

# SARDER JUNAID AHMED

Computational Social Scientist · Machine Learning Researcher

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[GitHub](#) • [Portfolio](#)

## EDUCATION

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### B.S. Computer Science & Engineering

Feb 2025

Rajshahi University of Engineering & Technology (RUET), Bangladesh

CGPA: 3.05/4.00 • Undergraduate Thesis: “Optimized Euler’s Approximation Method” (A+) • Seminar: A+

## RESEARCH INTERESTS

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Interrogate how high predictive accuracy in applied machine learning conceals violations of fundamental distributional assumptions. Establish statistical validity as prerequisite—not consequence—of model performance through: (1) clarifying theoretical probability’s integration with computational practice; (2) distinguishing categorical variables from random variables via measure-theoretic formalism; (3) explicit assumption validation before interpretation. Apply this framework to computational social science, causal inference, and governance analytics.

## PUBLICATIONS

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### Accepted Conference Publication:

- Ahmed, S.J.** (2025). “Multi-Dimensional Statistical Similarity for Governance Classification: Beyond Arbitrary Thresholds in Comparative Politics.” *6th Annual Paper Meet Electrical Engineering Division (APMEE 2025)*. Oral Presentation. [Best Research Paper Award](#)  
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### Manuscripts Under Review:

- Ahmed, S.J.** (2025). *Democracy’s Financial Paradox: How Economic Barriers Reconstitute Elite Power*. Theoretical analysis of how campaign finance structures systematically reconstitute elite power through electoral mechanisms, challenging assumptions about representative democracy and popular sovereignty.
- Ahmed, S.J.**, Islam Nahian, M.T., & Kwoshik, M.H.R. (2025). *Machine Learning for Crime Classification: A Fairness-Aware Approach to Class Imbalance*.
- Ahmed, S.J.**, Kwoshik, M.H.R., & Islam Nahian, M.T. (2025). *Using Machine Learning to Classify Countries as Developed or Developing: A Practical Approach with Real Validation*.

## RESEARCH EXPERIENCE

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### Independent Research Program

2021–Present

*Department of Computer Science & Engineering, RUET*

### Economic Development Classification Framework

Developed a multi-dimensional classification system using World Bank indicators across 150+ countries to predict economic development status. Addressed high-dimensionality and feature multicollinearity through principled feature selection; analyzed model interpretability to identify key drivers of development classification. Achieved 98.3% accuracy while maintaining statistical transparency. [GitHub](#)

### Crime Classification & Public Safety Analytics

Engineered spatial and temporal features from demographic datasets to predict crime categories using ensemble methods (XGBoost). Systematically validated distributional assumptions underlying model predictions; examined feature importance to inform policy-relevant insights on public safety. 93% accuracy. [GitHub](#)

### Senior Researcher & Executive Committee Member

May 2022–May 2024

*Young Learners’ Research Lab, RUET*

- Conducted machine learning analysis, statistical inference, and numerical analysis for lab-wide research initiatives, with focus on methodological rigor and assumption validation
- Mentored 5+ junior researchers on the philosophical distinction between predictive optimization and statistical validity, facilitating understanding of advanced topics including Bayesian inference and causal inference methodology

- Led analysis of cross-disciplinary datasets employing hypothesis testing (Mann-Whitney U, Kolmogorov-Smirnov, Shapiro-Wilk) to ensure validity before interpretation
- Esteemed Alumni Award (2024) • Certificate of Appreciation for Research Mentorship Excellence (2024)

## TECHNICAL AND RESEARCH SKILLS

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<b>Programming:</b>	Python, C/C++, SQL, R, Git, Docker, Linux, LaTeX
<b>Statistical Methods:</b>	Probability Theory, Bayesian Inference, Causal Inference, Hypothesis Testing, Mann-Whitney U, Kolmogorov-Smirnov, Shapiro-Wilk Tests
<b>Machine Learning:</b>	TensorFlow, Scikit-learn, XGBoost, Random Forest, Ensemble Methods, Feature Engineering
<b>Statistical Computing:</b>	NumPy, Pandas, Scikit-learn, Advanced Cross-validation, Model Selection
<b>Deep Learning:</b>	TensorFlow, PyTorch, Neural Network Optimization, Model Architecture Design
<b>Research Tools:</b>	Jupyter, Git/GitHub, Linux, LaTeX
<b>Data Visualization:</b>	Matplotlib, Seaborn, Plotly, Statistical Graphics
<b>Research Methodologies:</b>	Experimental Design, Statistical Testing, Academic Writing, Reproducible Research

## HONORS & AWARDS

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- Best Research Paper Award, APMEE 2025
- Esteemed Alumni Award, Young Learners' Research Lab, RUET (2024)
- Certificate of Appreciation for Research Mentorship, RUET (2024)

## TEACHING & MENTORSHIP

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### Independent Tutor & Peer Mentor

2019–Present

- Instructed Physics, Chemistry, and Higher Mathematics to 50+ students across high school and college levels. Documented impact: 5 students achieved perfect GPAs (5.00/5.00) on national SSC and HSC examinations; 4 gained admission to premier engineering universities including RUET and BUET.
- Mentored 10+ university peers in advanced mathematics and machine learning (Vector Calculus, Statistics, Linear Algebra, ML fundamentals), employing collaborative problem-solving to facilitate understanding of graduate-level technical material.

## LANGUAGES

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**Bengali:** Native fluency • **English:** Professional fluency

## REFERENCES

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