

BHUVAN JHAMB

Seeking Internships for Summer-2024 in the domain 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

Frameworks: PyTorch, PyTorch3D, Numpy, OpenCV, Pybind11, PCL, GTest, Git, ROS, CARLA, g2o, CMake, 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 **unsafe region detection** for functional safety of autonomous mobile robots using stereo-depth cameras
- Developed robust, **interpretable** and **ISO-26262** compliant **lightweight** algorithm, 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 software development ([certification](#))
- Implemented **comprehensive test suite**, cross-platform **logger**, Python & ROS **wrappers**, and managed **releases**

Silicon and Systems Prototyping Group @Intel Labs

- Worked on **Visual Inertial 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**, benchmarked 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 **dense SLAM** systems that work **in the wild**, with challenging data like **motion blur** and **sparse views**
- Exploring coupling **3D Gaussian** backend with robust **foundation models** feature frontend

Development of a Stage 3 Autonomous Vehicle Research Platform | Senior Year Project ([link](#))

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

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

- Automated the flight of a drone in an indoor environment**. Implemented **precise localization** of drone and other elements in the environment through **whycon** markers and a roof-mounted monocular camera

Course Projects

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

Publications

- S. Paul, **B. Jhamb**, D. Mishra, M. Senthil Kr., "Edge loss functions for deep-learning depth-map" ([link](#))
- B. Jhamb**, A. Gupta, M. Karim, "3D obstacle avoidance and path planning for quadrotor using modified DWA" ([link](#))