Sadia Afrin Purba

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Research Interests

Quantum Machine Learning, Quantum Computing, Artificial General Intelligence (AGI), LLMs.

Education

Temple University — Philadelphia, PA
Ph.D. in Electrical and Computer Engineering — Aug, 2024–May, 2027
Courseworks: GPU Programming, Probability and Random Processes, Engineering Analysis, Machine Learning, Reinforcement Learning

Bangladesh University of Engineering and Technology (BUET) — Dhaka, Bangladesh
M.Sc in Computer Science and Engineering — 2022–2025

- Thesis: "Multimodal Emotion and Sentiment Detection Using Contrastive Learning"
  Courseworks: Neural Network, Semantic Web, Computational Proteomics, Advanced Human Computer Interaction, Data Mining, Elements of Cryptography

Ahsanullah University of Science and Technology — Dhaka, Bangladesh
B.Sc. in Computer Science and Engineering — 2015–2019

- Thesis: "Emotion Detection from Bengali Language"
- Courseworks: Elementary Structured Programming, Discrete Mathematics, OOP, Digital Electronics and Pulse Techniques, Algorithm, Differential Calculus, Integral Calculus, Statistics, Fourier Analysis, Digital Image Processing, etc

Work Experience

Neural Engineering Data Consortium (NEDC) — Philadelphia, USA
Research Assistant — 2024–Present

- I am conducting research on the applications of machine learning to quantum computing, with a particular focus on digital pathology and EEG interpretation. Specifically, I am exploring how quantum entanglement can enhance correlation capabilities within machine learning architectures.

Infolytx Inc. — Dhaka, Bangladesh
Senior Machine Learning Engineer — 2019–2024

- **Generative AI for Medical Coding:** Reduce physicians' time to suggest accurate ICD-10 codes during assessment based on the patient's medical conditions using Large Language Models.
- **Data Quality Monitoring SaaS:** Played a pivotal role in the development of a data quality monitoring SaaS, rooted in unsupervised learning, active learning algorithms, and knowledge graphs. My contributions led to a marked improvement in detecting anomalous data and efficiently processing thousands of rows in large datasets.
- **Retail Object Recognition with Deep Learning:** I have worked on a computer vision problem where I have trained Deep Learning models that can recognize objects in the Retail domain, resulting in timely restocking and a substantial **85%** boost in sales.

Publications

[1] D. Hackel, M. Bagritsevich, C. Dumitrescu, M. A. Al Mamun, **Purba, SA**, D. Heathcote, I. Obeid, and J. Picone, "Enabling microsegmentation: Digital pathology corpora for advanced model development", *Signal Processing in Medicine and Biology: Applications of Artificial Intelligence in Medicine and Biology*, vol. 1, p. 50, 2026.

[2] **Purba, Sadia Afrin**, S. Tasnim, M. Jabin, T. Hossen, and M. K. Hasan, "Document Level Emotion Detection from Bangla Text Using Machine Learning Techniques", in *2021 International Conference on Information and Communication Technology for Sustainable Development (ICICT4SD)*, IEEE, 2021, pp. 406–411.

Skills

- **Programming Languages:** Python, C/C++, CUDA
- **Frameworks and Libraries:** Qiskit, Pennylane, PyTorch, Tensorflow, Scikit-Learn, FastAPI, .Net Core
- **Databases:** MySQL, Graph Database (NeptuneDB), SPARQL, DynamoDB
- **Others:** Linux, git, Docker, MLflow, Kubeflow, NATS Messaging System, AWS Lambda, Ontology Editor: protege, d-wave

Awards

- First Runner-up in the hardware category of Engenius, an Inter University tech competition [Demo] 2018

Projects

- NSF FET QUANTUM
  Qiskit, Pennylane, Python — August 2024 – Present
  - Integrated quantum algorithms (QRBM, QNN, QSVM) into our benchmarking suite `IMLD`, enabling support for quantum-classical hybrid models on synthetic datasets for binary classification. Enhanced tool functionality to support both classical ML and quantum pipelines.

- Rapid and Inexpensive Precision Breast Cancer Screening Using Machine Learning
  PyTorch, Transformer — May 2025 – August 2025
  - Developed and benchmarked ViT, MLPMixer, and Masked RCNN models for cancer segmentation using WSIs.

Certifications

- Udacity Deep Learning Nanodegree — September 2020–No Expiration Date
  Credential ID : P9HHYPZD
- Intel Edge AI for IoT Developers Nanodegree — July 2020–No Expiration Date
  Credential ID : X9CDFJHR