

# Devadripta Jadhav

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## SUMMARY

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Applied researcher specializing in foundation models, computer vision, and natural language processing. Currently a Research Fellow at BITS Pilani, developing industry-sponsored large-scale machine learning systems while pursuing research in medical imaging, robotics, 3D vision, and robust neural systems. Experienced in designing end-to-end ML pipelines, publishing at leading international conferences, and scaling deep learning training across multi-GPU computing clusters.

## EDUCATION

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**Ph.D. in Computer Science and Information Systems (Full-Time)** December 2025 – Present  
*Birla Institute of Technology and Science (BITS) Pilani, K K Birla Goa Campus* Goa, India

**B.E. in Electronics and Telecommunication** December 2021 – May 2025  
*Savitribai Phule Pune University* Pune, India

## EXPERIENCE

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**Research Fellow** December 2025 – Present  
*BITS Pilani, K K Birla Goa Campus* Goa, India

- Working on an industry-sponsored ML project for end-to-end automotive lifecycle and safety systems.
- Developing and evaluating ML models and pipelines for real-world, large-scale data.

**Research Intern** March 2023 – January 2025  
*Indian Institute of Education Science and Research (IISER), Kolkata* Kolkata, India

- Developed SportsOpi, a 43K-comment dataset on six major sports controversies, using LLaMA-3.1's multi-phase annotation and human verification ( $\kappa > 0.8$ ) for reliable 4-way stance labels.
- Fine-tuned LLaMA-3.1-8b and DeepSeek-8b, raising stance-detection F1 from  $\sim 0.35$  to  $\sim 0.75$  and performed attention-based probing to interpret model gains.

**Research Intern** December 2023 – March 2024  
*Defence Institute of Advanced Technology, Defence Research and Development Organisation (DIAT, DRDO)* Pune, India

- Developed a novel EEG signal classification method for upper limb movement tasks, achieving 97.50% micro-averaged accuracy and 99.17% mean accuracy, outperforming recent approaches.
- Extracted and evaluated time-domain statistical and band-power features from pre-processed EEG signals using multiple machine learning classifiers, including KNN, SVM, and an ensemble classifier, improving motor imagery task classification accuracy by 10% with MATLAB and Python.

**Project Intern** October 2023 – March 2024  
*Indian Institute of Technology (IIT), Bombay* Bombay, India

- Project Title: Brain Tumour Detection – Implemented a Convolutional Neural Network (CNN) for Brain Tumor Detection which achieved a robust testing accuracy of 95%, demonstrating superior generalization ability in identifying brain tumors from MRI images.
- Utilized a pre-trained ResNet-50 model for brain tumor detection that achieved a high training accuracy of 99.50%.
- Conducted a comprehensive comparative analysis between CNN and ResNet-50 models.

## PROJECTS

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**Parameter-Efficient Automotive Dent Detection via Deformable Spatial Adapters** BITS Pilani | 2025 – Present

- Working on an industry-sponsored project for automotive dent detection using DINOv3, RTMDet, and DCNv4 on the CarDD dataset.
- Implemented a custom DCNv4 deformable spatial adapter enabling parameter-efficient fine-tuning without modifying the frozen backbone.

### **Retinal Micro-Lesion Detection via RETFound-DETR** *BITS Pilani | 2025 – Present*

- Designed a multi-scale bounding-box detection pipeline using pre-trained RETFound (ViT-Large MAE) for localising micro-lesions across the MAPLES/MESSIDOR datasets.
- Implemented MA vs. Non-MA binary classification as a foundation stage, then extended to multi-class bounding-box detection across IDRiD, MAPLES, and Shrouk MA patch datasets.

### **TPACT: Transformer Positional Encoding for 3D Point Clouds** *BITS Pilani | 2025 – Present*

- Designed TPACT, combining Coordinate Confidence Gating, Frequency- Modulated RoPE, and a multi-head attention layout for geometry-aware positional encoding in transformer-based 3D classification.
- Outperformed existing positional encoding variants on ScanObjectNN and achieved competitive results on ModelNet40.

### **HDC Robustness under Hardware Bit-Flip Faults** *BITS Pilani | 2025 – Present*

- Extending ICCD-accepted research into a full journal submission, benchmarking hyperdimensional computing robustness against FNN and Transformer baselines across five datasets under hardware bit-flip faults.
- Conducted deterministic single-bit sensitivity sweeps and layer-position analysis on a remote H100 server with fixed-seed reproducibility.

### **Oral Cancer Lesion Segmentation** *BITS Pilani | 2025*

- Evaluated Mask R-CNN, UNet++, and RTMDet on the Piyarathne annotated oral-cavity dataset, comparing detection-first vs. segmentation-first paradigms for clinical decision-support applications.

### **AI-Powered Cost-Effective Spirometer** *Presented at ICASI 2025, Tokyo, Japan*

- Final Year Project – Developed a cost-effective, portable spirometer to measure key respiratory parameters (FVC, FEV1, PEF, FEV1/FVC) and diagnose lung disorders like asthma and COPD.
- Developed a Flutter App and designed dual AI models using Python and TensorFlow: a 1D CNN+LSTM for time-series sensor data (93.73% accuracy) and a fine-tuned MobileNetV2 for flow-volume loop images (92.7% accuracy).

### **EMG based Robotics Claw (prosthetics)**

- Secured second rank in department in pre-final year in Bachelor of Engineering.

## **SKILLS**

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- **Programming Languages:** Python, C++, Java, SQL, JavaScript, R, MATLAB
- **ML/AI Frameworks:** PyTorch, TensorFlow, scikit-learn, Hugging Face, NumPy, pandas
- **Cloud & Data Technologies:** Google Cloud Platform (GCP), AWS, MongoDB, DBMS
- **Development & Tools:** Git, REST APIs, ReactJS, HTML/CSS, Linux