

TEJASWI V. PANCHAGNULA

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SUMMARY AND AREAS OF INTEREST

Machine learning researcher and incoming Ph.D. student working at the intersection of computer vision, LLMs, and agentic AI. Research includes vision-foundation-model adaptation, parameter-efficient learning, LLM alignment, and adaptive agent architectures.

EDUCATION

M.S. in Electrical and Computer Engineering, Purdue University, West Lafayette, IN **Expected May 2027**
GPA: 3.80/4; VIPER Lab, advised by Dr. Fengqing Maggie Zhu, **starting Ph.D. in Fall 2027**
Coursework: Deep Learning for Computer Vision, Natural Language Processing, Artificial Intelligence

B.Tech. in Electronics and Communication Engineering, IIITDM Kancheepuram **2020–2024**
GPA: 8.71/10; B.Tech. Project - Human Visual Perception using Gaze Tracking

RESEARCH AND PROFESSIONAL EXPERIENCE

VIPER Lab, Purdue University Oct 2025–Present
Graduate Research Assistant West Lafayette, IN

- Developed a training-free DINOv3–SAM framework that uses a single annotated reference image to segment scientific imagery across microscopy, pool-boiling, and radiography, improving mean IoU by 79% on pool-boiling images. **(Under review at ICASSP 2027)**
- Developed GATA, a geometry-aware parameter-efficient fine-tuning method that uses Hessian and task-gradient information with Q-DEIM-selected parameter anchors; achieved approximately 92% ViT-B/16 accuracy on CIFAR-10 using 150 optimized variables, comparable to rank-4 LoRA with 3,112. **(Under review at ICLR 2027)**
- Built inference-time iterative self-correction and zero-shot chain-of-thought guardrails that improved political-neutrality scores from 2.14 to 4.56 on a Likert scale without additional model training. **(Published at MMSP 2026)**
- Fine-tuned open-source LLMs using Direct Preference Optimization and LoRA, and developed an automated multi-axis LLM-as-a-judge pipeline to reduce political bias while preserving response fidelity.

Walmart Center for Tech Excellence, IIT Madras Jun 2024–Jul 2025
Research Associate Chennai, India

- Developed AI-enabled analytics tools for manufacturing MSMEs, integrating predictive modeling, anomaly detection, and time-series forecasting to support data-driven process monitoring and decision-making.

SENAI Lab, IIT Madras Jan 2023–Jan 2025
Research Intern (Advised by Prof. Raghunathan Rengaswamy, WSAI) Chennai, India

- Created a 4-million-point human eye-gaze dataset and analyzed Lévy-walk dynamics to characterize visual-search behavior; trained a MobileNetV2 U-Net to generate high-fidelity fixation heatmaps with over 90% Pearson correlation. (arxiv.org/abs/2510.09299)

SELECTED PUBLICATIONS

1. **Panchagnula, T. V.**, Narasimhan, S., Panchagnula, M. “Training a Few Anchors for a Dense Update.” Under review at *ICLR 2027*.
2. **Panchagnula, T. V.**, Davis, A. M., and Zhu, F. “One-Shot Adaptive Segmentation for Scientific Images.” Under review at *IEEE ICASSP 2027*.
3. **Panchagnula, T. V.**, Coburn, B., Dietrich, B. J., Browning, R. X., Delp, E. J., and Zhu, F. “Inference-Time Mitigation of Political Bias in Large Language Models.” *IEEE MMSP*, 2026. [arXiv:2608.14629](https://arxiv.org/abs/2608.14629).

PROJECTS

Compute Commons | Python, PyTorch, MLX, WebSockets, Streamlit | **Winner of Purdue University Chips and AI Hackathon**

- Built a working prototype web application that pools idle community devices into a shared AI-training network, coordinating collaborative learning across heterogeneous machines through data-parallel and model-sharded training.

Adaptive Agentic Architecture for LLMs | LangChain, PyTorch

- Designed modular routing and self-reflective feedback that adapt computation to task complexity; benchmarked 10–15% FLOP variation and 50–100 ms lower overhead than static generative AI baselines.

Human-Inspired Vision Models | PyTorch, ResNet-18, ConvRNN

- Implemented recurrent and foveated vision models on CIFAR-10 and ImageNet subsets; evaluated noise robustness and human-aligned representations using contrast-sensitivity and spatial-frequency probes.

TECHNICAL SKILLS

Languages and Systems: Python, C/C++, Git, Linux
ML and Data: PyTorch, TensorFlow, vLLM, scikit-learn, NumPy, pandas, Keras, OpenCV, LangChain
Platforms: AWS, Amazon Bedrock