VIGNESH RAJAGOPAL

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EDUCATION

Ph.D. in Computer science | *University of Virginia, USA* | *Advisor- Dr.Rohan Chandra* **Aug 2029**
Masters in Robotics | *University of Maryland - College Park, USA* | ***GPA- 3.66*** **Dec 2024**
Bachelors in Mechanical Engineering | *Anna University, India* | ***GPA- 3.3*** **Apr 2021**

TECHNICAL SKILLS

Frameworks : ROS1, ROS2, OpenCV, Pandas, Tensorflow, Pytorch, Scikit-learn, Tableau, CUDA, OpenAI Gym
Languages : Python, C++, MATLAB, HTML, R, JavaScript
Tools : Gazebo, RVIZ, CARLA, SLAM, Git, Visual Studio, Unreal Engine, DevOps practices, API
Modeling : Solidworks, CATIA, Blender, Abaqus, Auto-desk, AutoCAD, Calculix, ANSYS
AI Models : CNN, DQN, GAN, LSTM, NerF, QCNet, UNet
Platforms : Linux, Windows, Arduino, Raspberry Pi, MacOSX, Bash, Kubernetes

EXPERIENCE

Research Assistant | *Gamma lab - UMD (Advisor Dr. Dinesh Manocha)* **Jan 2024 - May 2025**

- Architected novel agent-based systems for continuous improvement in autonomous navigation
- Developed secure protocols for multi-agent communication and task allocation
- Optimized cross-attention mechanisms for fusing visual and time-series data inputs, including accelerations, angular velocities, and joint efforts, to enhance adaptive locomotion capabilities
- Designed analytical frameworks to measure agent performance metrics and provide feedback loops

Research Assistant | *Bio-Imaging & Machine Vision Lab, UMD (Advisor Dr. Tao Yang)* **Oct 2023 - Jan 2024**

- Innovated a crab classification model with Meta SAM, increasing identification accuracy through advanced depth estimation.
- Engineered an innovative depth estimation technique using simplified triangulation methods, enhancing object analysis precision.
- Implemented formal verification techniques to ensure the security and reliability of AI models

Robotics Engineer | *Kaatru, IIT Madras* **Sep 2021 - Dec 2022**

- Boosted urban mapping accuracy by 14% through optimizing ZED stereo cameras and achieving real-time obstacle detection with 25% improved accuracy, LiDAR, and ORB-SLAM integration within ROS.
- Elevated navigation safety by 22.65% by designing real-time 3D mapping and obstacle avoidance ROS nodes, ensuring precise localization in GPS-limited zones.

Robotics Controls Intern | *Admatic Solutions, India* **Jan 2021 - Apr 2021**

- Collaborated on sensor calibration and robotic component testing to enhance system reliability, focusing on Arduino, SMPS, and motor integration. Achieving 50% increase in services and production.

PUBLICATIONS

- BehAV: Behavioral Rule Guided Autonomy Using VLMs for Robot Navigation | (Under review) ICRA* 2025
- CROSS-GAiT: Cross-Attention-Based Multimodal Fusion for Parametric Gait Adaptation | (Under review) ICRA* 2025
- VLM-GroNav:Robot Navigation using Physically Grounded VLMs in Outdoor Environments|(Under review) ICRA*2025
- AMCO: Adaptive Multimodal Coupling of Vision & Proprioception for Quadruped Robot Navigation. | IROS 2024
- A Study of Delamination Characteristics on Carbon Fiber Reinforced IPN Composites | MSE 2020
- Effect of Hydrothermal Ageing on the Compressive Behavior of Glass Fiber Reinforced IPN Composites | ICAMR 2021

PROJECTS

- **Landmark detection LLM :** Developed an agent-based system for landmark detection, incorporating advanced error handling and memory management techniques
- **PDFPro :**Implemented blockchain-inspired security measures for document management.
- **LANEAR :** Designed an agent-based workflow for autonomous navigation, integrating hardware and software protocols.
- **Movie Recommendation System :** Built a system with MLOps for automated deployment and monitoring.
- **Brain Cancer Image Synthesis :** Implemented secure protocols for handling sensitive medical data in AI applications
- **Self-Balancing Bike :** Created a bike with 3D mapping and self-balancing capabilities for urban navigation.