Md. Azmain Khan Alve

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Objectives — Data-driven ML/AI professional with hands-on experience in developing ML and DL models for healthcare, including skin lesion classification and diabetes risk prediction. Proficient in Python, PyTorch, TensorFlow, and SQL, with expertise in end-to-end ML pipelines—from data preparation to deployment. Known for technical depth, problem-solving skills, and the ability to adapt solutions to real-world challenges.

Research Experiences

Efficient and Explainable Skin Lesion Classification: A Single ConvNeXt-Large Surpassing ConvNeXt Ensembles with Grad-CAM **May 2024 – May 2025**

- Built a **ConvNeXt-Large model** for **8**-class dermoscopic classification **(ISIC 2019)**, achieving **88.3% accuracy** on validation set and **87.9% accuracy** on a held-out test set, with strong sensitivity and specificity.
- Outperformed other **SOTA** ensembles in clinical metrics (sensitivity **86.3%** vs **84.2%**, specificity **98.1%** vs **97.9%**), while reducing **melanoma→benign misclassifications** by **42%**, and improving generalization (**macro F1 86.8%**).
- Designed a training framework with **Focal Loss, dynamic class weighting, Albumentations, AdamW**, and **cosine annealing** to address **dataset imbalance**.
- Incorporated **Grad-CAM heatmaps** for interpretability and clinical trust in predictions.

AI/ML Projects

Clinical Data–Driven Diabetes Risk Prediction

- Built an **end-to-end ML pipeline** (data cleaning, outlier removal with IQR, categorical encoding, scaling, visualization) on a **100K healthcare dataset**.
- Performed exploratory data analysis **(EDA)** with **Matplotlib/Seaborn** to identify class imbalance, variable correlations, and feature distributions.
- Trained and tuned five supervised models — **KNN, Logistic Regression, SVM, Decision Tree**, and **XGBoost** — with **cross-validation** and **hyperparameter optimization**.Among them XGBoost achieved highest results : **97.1%** accuracy, **98.2%** precision, **73.5%** recall, ROC-AUC **0.964**.

Early Detection of Parkinson's Disease Using Voice Sample Data

- Built and evaluated **ML models** on the **UCI Parkinson's dataset** (**22** acoustic features, **195** samples) with **preprocessing** (scaling, correlation analysis, duplicate removal).
- Reported results per project: **Random Forest** (Acc **0.89**, F1 **0.93** on **59** samples) and **XGBoost** (Acc **0.92**, F1 **0.95** on **39** samples) were best-performing.
- **Feature analysis** identified **PPE, spread1, Fo(Hz)** as critical predictors, consistent with clinical voice markers.

Technical Skills

Languages:	Python
Frameworks:	Tensorflow, Keras,PyTorch, Laravel, Flask, Django
Python Libraries:	NumPy, Pandas, SciPy, Scikit-Learn, Matplotlib, Seaborn, Plotly, OpenCV, PIL
Database:	MySQL, MongoDB
Cloud & MLOps Tools:	Docker, Hugging Face Spaces, GitHub Actions-CI/CD
Version Control:	Git, GitHub
Office Skills:	LaTeX, Sheets, Word, PowerPoint

Certifications

Cleaning Data in Python **DataCamp**
Machine Learning with Tree-Based Models in Python **DataCamp**
Cluster Analysis in Python **DataCamp**
Data Visualization in Tableau **DataCamp**

Education

Bachelor of Science in Computer Science, *Fall 2020 - Summer 2025*
BRAC University **Dhaka,Bangladesh**

References

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