UMA MAHESWARA R MELETI

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EXPERIENCE

Aira Matrix (clients: MercK & Co., JTI, Janssen, Sun Pharma) Dec 2020 – Dec 2022

Lead Engineer - A.I.

- Promoted from Imaging Scientist to Lead Engineer position. Automated workflows for life science applications, advancing **drug discovery** and **cancer research** using deep learning and minimizing manual intervention by **90%**
- Partnered with pathologists and facilitated seamless communication to build AI algorithms. Improved the interobserver variability among pathologists by **30%** using AI-Model insights
- Applied state-of-the-art **Semantic Segmentation** and **Object Detection** algorithms for **abnormality detection** in WSI images. Devised an active learning frame-work to reduce the annotation time by over **60%**
- Engineered a custom **CNN** architecture for **feature extraction** from the rat uterus, improved processing speed by **30%**. Worked on **random forest** to stage the estrous cycle.
- Developed **Generative AI** solutions for domain generalization in histopathology to address **data drift** in productionizing vision models. Improved models with a **10% average reduction** in False Positive Rate through research insights

Brane Enterprises Jul 2019 – Dec 2020

Machine Learning Engineer

- Joined the early-stage startup, contributing to the ideation and development of pioneering **AI SaaS** products. Built solutions from scratch and actively participated in sprint retrospectives and continuous improvement initiatives
- Created computer vision software for automated bank cheque detection using image processing and **OCR**, achieving **92% accuracy** on **300+** cheques from 15 Indian banks.
- Designed ML solution to convert workflow images into intuitive entities using algorithms like **Faster RCNN**, **YOLOV4**, and **zero-shot learning**. Attaining **80%** conversion accuracy over **1500+** documents. Integrated with **AWS** using **ECS**
- Researched and deployed a POC for physiotherapy on **NVIDIA Jetson** with **Rasberry Pi** Camera; used stacked hourglass network with **Tensor-RT** for classifying human activity

Musco Sports Lighting May 2024 – Aug 2024

Machine Learning Intern

- Designed calibration pipeline for stereo cameras deployed on **edge devices** for an **AI-based** sports assistance application. Achieved a **93%** accuracy for field calibration on the custom-prepared dataset
- Performed **statistical analysis** on **depth estimation** and **field calibration** using **computer vision** algorithms, applied insights and improved the workflow efficiency of calibration software by **60%**
- Integrated code into an existing large code base. Documented work and proposed lidar-based methods for product validation

School Of Computing - Clemson University Jan 2023 – Aug, 2023

Graduate Research Assistant

- Pioneered research on wildfire management, proposing a new paradigm for obscured wildfire detection using **drone data** and improved the wild-fire detection rate by a margin of **28%**
- Proposed a novel **transformer**-based architecture for wildfire localization. Explored **attention** mechanisms for the **video feature analysis**; implemented a new mechanism surpassing the state-of-the-art methods with a **5%** F1 score
- Curated a task-specific dataset and conducted experiments with varied frame rates at different feature resolutions. Reduced computational costs by **43%** through strategic frame selection
- Trained deep learning models on **GPU Cluster** using **DDP** with **PyTorch** on Linux via SLURM, speeding up the training by **40%**

Clemson University Aug 2023 – Dec 2024

Graduate Teaching Assistant

- Assisted Cloud Computing, Discrete Math., Data Structures & Algorithms courses. Helped **120+** students with **low-level software design**, focusing on **Java and C++** programming.
- Guided AWS labs for **60+** students, giving hands-on experience on AWS services like **EC2, RDS, s3, and Lambda**.

Wow Exp May 2019 – Jun 2019

ML and AR Intern

- Developed **graphics templates** and implemented **Generative AI** models for image editing in an AR application

PUBLICATIONS

- Obscured Wildfire Flame Detection by Spatio-temporal Analysis of Smoke Patterns Using Frame-wise Transformers. https://doi.ieeecomputersociety.org/10.1109/DCOSS-IoT61029.2024.00019
- Unveiling Patterns in European Airbnb Prices: An Analytical Study Using Machine Learning Techniques. IRJET, 10(12), 1104–1112. https://www.irjet.net/archives/V10/i12/IRJET-V10I12153.pdf

EDUCATION

Clemson University — Clemson, USA
Masters of Computer Science; ***GPA: 3.93/4.00*** — *Jan 2023 – Dec 2024*

IIIT - RGUKT — Nuzvid, India
Bachelors in Electronics and Communications Engineering; ***GPA: 8.61/10.00*** — *Jun 2015 – Apr 2019*

SKILLS

Areas of Expertise: General Machine Learning, Computer Vision, NLP, MLOps, Generative A.I., Software Engineering.

Programming: Python, R , C++ , Java , MATLAB, SQL, Shell script.

ML Frameworks: Pytorch, TensorFlow, OpenCV, CUDA, Scikit-Learn, PEFT, LoRA, SFT, LangChain, LlamaIndex

Tools & Systems: AWS, GCP, Azure, Git, Docker, Linux, ONNX, Flask, FastAPI, Data-Version-Control (DVC), MLflow

Certifications: AWS Certified Solutions Architect, MLOps Specialization from Duke

PROJECTS

Brush Stroke Parameterized Style Transfer | *Project Website*

- Developed a novel **style transfer** approach using **parameterized brush strokes** instead of pixel-based methods for **natural** and **artistic representation**
- Implemented a **differentiable renderer** to convert brush strokes into pixel-canvas. Optimized brush strokes iteratively using **content loss and style loss** to stylize images

Text to SQL Generation - Generative A.I | *GitHub*

- Built a text-to-SQL query converter by fine-tuning **LLaMA-7b** using Low Rank Adaptation for efficient LLM fine-tuning
- Trained model using SQL-create-context dataset on **NVIDIA A100 GPUs** using **SFT** and **PEFT**

Defending Adversarial Attacks using Stable Diffusion | *GitHub*

- Developed a robust, adaptive defense strategy against adversarial attacks using **stable diffusion**
- Used public datasets to evaluate the approach against **PGD and FGSM attacks** in black-box and white-box settings, demonstrating effective and forward-thinking solutions for mitigating adversarial threats in vision models.