DEBESHEE SEN

RESEARCH INTERESTS

My areas of expertise include **Deep Learning**, **Computer Vision**, **Large Language Models (LLMs)**, **Generative AI**, **Retrieval-Augmented Generation (RAG)**, **Model Compression & Optimization** and **Bioinformatics**.

PUBLICATIONS

- **Debeshee Sen**, Leelavali Narlikar. **EvoSplicer: Conservation-aware splice site predictor.** - In preparation.
- A. Das, **Debeshee Sen**, P. Bhattacharya, S. Sarkar, D. Sengupta. **"MedCompress: A Modular Framework for Benchmarking Compression Techniques in Medical Imaging."** *DABCon 2026* — Accepted

EXPERIENCE

Research Intern *Jun 2026 – Aug 2026*

Prof. Leelavati Narlikar, Indian Institute of Science Education and Research, Pune(IISER Pune)

- **EvoSplicer: Conservation-aware splice site predictor**
  First-authored EvoSplicer, a Convolutional Neural Network (CNN) model to predict splice sites, trained on human nucleotide sequences of 42 bp and 102 bp length, incorporating evolutionary conservation scores as an additional input feature, unlike existing state-of-the-art models with accuracy > 0.960 and AUC > 0.995.

Undergraduate Research Assistant *Aug 2024 – Present*

Dr.Diganta Sengupta, Heritage Institute of Technology, Kolkata

- **MedCompress: Neural Network Compression for Medical Image Classification**
  MedCompress is a modular framework for evaluating structured pruning and PTQ/QAT across ResNet, MobileNet, EfficientNet, and DenseNet on three medical imaging datasets, achieving up to $8\times$ model compression (ResNet50: 89.9 MB $\rightarrow$ 11.6 MB) while maintaining AUC > 0.97 with fewer than 2.1 million parameters.
- **Brain Tumour Segmentation using Attention U-Net and GAN-based Augmentation**
  Designed an Attention U-Net for voxel-level tumour segmentation on BraTS MRI datasets, incorporating GAN-based augmentation to address limited annotated data and evaluating performance using Dice Similarity Coefficient (DSC) and Intersection over Union (IoU). Explored Spiking Neural Network (SNN) architectures for image understanding and visual recognition tasks.

PROJECTS

Brand Guardian AI | Python, LangGraph, Azure AI, NVIDIA Nemotron 2026

- Engineered an AI video compliance pipeline that audits YouTube content against brand/regulatory rules, orchestrating Azure AI Video Indexer, Azure AI Search RAG retrieval, and NVIDIA Nemotron reasoning via LangGraph.

Crucible | Next.js, Python, FastAPI, AI/ML 2026

- Engineered an AI-driven virtual co-founder platform that guides hackathon participants from raw ideas to execution-ready technical roadmaps.

Multimodal Knowledge Retrieval | Python, LangChain, Qdrant, VLMs 2026

- Built a multimodal document retrieval system using Docling parsing, semantic chunking, Qdrant vector search, and VLMs to interpret tables and images alongside text.

Interactive BPE Token Visualizer | Python, FastAPI, React 2026

- Implemented a from-scratch BPE tokenizer with GPT-4 regex pre-tokenization and a FastAPI backend, paired with an interactive React visualizer for subword boundaries and compression metrics.

Implementation of PyTorch 2026

- Built a lightweight autograd engine from scratch, replicating core PyTorch functionality (Neurons, Layers, MLPs, SGD) via custom computational graphs for reverse-mode backpropagation.

EDUCATION

Heritage Institute of Technology *Kolkata, India*
Bachelor of Technology in Computer Science and Engineering | GPA : 9.71/10.0 *Aug 2023 - Jul 2027*

Our Lady Queen of the Missions School, Salt Lake *Kolkata, India*
High School | XII (ISC) : Percentage - 97% | Grade - A *2023*
Middle School | X (ICSE) : Percentage - 94.2% | Grade - A *2020*

COURSES

• Large Language Models • Natural Language Processing • Generative AI • Retrieval-Augmented Generation (RAG)
• Machine Learning and Data Mining • Deep Learning • Probability and Statistics • Linear Algebra • Optimization

EXTRACURRICULAR ACCOMPLISHMENTS

Cultural Talent Search Scholar | Odissi Dance *2016 – 2021*
Center for Cultural Resources and Training, Ministry of Culture, Government of India

Avishkar (CESC Limited) | Odissi Dance *2017 – 2020*
Winner (2020), 1st Runner Up (2018), Winner (2017)

Performed at Bhagirath Nritya Utsav | Odissi Dance *31 Dec 2017*

Performed at The Shishu Kishore Utsav | Odissi Dance *2015, 2017*
Information and Cultural Affairs Department, Government of West Bengal

6th Cuttack Mahotsav | Odissi Dance *2 Jan 2015 – 8 Jan 2015*
Winner