Vijay Chevireddi

College Park, MD • vijaydevreddychevireddi@gmail.com • 240-940-9294 • GitHub • LinkedIn • Portfolio

EDUCATION

University of Maryland Aug 2023 – May 2025
Master of Engineering (M.Eng.) – Robotics | GPA – 3.77 *College Park, MD*

Osmania University Aug 2018 – June 2022
Bachelor of Engineering – Mechanical Engineering | GPA – 9.05/10 *Hyderabad, India*

COURSEWORK

Multimodal Foundation Models (**CNN, Transformers, RoPE, Flash Attention, Fine Tuning, MAMBA, GPT-1,2,3, Agentic AI, Vision Lang. Models, Variational Auto Encoder, Diffusion Models, Flow Matching, SWIN Transformer, RAG, CLIP, DINO, LLaVA**), Natural Language Processing (**Audio Signal Processing for ML, RLHF, PPO, DPO, AI Alignment, AI Distillation, BERT, ELMO, RNN, LSTM**), Robot Learning **(Reinforcement Learning**), Perception for Autonomous Robots (**Computer Vision**), Planning for Autonomous Robots, Control Systems

SKILLS

- **Programming Languages**: Python, C/C++, SQL, MATLAB
- **Tools & Frameworks**: PyTorch, TensorFlow, AWS, SageMaker, SQL, OpenAI Gym, MuJoCo, Langchain, Langgraph, Hugging Face, Docker, Scikit-learn, xgboost, NLTK, Stable-baselines3, ROS2
- **Optimization & Tools**: CUDA, NumPy, Pandas, OpenCV, SciPy
- **Machine Learning & AI**: Machine Learning, Multimodal Machine Learning, RAG, NLP, Finetuning, Distillation,LLM, Vision Language Models, Reinforcement Learning, Distributed Training,

EXPERIENCE

Fischell Department of Bioengineering - University of Maryland | *Machine Learning Intern* **Jun 2024 - Present**
- Implemented YOLOv8 for dredger detection in a University of Maryland initiative to modernize oyster farming, later upgrading to RT-DETR which improved IoU by 6%.
- Developed human pose detection for walking style classification using MMPose and a CNN transformer, enhancing classification accuracy and contributing to improved gait analysis.

Sai Vamsi Industries | *Machine Learning Engineer* **Jan 2022 - May 2023**
- Integrated a camera-based system using the YOLO framework to detect visual anomalies in press tool machines, showcasing applied computer vision and image understanding skills.
- Combined vibration data from Fluke 3561 FC Vibration Sensors with real-time image analysis to enhance defect detection by 5%, demonstrating practical software development and distributed training methodologies.

PROJECTS

Implementation of GPT and GPT 2 Models from Scratch **March 2025**
- Developed a Generative Pretrained Transformer (GPT) model entirely from scratch using PyTorch, implementing core componenets such as tokenization, self-attention mechanisms, multi-head attention, positional embeddings, and transformer blocks.
- Reproduced a 124M parameter GPT-2 model, including architecture design, model training, fine-tuning, and inference. Optimized training pipelines, configured hyperparameters, and validated model performance against standard language benchmarks.

Text-to-Command Translation for Robot Navigation Using T5-small Transformer Model[GitHub Link] **Oct 2024 - Dec 2024**
- Fine-tuned T5-Small to translate natural language commands into structured navigation plans with 98% test accuracy.
- Integrated Low-Rank Adaptation (LoRA) to reduce training parameters by 99.64% while retaining 92.5% test accuracy.
- Implemented the resulting NLP model with ROS2 and Gazebo to validate autonomous navigation on a TurtleBot3.

Transformers for 3D Object Detection in LiDAR Point Cloud [GitHub Link] **Nov 2024 - Dec 2024**
- Developed and trained a custom transformer-based 3D object detection model for LiDAR point clouds on the KITTI dataset.
- Combined PointNet++ embeddings with specialized transformer encoders and introduced a novel loss function, achieving a 3D bounding box detection mAP IoU of 0.67—on par with leading benchmarks.

AI learns to Play MARIO Using Deep-Q Learning and SWIN Transformer [GitHub Link] **Mar 2024 - May 2024**
- This project combines DQN with a SWIN Transformer to train Mario-playing AI agent.
- Enabling efficient interpretation of complex visuals and achieving a 500-moving average reward of 2700 in just 1250 episodes-far outperforming a model without SWIN.

Advanced Vision Systems for Autonomous Navigation Using YOLOv5 and Homography [GitHub Link] **Jan 2024 - May 2024**
- Applied homography for dynamic route planning.
- Optical flow and YOLOv5 were used to detect obstacles and their velocities in real time, enabling adaptive navigation.
- By leveraging projective geometry to locate vanishing points and horizon lines, the robot achieved over 80% successful navigation.