Bhuvan Jhamb

Seeking Internships for Summer-2024 in realm of Computer Vision/Perception/Robotics/Embodied-AI

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Education

Carnegie Mellon University — **Aug 2023 – Dec 2024**

M.S. in Computer Vision @ Robotics Institute, School of Computer Science — **Current CGPA**: 4.11/4.0

Selected Courses: Learning for 3D Vision, Visual Learning and Recognition, Machine Learning, Advanced Computer Vision

National Institute of Technology, Allahabad — **Jul 2017 – May 2021**

Bachelor of Technology in Mechanical Engineering — **CGPA**: 8.69/10.0

Achievements: President-Robotics Club, Merit Scholarship Recipient

Technical Skills

Languages: C, C++, Python, MATLAB/Octave

Software/Frameworks: ROS, ROS-2, PyBullet, OpenCV, PyTorch, Pybind11, CARLA, Webots, GTest, Git, g2o, VTune

Competencies: Computer Vision, Machine Learning, Deep Learning, 3D Vision(SLAM, NERFs, Gaussian Splats), Robotics

Experience

Intel Corporation-Robotics Software Developer — **May 2021 – August 2023**

AI and Computer Vision @ Vision Technologies Group (Intel Realsense)

- Engineered **functional safety** technology for autonomous mobile robots using Intel Realsense (stereo-depth cameras)
- Developed robust, **interpretable** and **ISO-26262 compliant lightweight unsafe region detector** capable of being run on safety certified hardware. Achieved **0.2% false negative rate** while maintaining **2% false positive rate**
- Generated **segmented pointcloud** and **occupancy grid** to support downstream tasks. Also, **designed metrics** to **quantify uncertainty** of results. Followed **MISRA-C standards** for development *(certification)*
- Implemented **comprehensive test suite**, cross-platform **logger**, Python & ROS **wrappers**, and managed **releases**

Silicon and Systems Prototyping Group @Intel Labs

- Worked on **VI-SLAM** for Digital Twin and Scene Intelligence platforms *(link)*
- Developed modules to **integrate inertial data and visual slam**, implement **robust backend optimization** via **pose graph optimization** and **bundle adjustment**, preprocess depth images, and **point cloud registration** using ICP
- Optimized code using compute profiling to **achieve performance of 60+ FPS**, benhcmarked results ensured **IP compliance** through protexIP scans, and managed tech transfer. Initially, I was getting payroll from Anlage Infotech

Summer Research Fellow-Indian Academy of Science — **May 2020–August 2020**

Guided by Dr.Deepak Mishra (Associate Prof, IIST Trivandrum) and Mr. Sandip Paul (Scientist G, ISRO)

- Implemented novel loss function for **monocular depth estimation** incorporating Huber loss and gradient information
- **Achieved improved depth map accuracy in NYU-v2 dataset**, especially in regions with high blur *(journal paper)*

Robotics and Computer Vision Intern - TATA Advanced Systems Limited — **May 2020-July 2020**

- Developed a **navigation system for UAVs in GPS Denied indoor environments** to explore unknown areas
- Used particle filter slam for **mapping**, AMCL for **localization**, A* for **global planning**, and DWA for **local planning**

Projects

Dense SLAM in the Wild | *MSCV Capstone Project (Ongoing)*

- Engineering **photorealistic dense SLAM** systems that work **in the wild**, with challenging data like motion blur and sparse views. Currently exploring coupling **Gaussian backend** with robust **foundation model** features

Development of a Stage 3 Autonomous Vehicle Research Platform | *Senior Year Project*

- **Developed autonomy stack for 1/10th scale RC vehicle research platform**. Implemented autonomous GPS waypoints traversal, drivable region estimation, global planner (A*), local planner(DWA), and controls(PID)
- Used CARLA and Webots prior to hardware implementation. Achieved **best paper award** at ICRCCV-22 conference

Autonomous Carrier Drone | *Cisco thingQbator MNNIT (paper)*

- Developed a **GPS-guided autonomous delivery drone.** Engineered **3D obstacle avoidance** using RGB-D camera by discretizing the space into cells, and evaluating a cost function for each grid cell based on depth image and dynamics

Automation of Quadcopter Flight in Indoor Environment using ROS | *eYantra Robotics competition (link)*

- **Automated the flight of a drone in an indoor environment** to mimic the polliation process of a honeybee
- **Implemented precise localization** of drone and other elements in the environment through Whycon markers and a roof-mounted monocular camera. **Implemented and fine-tuned PID controller** for drone

Minor Projects

- Implemented **homography estimation**, used it to project a reference image into different scene and to stich panoramas
- Implemented basic **sparse structure from motion and multi view stereo** pipeline from scratch
- Implemented calibrated and uncaliberated versions of **photometric stereo**