

Technical Competencies

Programming Languages	Python, R, SAS, Java, C, FORTRAN, MATLAB
Machine Learning and Pattern Recognition	Caret, Scikit-Learn, DASK, Tensorflow, Keras, PyTorch
Big Data	Map/Reduce, Hive, Apache Spark, Apache Hadoop
Data Visualization	Tableau, Microsoft Power BI
Databases	Microsoft SQL Server, Oracle
Version Control	Git, GitHub
Cloud Computing Technology	Amazon Web Services (AWS)
Geographic information system (GIS)	Remote Sensing
Natural Language Processing	Topic Discovery and Modeling, Sentiment Analysis
Others	Linux (Bash Shell Scripting)/Docker,LaTeX

Certifications

- SQL for Data Science, Coursera, January 11, 2020

Graduate Courses

Statistics Probability and Random Variables, Theory of Statistics, Introduction to Statistical Learning, Computational Statistics, Bayesian Statistical Inference, Linear Statistical Inference, Generalized Linear Models and Extensions, Time Series Analysis, Statistical Graphics, Statistical Computing, Statistical Learning I, Statistical Learning II

Data Science Data Science Programming, Data Science Communication, Big Data Analytics, Unsupervised Feature Learning, Machine Learning, Data Visualization, Advanced Topics in Data Mining

Mathematics Real Analysis, Topology, Abstract Algebra, Numerical Methods for Differential Equations, Complex Analysis, Fluid Dynamics, Dynamical Systems, Mathematical Hydrology, Numerical Analysis

Research Interests

Explainable Machine Learning and Deep Learning Methods, Big Data, Imbalanced Classification, Anomaly Detection, High Dimensional Data Analysis, Categorical Data Analysis, Time Series Analysis, Public Health, Survival Analysis, Healthcare Analytics, Computational Social Science, High-Performance Computing

Service and Volunteering

- Mentored high school students for the Ritchey Science & Engineering Fair, leading to a 3rd place award in Environmental Engineering at the Regeneron International Science and Engineering Fair (ISEF) 2024.
- Served as a Grand Award Judge in the Ritchey Science & Engineering Fair, providing constructive feedback to student researchers and strengthening the university's community outreach.
- Student Advisor, University of Barisal (2012-2016)
- Undergraduate exam committee member, University of Barisal (2012-2016)
- Undergraduate entrance exam committee member, University of Barisal (2012-2016)
- Examiner, National Math Olympiad, Bangladesh (2013)

Professional Memberships

- Bangladesh Mathematical Society (BMS)

References

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