Mahboob Alam

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Professional Summary

Professional with hands-on experience across the machine learning lifecycle, including exploratory data analysis, statistical modeling, cost-sensitive decision systems, and deep learning pipelines. Experienced in translating business objectives into data-driven solutions and in designing, training, and evaluating models using Python, Scikit-learn, and PyTorch. Contributed to a sponsored research project resulting in a peer-reviewed conference publication.

Experience

Research Intern – Machine Learning Jun 2025 – Present
Defence Institute of Advanced Technology (DIAT–DRDO), Pune

- Designed and trained a Physics-Informed Attention U-Net (PIAUNet) for underwater image segmentation.
- Improved segmentation performance by +3.52% Dice score and +3.90% mIoU over baseline U-Net.
- Built end-to-end PyTorch pipelines for data preprocessing, augmentation, training, and validation.
- Integrated domain physics constraints to improve robustness under real-world noise and light attenuation.

Projects

Business Metric–Driven Churn Intervention System — [Link] Python, Scikit-learn

- Built a cost-aware churn prediction and decision system on 7,000+ customers.
- Combined churn probability, customer lifetime value (CLV), and intervention cost to optimize retention decisions.
- Identified the top 20% high-risk, high-value customers while excluding negative ROI segments.

Medical Insurance Cost Analysis Python, Scikit-learn

- Conducted exploratory data analysis on demographic and health-related variables influencing insurance costs.
- Developed regression models and evaluated performance using R^2 and residual diagnostics.
- Interpreted model outputs to identify key cost-driving variables.

Publication

Alam, M., et al. *Physics-Informed Attention U-Net (PIAUNet): An Enhanced U-Net Framework for Underwater Segmentation in Aquaculture*. **Proceedings** of Cutting Edge Technologies in Advanced Computing, Nov 2025. Peer-reviewed; Indian Journal of Technical Education (under process).

Technical Skills

Programming: Python
Data Analysis: Exploratory Data Analysis, Statistics, Feature Engineering, Model Evaluation
Machine Learning: Classification, Regression, Cost-Sensitive Modeling
Deep Learning: CNNs, Image Segmentation, Attention Mechanisms
Frameworks: Scikit-learn, PyTorch
Tools: Git, GitHub, Jupyter Notebook, Google Colab
Databases: SQL

Education

M.Tech in Data Science 2024 – 2026
Defence Institute of Advanced Technology (DIAT–DRDO), Pune
CGPA: 7.65

B.Tech in Computer Science and Engineering 2019 – 2023
RBSSIET, Rewari

Certification

The Data Science Course: Complete Data Science Bootcamp 2025 — Udemy