

Sumukha Manjunath

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Education

North Carolina State University, Raleigh, NC
Master of Science, Electrical Engineering

August 2022 – May 2024
GPA: 4.0/4.0

Experience

Raven Industries, *Machine Learning Engineer Intern*

May 2023 – April 2024

- Improved **YOLO-NAS** model performance by 20% through increased data diversity by training an **image2image diffusion model** and engineering a **Generative AI**-driven data augmentation pipeline.
- Reduced model unit testing and evaluation pipeline design time by 90% and streamlined **CI/CD** of models to production by developing a model agnostic pipeline design and orchestration library using **DAG data structure** and **PyTorch**.
- Contributed to the filing of a **patent** for “**Attention Based Feature for object oriented granular neighbor search**” as the **primary inventor**.
- Accelerated data curation time by 80% by automating it through **containerized** deployment of **Python**-based **image recommendation system** using **AWS S3**, **Lambda**, **DynamoDB**, and **Facebook AI Similarity Search index** (FAISS).
- Achieved a 99% reduction in memory consumption for image storage by training a **Vision Transformer** for image representation as 1D **NumPy** array using **self-supervised distributed training** with **self-distillation** and **masked-image-modelling**.

Interpretable Visual Modeling, Computing and Learning Lab, *Graduate Student Researcher*

January 2023 – May 2023

- Reviewed and analyzed literature on **large foundation models**, notably **Contrastive Language Image Pretraining** (CLIP), exploring methodologies for fine-tuning them for downstream applications.
- Devised and tested a **fine-tuning** approach for the pre-trained CLIP model with a focus on preserving **out-of-distribution** (OOD) performance.

Mphasis, *Senior Data Scientist*

May 2021 – June 2022

- Expedited patient diagnosis by **60%** by leading the engineering of **Convolutional Neural Networks** based diagnostic pipelines using **Python**, **TensorFlow**, **Azure Services**, **FastAPI** and **Docker** for Fundus and OCT systems.

Robert Bosch, *Senior Software Engineer*

August 2018 – May 2021

- Increased driver safety by improving road sign detection by **40%** through **Faster-RCNN** integration to **ADAS feature**.
- Improved obstacle and free space detection by **20%** by integrating a **Fully Convolutional Network** (FCN) trained using **TensorFlow** to an **ADAS** component for automated lane changes.
- Led the development and deployment of a blueberry farm's **real-time** harvest estimation tool, achieving **50%** accuracy enhancement through a custom **Unet** model, optimized with **pruning** and **quantization**.

Technical Skills

Languages: Python, C++, MATLAB, SQL

Database, Cloud Services, Tools: Git, Docker, Kubernetes, AWS, Azure, Weaviate, Streamlit

Machine Learning: TensorFlow, PyTorch, PyTorch Lightning, HuggingFace, TensorRT, ONNX, LlamaIndex, Mlflow, Scikit-learn

Other Libraries: OpenCV, Pandas, Pyspark, FastAPI, Matplotlib, Plotly, NumPy, Pillow

Projects

ResearchSurveyLLM: (In Progress)

- Developing an automated survey paper generator using **RAG** framework with **LlamaIndex**, leveraging **LLama-2-7b** for generation and **Mistral-7B** for vector embedding.
- Created an **ETL** pipeline to scrape and filter academic papers from arXiv, storing the refined dataset in **Weaviate DB**.

FashionXChange:

- Developed an application with **Streamlit** for text-based modification of outfits of people in images using **Grounding DINO**, **Segment Anything Model** and **Stable Diffusion**.
- Achieved superior pose preservation and reduction in distortion of results by finetuning Stable Diffusion inpainting model with **DeepFashion** dataset, leveraging **Low Rank Adaptation** (LoRA) and custom data masking.