Avigyan Bhattacharya

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EDUCATION

Carnegie Mellon University, Robotics Institute   *Pittsburgh, PA*
Master of Science in Robotics (Research), **GPA: 4.22/4**   *May 2026*
- Relevant Courses: Advance Computer Vision, Learning for 3D Vision**,** Deep Learning Systems

Jadavpur University   *Kolkata, India*
Bachelor of Engineering in Computer Science, **GPA: 9.14/10**   *May 2023*
- Relevant Courses: Deep Learning, Brain-Computer Interfacing, Computer Graphics, Graph Theory and Combinatorics

EXPERIENCE

Carnegie Mellon University   *Pittsburgh, PA*
Graduate Research Assistant at AirLab & TBDLab   *November 2024 – Present*
- Building a vision-language reasoning benchmark and method for autonomous vehicles and delivery robots to generate high-level navigation commands and resolve ambiguous goals through perception and commonsense grounding.
- Developed a semantic mapping framework for robots that fuses in-range and beyond-range observations, achieving SOTA zero-shot open-vocabulary 3D segmentation and 2.2× improved exploration efficiency. **[Paper][Website]**

Indian Institute of Technology Bombay   *Mumbai, India*
Research Fellow in AI at Centre for Machine Intelligence and Data Science   *July 2023 – July 2024*
- Developed a novel visual clue based prompt learning architecture for CLIP to solve class and domain generalization in remote sensing and surpassed SOTA by 3-5% in accuracy across multiple datasets**. [Paper]**
- Improved robustness of self-supervised pretrained models to domain shift by generating synthetic data with diffusion models. **[Paper]**

TCS Research and Innovation Labs   *Kolkata, India*
Research Intern   *May 2022 – August 2022*
- Designed and deployed a pipeline to generate Scene Graphs, Knowledge Graphs, and Topological Maps from RGB-D images captured by a robot, enabling a system for handling robotics context and task feasibility. **[Paper][Patent]**

PROJECTS

Hate-Speech Content Moderation   *June 2023 – July 2024*
- Scaled up formation of a database of hateful social media content in the Indian political scenario and proposed a policy for a crowdsourced content moderation scheme. Led a team of 3 and mentored 2 interns. **[Paper]**

Scene Text Image Super Resolution   *September 2022 – April 2023*
- Integrated Dictionary Embedding based probabilistic priors into a Scene Text Image Super Resolution pipeline and obtained 3-4% higher accuracy for more challenging and lengthy words compared to existing approaches. **[Paper]**

Image analysis - Grain boundaries in Iron-Titanium alloy system   *December 2021 – March 2022*
- Automated the method of analysis of grain boundaries by collaborating with the Metallurgical Dept. Evaluated classical image processing algorithms and compared results against ML classifiers (SVM, Random Forest, ELM).

Segmentation based Burnt Scars identification   *June 2021 – January 2022*
- Implemented DL models (FCN, UNet, Deeplabv3) to segment burnt-scars in Amazon rainforest pastures from a weakly labeled dataset. Applied human-in-the-loop approach for iterative label refinement, boosting performance.

Dataset for Vehicle Detection on Indian Roads   *October 2020 – March 2021*
- Curated an image dataset reflecting India's road conditions, congestion patterns, and vehicle types and benchmarked using deep learning models (Faster RCNN, YOLOv3, RFCN, DETR), achieving a mAP of 74.53%. **[Paper]**

SKILLS

Computer Vision, Multimodal Learning, Generative AI, Deep Learning
Languages & Frameworks: Python, C++, C, Pytorch, TensorFlow, SQL, Git, Unreal Engine