AGNISH BHATTACHARYA

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LinkedIn GitHub Scholar Webpage

EDUCATION

B.E. in Electrical Engineering, Jadavpur University *Jul 2020 - Jul 2024*
CGPA: 9.22/10

ICSE and ISC, Science, St. Xavier's Institution *Mar 2013 - Mar 2020*
Score - 98.2% (ICSE Aggregate) and 98.25% (ISC Aggregate)

TECHNICAL SKILLS

Languages	Python, C/C++, SAS, SQL, R, Matlab
Tools & Frameworks	Langchain, PyTorch, TensorFlow, OpenCV, Pandas, NumPy, SAS Viya, AWS, MS Excel
Development	HTML, CSS, MongoDB, Streamlit, Shell Utilities, Git

INDUSTRIAL EXPERIENCE

Sumitomo Mitsui Financial Group India Credit, Mumbai, India
Analytics & Information Management *Jun 2024 - Present*

- Developed application scorecards for personal loan approvals, reducing bad rates by $\sim 18\%$. The process involved a **vintage study**, **capture-conversion**, and **roll-rate analysis** to identify the bad definition, followed by feature engineering (**IV**, **colinearity checks**), model development and validation (**K-S**, **Gini**).
- Conducted in-depth bad rate and volume analysis to identify regions for product expansion; performed peer analysis for **cross-selling opportunities**; devised a **cut-off strategy** to increase product profitability by ~ 200 bps; filtered bureau variables and identified segments using **Decision Trees** and **Regression** algorithms.
- Analyzed loss rate and impact on **profitability** for refreshing the PL Scorecard cut-off strategy by **mathematically predicting** customer default probabilities.

RESEARCH EXPERIENCE

Indian Statistical Institute, Kolkata, India *Aug 2022 - Present*
Research Intern, ECS Unit — Advisor: Dr. Swagatam Das

- Learned about advanced **Data Augmentation** & **Imbalance-handling** methodologies.
- Developed **MixUp** methods & **Bias-Mitigation** techniques for improved classification of minority classes.

Indian Institute of Technology, Kanpur, India *May 2023 - Jul 2023*
Research Intern, Comp-Bio Research Group — Advisor: Dr. Hamim Zafar

- Developed an architecture for **graph representation learning** on multi-omics data.
- Analyzed complex biological data for tissue-wise cell clustering.

Leiden Medical University, Netherlands (LOR) *Aug 2022 - Jun 2023*
Research Intern, Division of Image Processing — Advisor: Dr. Marius Staring

- Worked on generative modeling of living cell shapes using Neural Implicit Functions.
- Learned about 3D-image reconstruction and **Generative Adversarial Networks**.

Jadavpur University, India *Feb 2022 - Sep 2022*
Research Assistant, CMATER Lab — Advisor: Dr. Ram Sarkar

- Developed meta-heuristic hybrid **feature-selection algorithms** for computationally effective classifications.
- Composed **semantic segmentation architectures** and performed **loss function engineering**.

RESEARCH INTERESTS

Broad Interests	Computer Vision, NLP, Deep Learning, Human AI Interaction
Specific Interests	Data Pre-processing Techniques, Generative Networks, Large Language Models

RESEARCH PUBLICATIONS

- **Agnish Bhattacharya**, Biswajit Saha, Soham Chattopadhyay, Ram Sarkar, "Deep Feature Selection using Adaptive β-Hill Climbing aided Whale Optimization Algorithm for Lung and Colon Cancer Detection," (*Published in **Biomedical Signal Processing and Control, ELSEVIER***).
- Faizanuddin Ansari, **Agnish Bhattacharya**, Biswajit Saha, Swagatam Das, "**Mo2E: Mixture of Two Experts for Class-Imbalanced Learning from Medical Images**," (*Presented at **IEEE ISBI, 2024***).

ONGOING PROJECTS

- **Spatial Multi-omics integration using Graph Variational Auto-Encoders**(*Manuscript to be submitted to **Nature Communications***) (Project Link)
  - Developed a novel framework that leverages a 'Graph Attention Variational Auto-Encoder' and an 'Adaptive Spatial Attention' mechanism to seamlessly reduce the high-dimensional multi-omics data to a common low-dimensional latent space embedding.
  - The framework incorporates an OpenAI's 'CLIP' inspired loss function to precisely represent the similarity between the data points in the embedding, for accurate final clustering of the cells in a tissue sample.
- **Bridging the Bias Gap: Contrastive Learning Meets Proto-Topical Loss**(*Manuscript submitted to **IEEE ICASSP, 2026***)
  - Developed a bias class-based contrastive proto-topical loss to overcome the effect of inherent biases in datasets.
  - The proposed method focuses on reducing the distance between data points sharing the same target class but differing in biasing attributes, enhancing the model's ability to distinguish between different classes effectively.
- **PITSNet: A Poly-Attention Intel Transfer Segmentation Network for Skin Lesion Segmentation** (Project Link)
  - Developed a state-of-the-art segmentation architecture incorporating ConvNeXT layers as the encoder with a bottleneck decoder having a compression ratio of 0.25, followed by the addition of attention-based squeeze excitation modules for intelli transfer from the initial to the latter layers.
- **Automated E-commerce Product Listing Framework** (Project Link)
  - A tool to automate product listing from social media content by processing audio and visual data; implemented **Katna** for keyframe extraction, **Whisper** for audio transcription, **YOLO v8** for object detection, and **Gemini** for generating product descriptions, keeping **Langchain** as the base framework and hosting using **MongoDB** and **Streamlit**.

OPEN-SOURCE PROJECTS

- **Melanoma detection through Semantic Segmentation using U-Net** (Project Link)
  Illustrated a pipeline to generate near to accurate masks by performing Semantic Segmentation on the PH2 dataset using U-Net, followed by feature extraction and classification using EfficientNet-b4-widese.
- **Deep feature extraction from CNNs followed by optimization with GA**(Project Link)
  Developed a project based on the deep analysis and optimization of histopathological image samples of the BreakHis dataset to classify the breast tumor tissue into benign or malignant, with the feature space further optimized using Genetic Algorithm to reduce the computational burden.
- **SARS-CoV-2 detection using SVM, MLP and KNN models** (Project Link)
  Designed a frameowrk to classify the covid lung CT-Scan images by extracting Gabor, GLCM, and Haralick features from the SARS-COV-2 CT-Scan dataset and applying different classification models on them.

ACHIEVEMENTS/AWARDS

- **All India Rank 7** at the Secondary Examinations (ICSE) and **All India Rank 8** at the Higher-Secondary Examinations (ISC)
- WBJEE (2020) Rank: **701/1L (99.3 %ile)**
- **SURGE-2023 Research Fellowship** by Indian Institute of Technology, Kanpur (Certificate)