Uday Santhosh Raju Vysyaraju

College Station, TX 77840 • uday@tamu.edu • (979) 422-4723 • LinkedIn • Website

EDUCATION

Texas A&M University, College Station, Texas — May 2025
Master of Science in Data Science, focus on Computer Science Engineering — *CGPA 4.0/4.0*

Indian Institute of Technology Kharagpur, West Bengal, India — Jul 2018
Bachelor & Master of Technology in Electronics & Electrical Communication Engineering — *CGPA 8.57/10*

SUMMARY

Machine Learning, Computer Vision, and Natural Language Processing Engineer with 6+ years of experience in building end-to-end AI solutions for disaster mitigation, livestock health monitoring, plant phenotyping, agricultural crop land analysis, yield prediction, sales forecasting, behavior recognition, industrial security and automation, quality control, autonomous surveillance, healthcare and many other applications. A self-starter committed to applying advanced machine learning techniques to address real-world challenges across industries. Skilled at achieving meaningful outcomes through creative model design, efficient data pipelines, and scalable system implementation.

HACKATHONS & WORKSHOP PRESENTATIONS

Plant Phenotyping Workshop at **2024 AI in Agriculture Conference** (workshop notebook) — Apr 2024

AgriTech Challenge at TAMU Datathon 2024 — Nov 2024

- *2nd Place* – Implemented a CNN-based cotton field detector using satellite imagery and weather data. Poster presented at the TAMU Beef Sustainability Summit 2024.

Corn Yield Prediction Challenge **at** **Machine Learning for Cyber Agricultural Systems 2024** (github) — Aug 2024

- *4th Place* – Designed a multi-modal CNN to predict corn yield using satellite images and numerical features

American Airlines Operations Research & Advanced Analytics Hack-A-Thon 2024, Dallas, Texas — Feb 2024

- *2nd Place* – Proposed a destination recommender using Collaborative Filtering & Similarity Matching

EXPERIENCE

Texas A&M Institute of Data Science, Texas A&M University, College Station, TX — Jun 2024 – May 2025
Graduate Assistant Research

- Developing a **computer vision-based pipeline** for the **early detection of Bovine Respiratory Disease** in beef cattle, incorporating animal detection, segmentation, identification, tracking, and activity recognition to monitor cattle, build activity profiles, and identify unhealthy individuals. Built an instance segmentation dataset using Auto distill foundation models, manual annotation and trained a high-accuracy YOLOv11 segmentation model. Developed a CLIP-based (finetuned) activity recognition model, an orientation detection model, and actively working on Cattle-ID, temperature detection, and self-supervised learning for cattle re-identification.
- Developed a **climate-smart decision support dashboard** for US beef production systems.
- Developing NLP-based predictive models for disaster impact estimation using social media data by collecting 1 million tweets from X/Twitter across Texas to assess hurricane damage at the zip code level. Building custom models for highly accurate predictions.

Advanced Vision and Learning Lab, Texas A&M University, College Station, TX — Jan 2024 – Aug 2024
Graduate Researcher

- Built **Machine Learning Pipeline** for **Large Scale Automated Plant Phenotyping** including Data preprocessing, Computer Vision based Plant Features & Statistics extraction, and an Interactive GUI Interface for users. Streamlined all modules in the pipeline with Apache Airflow.

Texas A&M University, College Station, TX — Jan 2024 – Aug 2024
Master of Science in Data Science

- SendMeStudies: Building an LLM based research alert system that selects papers from internet and emails them to users based on automated user personalization.

LG, Seoul, South Korea Sep 2018 – Sep 2022
AI Specialist Researcher

- ***X-ray object detection***: Enhanced the performance of **X-ray detection** models by utilizing **synthetic images** generated from datasets across different domains using **GANs**. Implemented **switch normalization** in place of batch normalization and incorporated **multi-scale training** using **SNIPER**, resulting in a notable improvement of baseline mean Average Precision (**mAP**) from **90** to **97**.
- ***Defect Detection in Display Panels***: Developed a defect detection system using Image segmentation on display panels for LG Display.
- ***Smart CCTV System***: Developed a comprehensive **CCTV system** that analyzes **real-time** footage for **people counting** and **loitering detection**. Key contributions include implementing **RTSP streaming** support, flexible **multi-channel** support, **object detection** & **tracking**, **Docker container packaging** as well as **benchmarking** various **object detection** and **tracking** models to enhance accuracy, particularly in detecting **small persons**.
- ***AI-Based Analog and Digital Meter Reading***: Established a robust pipeline for **extracting readings** from **images** of **analog** and **digital meters**, achieving an accuracy of **85%**. Implemented **data augmentation**, **custom datasets**, and **CNN models** to enhance accuracy from the initial baseline.
- ***Versatile Object Detection System***: Implemented a customizable object detection system, based on **EfficientDet**, on deep learning vision inspection service (link).
- ***Smart Retail Store with Automatic Checkout***: Optimized **product recognition** accuracy with fewer training images (**few shot**) by using **synthetic datasets** and conventional image processing techniques including **background elimination**, **foreground detection**, and **feature generation** and **matching** (**SIFT** and **SURF**).

Texas Instruments, Bengaluru, India May 2017 – Jul 2017
Digital VLSI Intern

- Engineered a pipeline for **seamless integration, testing, and validation of Cadence Elastic Compression**, a latest scan compression architecture on a System on Chip, contributing to a published work.

Jana Care, Bengaluru, India May 2016 – Jul 2016
R&D Intern

- Designed, prototyped and validated a **docking system** for a **mobile blood analyzer medical device**. Written a detailed documentation of firmware code for the embedded device.

SKILLS & LANGUAGES

- *Programming & Tools:* Python, OpenCV, C/C++, Docker, Git, TensorFlow, PyTorch, TensorRT, Airflow, Keras, Seaborn, SQL, NoSQL, Redis, MongoDB, MATLAB, Perl, Linux, Shell, Apache Airflow, Kubeflow, Kubernetes, MLFlow, Kubectl, Amazon Web Services (AWS), ETL pipeline, Google Cloud Platform (GCP)
- *Technical skills:* Machine Learning, Artificial Intelligence, Computer Vision, Natural Language Processing (NLP), Multi Modal AI, Large Language Models (LLMs), Vision Language Models (VLMs), Deep Learning, Generative AI, Regression, Image Classification, Clustering, Recommendation Systems, Time Series Forecasting, Domain Adaptation, Image Segmentation, Object Detection, Localization, Pose Estimation, Model Fitting, Optimization, Phenotype Measurement, Activity Recognition, Behavior Analysis, MLOps, Docker Containerization, Multi Spectral Data Processing, Price Forecasting, ML Fine-tuning, ML Model deployment, Dataset engineering, Digital Signal Processing, Image Processing, Imaging, Defect detection, Feature detectors and descriptors, Feature Engineering, Auto-Encoders, Variational Auto-Encoders (VAE), Embedding models, Generative Models, Vision and Language, Generative Models, Diffusion Models, Stable Diffusion, Image Synthesis, Image manipulation, Supervised Learning, Unsupervised Learning, Support Vector Machines (SVM), Decision Trees, Random Forest, Linear Regression, Logistic Regression, Text to Image Generation, Denoising Diffusion Models, Machine Learning Debugging, Image Video, Data Sampling, Model Training, Validation, Evaluation, Testing, Inference, Reinforcement Learning (RL), Imitation Learning, Algorithms, Data Structures, Coding, Model Tuning, Serving, GPUs, Auto Labeling, Autodistill, Knowledge Distillation, HuggingFace, Camera Monitoring, Camera and Sensor Testing, Image Recognition
- *Algorithms:* CLIP, YOLO, Segment Anything Model, GroundedSAM, EfficientNet, MaskRCNN, SORT, CNN, RNN
- *Soft Skills:* Communication, Analytical skills, Problem-solving skills, Team Player