Sumukha Manjunath

sumukha1996@gmail.com | linkedin.com/in/sumukha-manjunath/ | 9846833259 | sumukha21.github.io

Education

North Carolina State University, Raleigh, NC — August 2022 – May 2024
Master of Science, Electrical Engineering — **GPA:** 4.0/4.0
Courses: Computer Vision, Neural Networks, Pattern Recognition, Design and Analysis of Algorithms, Cloud Computing Technology, Design of a Robotic Computer Vision System for Autonomous Navigation

Visvesvaraya Technological University, Belagavi, India — August 2014 – June 2018
Bachelor of Engineering, Electronics and Communication Engineering — **GPA:**3.7/4.0

Experience

Raven Industries, ***Machine Learning Engineer Intern*** — May 2023 – April 2024

- Engineered **Generative AI**-driven data augmentation pipeline by training an **image2image diffusion model**, resulting in increased data diversity and model performances.
- Developed **PyTorch** and **Python** based **configurable** evaluation library, reducing model evaluation pipeline design time by **90%**.
- Developed image representation model through **self-supervised distributed training** of **Vision Transformer** with **self-distillation** and **masked-image-modelling** on **large-scale** agriculture image dataset.
- Automated data curation through **containerized** deployment of Python-based **image recommendation system** using **AWS Lambda**, trained Vision Transformer, and **Facebook AI Similarity Search index** (FAISS), with **patent-pending** components.

Interpretable Visual Modeling, Computing and Learning Lab, ***Graduate Student Researcher*** — January 2023 – May 2023

- Literature survey and analysis of large foundation models such as **Contrastive Language Image Pretraining** (CLIP) and methods to finetune them for downstream tasks.
- Hypothesized and experimented with **fine-tuning methodology** of pre-trained CLIP model, with a key focus on preserving **out-of-distribution** (OOD) performance.

Mphasis, ***Senior Data Scientist*** — May 2021 – June 2022

- Improved speed of patient diagnosis by **60%** by leading the engineering of **Convolutional Neural Networks** based diagnostic pipelines using **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**.
- Enhanced 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 **U-Net** model, optimized with **pruning** and **quantization**.

Technical Skills

Languages: Python, C++, MATLAB, SQL
Database, Cloud Services, Tools: Git, Docker, Kubernetes, AWS, Azure, Weaviate, Streamlit, FastAPI
Machine Learning: TensorFlow, PyTorch, PyTorch Lightning, HuggingFace, TensorRT, ONNX, LlamaIndex, Mlflow, Pyspark

Projects

ResearchSurveyLLM: (In Progress)

- Developing an automated survey paper generator using **RAG** framework with **Weaviate Vector database** and **LlamaIndex**, leveraging **LLama-2-7b** for generation and **Mistral-7B** for vector embedding.

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**.
- Enhanced Stable Diffusion inpainting model by finetuning with **DeepFashion** dataset, leveraging **Low Rank Adaptation** (LoRA) and custom data masking for superior pose preservation, reduced distortion, and improved results for complex modifications.