MALHAR INAMDAR

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Education

Pune Institute of Computer Technology, India 2023 - 2027

Bachelor of Engineering (B.E.) in Electronics and Telecommunication *9.23/10.00*

- **Coursework**: Data Structures, Algorithms, Digital Circuits, Differential Equations, Linear Algebra, Vector Calculus
- **MOOCs**: Machine Learning Specialization, Deep Learning Specialization (Coursera)

Publications

1. Regional Tiny Stories: Using Small Models to Compare Language Learning and Tokenizer Performance arXiv

Year - 2025

- Designed and implemented a framework for developing **Small Language Models (SLMs)** for Indian regional languages (Hindi, Marathi, Bengali), serving both as a practical alternative to LLMs and as a foundation for **comparative analysis** of tokenization strategies, machine translation performance, and linguistic complexity.
- Trained models (5M–150M parameters); showed a **53M-parameter SLM** achieves GPT-3.5–comparable short-story generation.
- **Co-First Authored** the publication, available as a pre-print at arXiv. Publication in review at **EMNLP 2025**.

Experience

Froncort.AI March 2025 – May 2025

AI Engineer *Remote*

- Led **R&D initiatives** as **Team Lead**, implementing Reinforcement Learning with Human Feedback **(RLHF)** for case-based AI agents generating **clinical evaluation reports** for regulatory submissions of medical devices.
- Developed **multi-agent systems** for automated generation of **regulatory submission reports** and **risk assessment documentation** for medical device compliance, streamlining the regulatory approval process.

Vizuara AI Labs March 2025 – April 2025

Machine Learning Intern *Pune, India*

- Developed a proof of concept AI-driven inpainting workflow for industry client (**Mahindra Motors**) by evaluating multiple **diffusion models** culminating in a detailed process manual on the recommended Photoshop Generative Fill methodology for creative teams.
- Engineered the approved workflow by iterating on text prompts to generate realistic environmental effects and applying advanced techniques like custom splatter brushes and hex-code color sampling, which streamlined the process to **reduce manual retouch time by 20%**

Vizuara AI Labs Oct 2024 – Present

Research Intern *Remote*

- Working under Dr. Raj Dandekar conducting research in developing **Small Language Models (SLMs)** for regional **Indian languages** (Hindi, Marathi, Bengali) analyzing **tokenizer** performance, **inference** results and **linguistic complexities** in multilingual low resource settings. Pre-print at arXiv
- Tested several **Indic tokenizers** to evaluate **tokenization efficiency** and **linguistic complexity**. Open-sourced more than **10M+ datasets along with the trained SLMs**.
- Applied a dual approach utilizing **Rényi Entropy** (information-theoretical) and **language morphology** to analyze tokenizer efficiency (**1B+ tokens**) and language complexity across the three regional languages.

Pune Institute of Computer Technology Sep 2024 – Present

Research Intern *Pune, India*

- Working under Dr. Geetanjali Kale conducting research in **contrastive learning** using **Vision Transformers** for video temporal data. Publication currently under preparation.

PICT Robotics Oct 2023 – Jan 2025

Technical Member *Pune, India*

- Selected as Technical Member of **PICT Robotics**; designed and 3D-printed robotic-arm components, developed **ESP32-based** control and sensor integration, and researched various **drivetrain and motor technologies** for adaptive manipulation.
- Engineered **PCB circuits** and **Fusion 360 CAD** designs; built multiple ESP32-driven robots (**line-following, ultrasonic- and hall-sensor based robots**).

Projects

Vaidya Nidaan (Jan 2025 - Feb 2025) **Code**

CNN, scikit-learn, GradCAM, Tensorflow, Pandas, NodeJS, FSL, Transformers, Vite, CSS, ReactJS, React Native

- Led development of a **CNN diagnostic tool** for Alzheimer's detection, integrating **FMRIB Software Library (FSL)** based biomarker identification (hippocampal volume, white/gray matter) and automated MRI analysis; leading the team to achieve **3rd place** among **400+** teams at the PICT Techfiesta Hackathon 2025, delivering structured medical reports with **Grad-CAM** overlays and a **RAG pipeline** referencing key research.
- Implemented **Grad-CAM** as an **Explainable AI** technique for visual interpretability; built an **image–text chatbot** plus a real-time MRI analysis website and mobile app; and deployed a **VGG-19** model with data augmentation to address class imbalance, achieving over **95%** accuracy in Alzheimer's prediction.

Stable Diffusion from scratch (Oct 2024 - Nov 2024) Code

PyTorch, NumPy, Transformer, tqdm, lightning, pillow, UNet, VAE, CLIP Encoder *Paper Link*

- Implemented **"Denoising Diffusion Probabilistic Models"** from scratch in PyTorch, following a VAE-based pipeline with **427M parameter U-Net** and CLIP encoder for denoising, and integrating attention mechanisms for **50-step denoising pipeline** generating **512×512 images**.
- Developed generative models for text-to-image and image-to-image synthesis, producing high-quality images from prompts via the diffusion framework.

Technical Skills

Programming Languages: Python, C++, C, Javascript, Java

Tools & Frameworks: PyTorch, TensorFlow, LangChain, OpenCV, NumPy, Pandas, Scikit-learn, Transformers, FSL, Grad-CAM, Flask, Streamlit, RESTful APIs, PostgreSQL, Node.js, Crawl4AI, VectorDB, FastAPI

Software: Git, GitHub, Flask, VS Code, Streamlit, TensorDock, Azure Cloud, HuggingFace, Weights & Biases, Docker

Achievements

Selected to attend Microsoft Research India Academic Summit 2025 June 2025

- Selected to attend a highly selective gathering held for researchers, academic professors and PhD, Master's and undergraduate students across India.

Selected for Data Science: Probabilistic and Optimization Methods II, ICTS-TIFR August 2025

- Selected for highly selective advanced program of **ICTS - Tata Institute of Fundamental Research**, featuring lectures by leading experts from world-renowned research institutions and industry leaders on cutting-edge probabilistic models and optimization techniques.

3rd in PICT Techfiesta International Hackathon Feb 2025

- Secured **3rd place** for Alzheimer's diagnostic project "Vaidya Nidaan" among **400+** international teams.

Cretronix Runner-up Credenz'24 April 2024

- Secured **runner-up** position in electronics circuit and Arduino programming competition at PICT IEEE's annual technical fest Credenz.

2nd in research idea presentation track Pulzion'24 Oct 2024

- Secured **2nd place** in Research Idea Presentation at PICT ACM's annual technical fest Pulzion.