Devadharshini Ayyappan

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EDUCATION

North Carolina State University, Raleigh, NC — GPA: 4 / 4
PhD, Electrical Engineering (Computer vision and ML Specialization) — Aug 2024 - May 2028 (Anticipated)
Masters, Electrical Engineering (Computer vision and ML Specialization) — Aug 2022 - Aug 2024
Anna University, Chennai, India — Aug 2015 - May 2019
Bachelors, Electronics and Communications Engineering — CGPA: 8.94 / 10

WORK EXPERIENCE

ARoS Lab (NCSU), *Research Assistant (3D Computer Vision)*, Raleigh, NC — **April 2023 - Present**

- Collaborated on research involving innovative DL-driven algorithms, merging **structure from motion**, NeRF, and **bundle adjustment** using COLMAP and NeRFStudio to reconstruct 3D objects with **perspective geometry**.
- Achieving high-fidelity point clouds design from 2D plant images, enabling accurate extraction of complex structural parameters emphasizing synthetic images from unreal engines to advance plant phenotyping.
- Currently working on predicting mussel orientation based on the reconstructed 3D model and validating predictions against IMU accelerometer values to ensure accuracy in orientation estimation.

Robotics88, *Computer Vision Engineer co-op*, Remote — **Feb 2024 - May 2024**

- Working on camera-lidar fusion and people detection algorithms with ROS1 for drones in real-time.

EcoPRT Lab (NCSU), *Graduate Lab Assistant (Computer Vision)*, Raleigh, NC — **Aug 2023 – Nov 2023**

- Utilizing **PointPillars** to advance the development of an autonomous campus vehicle for robust **object detection** and classification tasks using the **Stereo** and **Lidar** data for V2X applications.
- Spearheading efforts to enhance inference efficiency through the utilization of ONNX and TensorRT on Nvidia GPUs.

USDA ARS Western Regional Research Center, *Machine Learning Intern*, Albany, CA — **May 2023 - July 2023**

- Leveraged **Langchain** and **LLM**s to optimize the database structure and enhance data accessibility and insights in pan-genome database dashboard for wheat, barley, rye, and oat crops created using Drupal and **PostgreSQL**.
- Applied ML/AI techniques to analyze genome signals and develop advanced querying strategies, contributing to a deeper understanding and interpretation of genomic data.

NC State University, *Graduate Teaching Assistant*, Raleigh, NC — **Jan 2023 – May 2023**

- Worked under Dr. Wong for ECE 301 Signal Processing in preparing assignments, exams, discussions and grading.

Robert Bosch, *Software Engineer*, Coimbatore, India — **Sept 2019 – July 2022**

- Engineered automated software analyzers, enhancing efficiency by 30%, and managed powertrain embedded software for 12V gasoline systems, ensuring quality.
- Integrated software modules and conducted system tests on Daimler ECUs using HIL LABCARs.
- Led onboarding for freshers in SDLC, CI/CD practices, and cross-functional knowledge sharing

SELECTED PROJECTS

Deepfake Detection Model | Tensorflow | XceptionNet | Metric Learning | Deep Learning [Link]

- Enhanced **Xception Network** performance on a dataset by optimizing architecture for improved validation accuracy, and elevated object detection accuracy through **FaceNet embeddings** and **triplet loss** implementation.

3D Tumor Segmentation |U-netR| ViT| Monai| PyTorch | Matplotlib| itkwidgets | Open3D | Computer vision [Link]

- Implemented 3D tumor segmentation using **UnetR** architecture, a combination of **ViT** and Unet, to improve localization of tumor classes and visualized and rendered the predictions in 3D.

CVAE Image Morphing | Pytorch | Scikit-learn| PIL | Matplotlib | NumPy | Neural Networks [Link]

- Developed and trained a **CVAE** model using the Celeb-A dataset to encode and manipulate images. Implemented image morphing by generating new samples through the linear interpolation of latent mean vectors extracted.

Conditional Deep Convolutional GANs | Pytorch | Deep Learning [Link]

- Developed Conditional DCGANs with generator and discriminator modules and trained them on a benchmark dataset.

Credit Card Fraud Detection System | PyTorch | Seaborn | Pandas | NumPy | Machine Learning [Link]

- Created the system using **Smote** and **Adasyn** resampling techniques to balance data and implemented Random Forest, DNN and regression techniques for detection and evaluated performance using **F1 Score** and **AUC**.

SKILLS

Languages : Python, MATLAB, C++, Embedded C, SQL
Frameworks : OpenCV, Numpy, Open3D, Pandas, Keras, Pytorch, Tensorflow, XGBoost, Scikit-learn, Matplotlib
Software Tools : Jira, Blender, AUTODESK, ASCET, Git, GitHub, Drupal, Docker, EKS (Kubernetes), AWS, Linux

PUBLICATIONS

- Authored a research paper **"**Statistical Approach For The Development Of Driving Support System Based On Pixel Classification Algorithm**"** which is published in **International Journal of Applied Engineering Research (Nov 2019)**