

# Anirudh Narasimha Bharadwaj

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## PROJECTS

### Brain Tumor Segmentation in Multi-Modal MRI Using Deep Learning

- Developed 3D U-Net and Attention U-Net for **BraTS 2021** (1,251 Volumetric MRIs) on dual **Tesla H100** (Newton ARCC clusters), achieving **~0.89 Dice for Whole Tumor, HD95 of 10. Optimized small tumor detection with DiceFocalLoss**, enhancing diagnostic accuracy.

### From Nuclei to Tissue - A Panoptic Approach in Melanoma Histopathology

- Innovative panoptic pipeline** for **PUMA dataset** in CAP5516 - MIC, using **Mask R-CNN** (AJI: 0.62, F1: 0.65) for **Nuclei Segmentation**. **Ongoing tissue segmentation** using **SwinUNet/DynUNet** enhances TIL assessment for precision oncology.

### Efficient Fine-Tuning of SAM with LoRA

- Fine-tuned **SAM** with **LoRA** on **NuInsSeg** (665 images), **reducing parameters to 1.04%**. Achieved **Dice 0.8233** and **AJI 0.6197**, advancing histopathological cancer analysis.

### Pneumonia Classification using CNN

- Built a **ResNet-34 model from scratch** for pneumonia classification, later fine-tuning with **ImageNet**, achieving **82% accuracy, 0.96 precision (NORMAL), 0.99 recall (PNEUMONIA)**. Demonstrated transfer learning's diagnostic efficacy.
- Achieved high accuracy using **custom TinyVGG with Squeeze-and-Excitation**, demonstrating strong **Jaccard similarity performance**.

## WORK EXPERIENCE

### Computer Vision Engineer, Equidor Medtech LLP

Jan 2024 – Dec 2024  
Bengaluru, India

- Collaborated in designing, developing, and optimizing an eye-tracking algorithm for real-time simultaneous tracking with 120Hz binocular cameras using OpenCV.
- Applied advanced OpenCV techniques to enhance image analysis workflows, improving performance across hardware and software components.
- Developed algorithms for real-time oculomotor data analysis, enabling precise diagnostic capabilities.
- Conducted research for torsional component detection, advancing the system's ability to identify complex eye movements.
- Designed and implemented a production-level Camera Tool using PyQt, streamlining camera setup, alignment, and testing for device quality control.
- Built an Encoder Tool with PyQt and FFmpeg, leveraging hardware acceleration.

### Computer Vision Consultant, Equidor Medtech

Jun 2023 – Jan 2024  
Bengaluru, India

- Conducted research on a state-of-the-art eye-tracking engine for enhanced performance.
- Developed skills in image processing, computer vision, research, computer architecture, parallel computing, problem solving and algorithm development.

### Research Intern, Cyclops Medtech Pvt. Ltd.

Sep 2022 – May 2023  
Bengaluru, India

- Analyzed real-time ocular movement dataset to improve accuracy of computer vision algorithms.
- Developed proficiency in Python and utilizing tools such as Pandas, NumPy, and OpenCV for data analysis and image processing.

## EDUCATION

### Master of Science in Computer Vision,

University of Central Florida

Jan 2025 – Jan 2027 | Orlando, Florida

**Coursework:** Medical Image Processing, Machine Learning, Image Processing

**Grade: A (4.0 / 4.0 GPA)**

### B.Engg - Electronics and Communication,

S J B Institute of Technology

2019 – 2023 | Bengaluru, India

Affiliated to Visvesvaraya Technological University (VTU)

**3.50 / 4.00 GPA**

## CERTIFICATES

PyTorch for Deep Learning Bootcamp, Deep Learning with PyTorch for Medical Image Analysis, Deep Learning using Medical Data, A.I. & Machine Learning Bootcamp

## SKILLS

**Programming:** Python, C++, MATLAB

**Computer Vision and Deep Learning:** PyTorch, MONAI, Optuna, OpenCV, MedPy, wandb, TensorBoard

**Data:** NumPy, Pandas, Matplotlib, Scikit-learn, SciPy

**Tools and Platforms:** PyQt, Linux, Git, GPU Cluster

## AWARDS AND ACCOMPLISHMENTS

Awarded for Contributions to **Assessment and Rehabilitation of Vertigo and Balance Disorders**, Department of Otorhinolaryngology - Head & Neck Surgery, Yenepoya Medical College(Deemed to be University), Mangaluru, India.