

# Shrikant Arvvasu

📞 734-596-8050 ✉ ashri@umich.edu 🔗 [linkedin.com/in/shrikant-arvvasu-b8a14b198/](https://www.linkedin.com/in/shrikant-arvvasu-b8a14b198/) 🌐 [ashrikant39.github.io/](https://github.com/ashrikant39)

**Interests:** Generative Vision, Diffusion Models, Image Segmentation, 3D Object Detection, Deep Learning, Lidar-based Object Detection

## Education

### University of Michigan

Master of Science in Electrical and Computer Engineering  
Specialization: Machine Learning and Computer Vision

Aug 2022 – May 2024

Ann Arbor, Michigan  
GPA: 3.97/4.0

### National Institute of Technology Karnataka

Bachelor of Technology in Electronics and Communication Engineering  
Honors: Machine Learning and Signal Processing

Aug 2018 – April 2022

Karnataka, India  
GPA: 3.87/4.0

## Experience

### Kim's Lab, University of Michigan

Research Assistant (Computer Vision and GenAI)

Ann Arbor, Michigan

May 2023 - Present

- Developed novel diffusion sampling algorithms for inverse imaging problems, enhancing the quality and fidelity of the samples of **latent diffusion models**, achieving an FID score of 37.2, **an improvement of 17.2%** over the baseline model.
- Implemented a unique channel-aware decoding algorithm using latent diffusion, leveraging noisy codewords for improved sampling, resulting in a reconstruction **PSNR of 24.4 dB** for a single-path AWGN channel with **0 dB SNR**.
- Developing a state-based algorithm for sparse lidar point cloud completion using **sensor fusion** and **Latent Diffusion**, aimed at enhancing the performance on 3D object detection in the **Nuscenes** and **Waymo** datasets.

### Skylark Labs

Machine Learning Intern (Representation Learning and Computer Vision)

Dover, Delaware

June 2023 – August 2023

- Designed a framework using a pre-trained RegNet model to achieve a **recall of 65% in self-learning** new categories by storing **multi-scale quantized features** to recognize pre-trained classes.
- Trained the neural network with a vector-quantized feature extractor to learn efficient multi-scale features of objects in natural scenes, enhancing the accuracy of the model by **12%** to detect objects from newly learned classes.
- Implemented the system to work on a **single core of a CPU** to run at about **3 fps** while storing features of new classes encountered.

### Burris' Lab, University of Michigan

Research Assistant (Computer Vision and Medical Imaging)

Ann Arbor, Michigan

August 2022 – April 2023

- Trained an **attention-UNET**-based model for aortic segmentation, enhancing the accuracy and efficiency of the Vascular Deformation Mapping pipeline, resulting in an **improvement of 3%** in the F1-score, particularly around aortic walls.
- Implemented corrections to an Elastix-based CT **Registration Pipeline**, improving the elastic registration performance of the pipeline for large deformations in the aortic walls. The corrections resulted in the detection of tissue growth by an improved **recall of 8%**.

### SixSense Corporation

Computer Vision Intern (Automatic Augmentation and Multiclass Classification)

Jalan Besar, Singapore

January 2022 – April 2022

- Worked on detecting and classifying defects in semiconductor chips using Faster RCNN.
- Trained a stochastic **automatic augmentation** framework based on **Fast AutoAugment** on a ResNet50 model to techniques for several public datasets like CIFAR-100 and in-house datasets which improved the average accuracy by 2.3%. Integrated the automatic augmentation to the defect detection pipeline, improving the **accuracy by 1.4%**.

### PLRI Lab, TU Braunschweig

Research Intern (Image Segmentation)

Braunschweig, Germany

May 2021 – October 2021

- Developed an efficient codebase for training and testing for semantic segmentation of sclera regions in the eye images.
- Acquired partial annotations using a game where the partial masks are saved as players competed for scoring regions.
- Trained a deep neural UNET model for the segmentation task, acquiring an average F1 score of 0.94 on the test segmentation set using multiple partial annotations.

## Projects

### Translating Cartoon to Natural Images using Stable Diffusion

November 2023

- Implemented an image-to-image translation system from cartoon Tom and Jerry images to real cat and mouse images using diffusion models.
- Implemented a Stable Diffusion utilizing BLIP-based text guidance to translate cartoon images to real-like images, achieving an FID score of 46.32 comparing the real-ness of the images generated.

### Block-Based Compressed Sensing for Natural Images and Videos

January 2023

- Innovated a block-based compressed sensing approach for natural images and videos, leveraging deep learning inspired by the insights from the paper "Video Compressed Sensing Using a Convolutional Neural Network."
- Trained the model and achieved a compression factor of 0.1 on non-keyframes of videos of KITTI Dataset.

### Automatic Stroke Lesion Identification

November 2021

- Developed a method for segmenting stroke lesions in brain MRI volumes, utilizing deep 3-D convolutional networks (Residual-UNETs). This approach aimed to enhance the accuracy of stroke risk assessment in patients.
- Improved the lesion segmentation F1-score from 51.7% to 56.3% by incorporating brain parcellations into Grey Matter (GM) and White Matter (WM), improving the precision of diagnosis.

## Publications

- A Chanchal, S Lal, D Barnwal, P Sinha, **S Arvvasu**, and J Kini. *Evolution of LiverNet 2.x: Architectures for automated liver cancer grade classification from HE stained liver histopathological images*. Multimedia Tools and Applications (2024), 83(1), 2791-2821.

## Technical Skills

**Languages:** Python, C, C++, MATLAB, Julia, Shell Scripting

**Developer Tools:** OpenCV, ITK, SLURM, Git, Open3D

**Machine Learning Tools:** Pytorch, Pytorch-Lightning, MMDetection3D, Pandas

**Technologies/Concepts:** Deep Learning, Computer Vision, Generative AI, Diffusion Models, MR Imaging, Statistical Learning, 3D Reconstruction, Lidar Processing, SLAM

**Soft Skills:** Professional Communication, Collaborative Working, Interpersonal Communication