

Shantanu Todmal

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EDUCATION

University of Massachusetts Amherst

Sept 2024 – May 2026

Master of Science (MS) in Computer Science

GPA: 4.0/4.0

Relevant Coursework: Advanced NLP; Robotics; Neural Networks: A Modern Introduction; Optimization in Computer Science; Data Science Fundamentals; Research Methods for Empirical CS; Trustworthy & Responsible AI; Methods of Applied Statistics

Indian Institute of Information Technology, Pune

Aug 2018 – June 2022

Bachelor of Technology (B.Tech) in Computer Science and Engineering

TECHNICAL SKILLS

- **Tech Stack :** Python; C; C++; Java; TensorFlow; PyTorch; Keras; OpenCV; NumPy; Pandas; Scikit-learn; LangChain
- **Core Skills:** Machine Learning; Computer Vision; Natural Language Processing; Retrieval-Augmented Generation (RAG); Prompt Engineering; LLM Agents; Vision Transformers; Object Detection; Segmentation; Tracking; Explainable AI

EXPERIENCE

Research Intern - *Tech5 USA, Inc*

Jul 2025 – Aug 2025

- Built a facial occlusion detection and alignment framework for biometric identification using Vision Transformers and landmark-based models, achieving IoU 0.95, Dice/F1 0.97, Precision 0.97, Recall 0.97, and 97.9% pixel accuracy.

Data Scientist (Senior Engineer) - *Bosch Global Software Technologies*

Aug 2022 – Aug 2024

- Contributed to three invention reports (patents) for Bosch VivaRay - anemia classification & hemoglobin prediction.
- Implemented end-to-end 3D object detection using LiDAR point clouds leveraging models such as PointNet/PointNet++, VoxelNet, and PointPillars for autonomous driving scenarios.
- Built intelligent fault detection algorithms for predictive maintenance using time-series and electrical current data, applying anomaly detection and signal-based ML models to enable early failure prediction and reduced downtime.
- Developed an LLM-powered machine troubleshooting chat assistant using LangChain, enabling contextual reasoning, multi-step diagnostics, and retrieval-augmented responses for efficient issue resolution.
- Developed Explainable AI algorithms (SHAP, LIME, Grad-CAM, etc.) for an in-house Responsible AI platform.

Intern - *Bosch Global Software Technologies*

Jan 2022 – Jun 2022

- Built a framework for image and video dehazing using GANs and CNNs for diverse atmospheric conditions.
- Implemented real-time data augmentation to generate synthetic datasets with varying fog intensity levels.

Research Intern - *University of Pavia, Italy*

May 2021 – Nov 2021

- Designed a multitemporal SAR feature selection strategy using seasonal and 24-day Sentinel-1 composites with spatial statistics to capture phenological and spatio-temporal patterns for effective vegetation classification.
- Implemented random forest classification model for land-cover mapping in Google Earth Engine.

PUBLICATIONS

- **Human Face Generation from Textual Description via Style Mapping and Manipulation,** *Multimedia Tools and Applications* (Springer), 2022 [Link](#)
- **Mapping Globally Using Multitemporal Sentinel-1 SAR: A Semiautomatic Approach,** *IEEE InGARSS*, 2021 [Link](#)
- **Text-Guided Image Manipulation Using LiT and StyleGAN2,** *IEEE ICMI*, 2024 [Link](#)
- **XAI for Bispectrum-CNN Based Bearing Fault Detection,** *VETOMAC 2023; JVET* (Springer) [Link](#)
- **XAI-Driven Spindle Health Monitoring for Precision CNC Machining,** *ICMER EC* (Springer), 2024 [Link](#)

PROJECTS

- **Agentic Document QA:** Built an agentic document QA system for complex document understanding under guidance from *Adobe* Research scientists, focusing on tool-using retrieval and long-context reasoning.
- **Video based Density Estimation and Crowd Counting:** Adapted image-based crowd density estimation to video using diffusion-based denoising and event-driven optical-flow sampling, for accurate real-time crowd monitoring. [Link](#)
- **Memory Poisoning Attack & Defense on Memory Based LLM-Agents:** Evaluated memory poisoning attacks in persistent-memory LLM agents for EHRs and introduced trust-aware moderation and memory sanitization defenses, showing reduced attack effectiveness. [Link](#)
- **Med-VQA-KGRAG:** Developed medical VQA framework integrating Knowledge Graphs (PrimeKG) and RAG with multimodal retrieval, evaluated on VLMs (LLaVA-RAD, Llama-3.2 Vision) using (ROUGE/BLEU) & DeepEval metrics.
- **Autonomous Object-Tracking Robot:** Deployed a ROS-based autonomous object-tracking robot (Triton) using YOLOv3-tiny + SORT with color-histogram-based re-identification, achieving low-latency (1.2 s) real-time human tracking and autonomous following.