TULIKA MANDAL

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EDUCATION

PENNSYLVANIA STATE UNIVERSITY
Master's in Computer and Information Sciences — Expected Graduation: May 2026

DAYANANDA SAGAR COLLEGE OF ENGINEERING, BANGALORE, KA, INDIA
Bachelor of Engineering, Computer Science — 2018-2022

EXPERIENCE

CLINICAL RESEARCH ARTIFICIAL INTELLIGENCE INTERN, PENN STATE HEALTH — June 2025 – Aug 2025

- Developed a Retrieval-Augmented Generation (RAG) application integrating LangChain, OpenAI embeddings, and Pinecone vector database, enabling domain-specific question answering across internal policy documents with semantic retrieval.
- Engineered a robust backend in FastAPI with custom document chunking, metadata handling, and retrieval filtering, achieving **~30% improvement in response relevance** compared to naive keyword search.
- Built a responsive chat interface in Next.js, **delivering a production-ready full-stack solution** that supports multi-session interactions, context-aware responses, and seamless frontend–backend integration.

GRADUATE RESEARCH ASSISTANT, PENNSYLVANIA STATE UNIVERSITY — Aug 2024 - Present

- Developed end-to-end ML pipelines on large-scale 3D brain MRI data, integrating custom preprocessing and feature extraction with ensemble/boosting methods to drive high-accuracy neurological classification.
- Transformed raw brain MRI scans into region-wise volumetric features and applied SHAP analysis on ML models to **identify biomarkers predictive of Parkinson's**.

SOFTWARE ENGINEER, PERSISTENT SYSTEMS LTD — July 2022-June 2024

- Shortened release cycles using custom CI/CD pipelines with GitHub Actions to containerize and deploy microservices on AKS and **reduced manual testing effort by 80**% through integrated regression testing.
- Optimized Dockerfiles and fine-tuned pod resource allocations, **cutting container image sizes by 30%**, improving system scalability, and reducing application startup time from **5 min to 3.5 min**.
- Designed and managed a security-focused CI/CD pipeline that generated native executables outside containers, eliminating direct codebase exposure and strengthening deployment security across all microservices.

PROJECTS

BrainAI – A Smart Medical Assistant (LLMs, Medical Imaging, Computer Vision)

- Built a GPT-4 powered medical assistant that automates 3D MRI segmentation by orchestrating FastSurfer via Docker, to extract and return 3D brain regions of interest, streamlining neuroimaging analysis for non-technical users.

PUBLICATIONS

P. T. Nyugen, H. A. Tran, **T. Mandal**, et al., "MTMLD-AWSR: A Novel Multi-Teacher Multi-Level Distillation Approach for Class Incremental Learning in Edge-Cloud Systems," 2025 IEEE Cloud Summit, Washington, DC, USA, pp. 95–100, 2025.

T. Mandal, V. Mishra, A. M., and A. K. Gupta, "Region-Growing based Hough Transform for Localization of Carotid Artery," Int. J. Intell. Syst. Appl. Eng., vol. 12, no. 19s, pp. 577–582, Mar. 2024.

SKILLS

Programming Languages: Python, Java, Bash, SQL
Machine Learning: PyTorch, TensorFlow, Hugging Face Transformers, Keras, OpenCV, NumPy, Pandas
DevOps and MLOps: Azure (AKS, Blob Storage, CosmosDB), Docker, Airflow, MLFlow, Kubernetes, Helm, Terraform, Jenkins, GitHub Actions, Git