

MRINMOY KUMAR DAS

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Education

Boston University, College of Engineering

Boston, Massachusetts

Master of Science in Robotics and Autonomous Systems

Sept 2025 – Present (Expected: May 2027)

Thesis topic: *Thinking Like a Driver: Human-Guided Adaptive Computation for Autonomous Driving*

Coursework: *Vision Robotics, Image and Video Computing, Deep Learning, Advanced Computer Vision*

Mahindra University, Ecole Centrale School of Engineering

Hyderabad, India

Bachelor of Technology in Computer Science and Engineering

Oct 2020 – Aug 2024

Coursework: *Machine Learning, Reinforcement Learning and Autonomous Systems, GPU Programming*

Technical Skills

Languages: Python, C++, C, CUDA, Bash

Software & Systems: Linux, Git, Docker, ROS, REST APIs, Multithreading, TCP/UDP, CI/CD, pytest

ML & Robotics: PyTorch, TensorFlow, OpenCV, MMDetection, ONNX, TensorRT, Unity

Hardware: NVIDIA Jetson Thor/Orin/Xavier/Nano, H100/A100/L40S/A6000/V100, Raspberry Pi, Arduino

Experience

Stangl Lab, CILSE | Research Collaborator

Feb 2026 – Present

- Engineered an immersive **Unity-based VR simulation** for human-subject experiments, integrating real-time **eye tracking, 6-DoF head pose, motion trajectories, and interaction events** into a synchronized sensing pipeline.
- Developed a **Streamlit-based experiment control system** for real-time VR headset control and stimulus triggering, synchronizing VR telemetry with **Raspberry Pi-connected iEEG/sEEG** recordings for multimodal data acquisition.

H2X Lab, Boston University | Graduate Research Assistant

Dec 2025 – Present

- Developed a **semi-autonomous mobility platform** on **Jetson AGX Thor**, integrating multi-camera RGB-D perception, GPS/IMU localization, trajectory tracking, autonomous steering, and rider feedback for real-world navigation.
- Deployed and evaluated the system with **39 blind and low-vision riders** across a **1.2 km real-world route**, validating perception, navigation, and shared-control behavior under human-in-the-loop operation.
- Benchmarked **modular perception/planning** and **VLA-based navigation** against an **Alpamayo baseline**; achieved **41 FPS** with the modular stack versus **23.7 FPS** for OmniVLA-Edge and **0.5 FPS** for Alpamayo.

ikeGPS (Contract) | AI Engineer

Dec 2024 – Aug 2025

- Led development of a **Unity Perception synthetic data pipeline** generating **140,000+ high-resolution images** with segmentation masks, keypoints, and bounding boxes for utility pole and wire perception.
- Trained and fine-tuned **Swin Transformer** models for segmentation and keypoint detection using **MMDetection** on a distributed **14-GPU H100 Lambda Cloud cluster**.
- Improved real-image wire segmentation accuracy from **67% to 83%** via **sim-to-real transfer**, using quadratic and linear line fitting to merge patch-level predictions and suppress false positives.

Publications

- Das, M. K.**, Borda, D., et al. *CyFI: Semiautonomous Cycling for Blind and Low-Vision Riders*. **IEEE ICRA 2027** (Under Review).
- Wakeham, M., **Das, M. K.**, et al. *A 3D-Driven Framework for Moving-Camera Perspective-to-360° Video Generation*. **WACV 2027** (Under Review).
- Borda, D.*, **Das, M. K.***, et al. *Pedaling with Autonomy: Exploring Accessible Independent Cycling for Blind and Low-Vision Riders*. **ACM CHI 2027** (Under Review).

Selected Projects

Visual Localization for 6-DoF Camera Relocalization | CODE

Feb 2025 – Apr 2026

- Reduced 6-DoF relocalization error from **4.16m to 1.87m** by replacing APR-Transformer's CNN encoder with a ViT backbone, guided by Grad-CAM analysis.

Autonomous Ball-Picking Robot | DEMO | CODE

Jan 2024 – Jul 2024

- Built a distributed **Raspberry Pi-Jetson Xavier** control architecture for autonomous ball detection, tracking, and pickup, integrating stereo vision and ultrasonic sensing for real-time robot coordination.
- Optimized the perception stack with **ONNX/TensorRT**, running **YOLOv8 at 30 FPS** and cutting depth/segmentation latency from **60 ms to 20 ms**.

Autonomous Underwater Vehicle (AUV) | DEMO | CODE

Sep 2022 – Apr 2024

- Led end-to-end autonomy development within a **12-member interdisciplinary team**, integrating perception, sensor fusion, mission logic, and real-time thruster control, achieving **6th place at the Singapore AUV Challenge**.
- Deployed **YOLOv8 Nano** with a **ZED stereo camera** for underwater object detection and depth-aware obstacle avoidance, achieving **87% accuracy** and up to **40 FPS** on a custom **9,000-image** dataset.