SOHAM PADHYE

ROBOTICS PERCEPTION ENGINEER

CONTACTS

📞 +91-8263082332

@ yusohampadhye@gmail.com

🔗 linkedin.com/in/soham-padhye-9a4583132

🔗 github.com/sohampadhye007

PROJECTS

Lightweight Semantic Segmentation

- Trained a segmentation model using a MobileNet pre-trained on the ImageNet dataset as an encoder and designed a decoder that predicts segmented masks.
- Used **spatial attention** mechanism and **atrous convolution** for generating segmentation mask. Secured special bonus marks for this project at IITJ.

Image Generation using VQ-VAE and Autoregressive Models

- Trained VQ-VAE on a skin lesion dataset to learn latent representations using CNN-based encoder-decoder architecture. Trained an autoregressive model on the quantized latent space to generate realistic medical images.

Sketch-to-Image Generation with Conditional Generative Adversarial Network (cGAN)

- Designed and trained a conditional GAN architecture conditioned on class labels to synthesize realistic images by taking paired sketches as input.

PROGRAMMING

PYTHON

C++

MATLAB

SKILLS

Libraries

PyTorch, TensorFlow, OpenCV, Keras, Streamlit, Scikit-Learn, Cupy, Numpy, Pandas.

Robotics stack

ROS2, ROS C++, Rclpy, Gridmap, Gazebo.

Tools & Platforms

Docker, Gitlab, Linux.

Robotics Hardware expertise

Camera, 3D Lidar, IMU, Nvidia-Jetson, Tracked robot, Sentry (wheeled robot).

EDUCATION

Indian Institute of Technology Jodhpur — Jodhpur, India
MTech Robotics and Mobility Systems — 08/2022 - 08/2024
- Deep Learning, Machine Learning, Artificial Intelligence, Computer Vision, Robotics, Data Science, Autonomous Systems.

CGPA | **8.57** / 10

Vishwakarma Institute Of Technology — Pune, India
BTech Mechanical Engineering — 08/2016 - 10/2020
CGPA | **9.35** / 10

MTECH THESIS

Unveiling Clarity: A Sensor-Guided Deep Learning Architecture for Motion Blur Removal Using IMU Sensor Fusion

- Developed an image enhancement system for a fast-moving robot addressing **motion blur**. Improved image quality to enhance the detection of keypoints that helps in object tracking.
- Developed a novel image processing algorithm using IMU sensor to predict motion blur kernels for sharp image recovery using Interaction matrix and optical flow.
- Designed novel deep neural network that will take blurred image and predicted kernel input and give deblurred image. Currently conducting experiments and collecting dataset for writing **research paper** for top tier conference.

EXPERIENCE

Novus Hitech Robotics Systems — CAIR-DRDO, Bengaluru, India

Robotics Perception Engineer — 07/2024 - Present

Research and development company focusing on robotics technologies

- **Image Segmentation**: Collected and preprocessed data from web scraping and benchmark datasets in YOLO format. Managed annotation pipeline and trained YOLOv8 model. Converted model to **TensorRT**, OpenVINO and deployed on NVIDIA Jetson for real-time segmentation.
- **Traversability Mapping Module:** Designed and deployed a real-time traversability mapping system on IPC2 (robot PC) and NVIDIA Jetson platforms. Developed a custom **context-aware gridmap fusion algorithm** that intelligently combines LiDAR-based elevation gridmaps with semantic gridmaps derived from segmented camera images. This fusion enables robust traversability estimation by adapting to environmental context, supporting both indoor and outdoor navigation scenarios including staircases and ramps for multi-floor mobility. The system is optimized with **CuPy** for high-throughput GPU acceleration.
- **Sensor Calibration**: Performed camera intrinsic calibration, camera–LiDAR calibration for accurate sensor fusion in perception pipeline.
- **LLM-based Coding Assistant**: Developed an offline chatbot using pretrained **Code LLaMA** via Ollama for coding assistance and debugging in no-internet DRDO labs. Dockerized the application and deployed on PC. Implemented a Streamlit frontend for interactive chatbot communication with integrated chat history management.

Atlas Copco India Ltd — Pune, India

Engineer-Product Management — 11/2020 - 07/2022

- Led cross-functional drawing revisions to mitigate welding spatter contamination in coolers.
- Proficient in mechanical 3D modeling and technical drawing using CAD tools.
- Oversaw compliance alignment and design modifications for UKCA certification of pressurized piston components.

ACHIEVEMENTS

- **Secured 3rd rank in M.Tech within the Inter-Disciplinary Research Platform (IDRP) department at IIT Jodhpur.**

- **Volkswagon Hackathon**
  Built a vision-based vehicle safety system and IMU-triggered airbag deployment along with award based Indian road data collection for autonomous driving.