Devesh Datwani

Email: datwanidevesh@gmail.com
Portfolio: https://deveshdatwani.com
Mobile: +1-978-809-5026
Github: https://github.com/deveshdatwani

Education

- **Worcester Polytechnic Institute** — Worcester, USA
  Masters of Science - Robotics Engineering — *Aug 2021 - May 2023*
  Courses: *Machine Learning, Computer Vision, Robot Dynamics, Artificial Intelligence, Robot Control, AI for Autonomous Vehicles*
- **University of Mumbai** — Mumbai, India
  Bachelor of Engineering - Mechanical Engineering — *Aug 2014 - May 2018*
  Awards: *Young innovator and best thesis award for exemplary research demonstrations of plasma actuators*

Skills Summary

- **Focus**: Computer Vision, Deep Learning, Image Segmentation, Object Detection, SLAM, Augmented Reality
- **Languages**: Python, C, C++, C#. MATLAB
- **Libraries**: PyTorch, OpenCV, Scikit, Keras, TensorFlow, STL, Django, Flask, Numpy, PCL
- **Tools**: ROS, Linux, Docker, Git, PostgreSQL, SQLite

Experience

- **Human Inspired Robotics Lab, WPI** — Worcester, USA
  Research Assistant — *Jan 2023 - Jul 2023*
  Conducted extensive research to improve human-robot collaboration for 7-DOF Kinova-armed mobile manipulator
  Developed augmented reality features in Unity engine with C# that assist shared-control robot teleoperation
  Demonstrated effectiveness of AR cues during teleoperation with 33% reduction in human errors in user studies
- **Worcester Fire Department & WPI** — Worcester, USA
  Graduate Student Researcher — *Aug 2022 - Dec 2022*
  Devised a fire exit safety evaluation system based on Roomba robots in consultation with Worcester Fire Department
  Integrated software stack for SLAM in indoor environments with LDS-01 LIDAR, ICP registration & particle filters
  Implemented change detection algorithm with PCA & K-Means clustering to localize objects in robot-generated maps
  Simulated the system in ROS & Gazebo environment & demonstrated applications to 350,000+ fires in USA annually
- **Popovic Labs, WPI** — Worcester, USA
  Capstone Member — *Sep 2021 - Jan 2022*
  Represented WPI in a team of 15 students at the NASA Big Idea Challenge & built a robot for Martian surface
  Designed and implemented software stack on Arduino micro-controller for quadruped robots to perceive surface tilt
  Wrote complementary & extended Kalman filters with Runge-Kutta method in C++ for robot attitude estimation
- **Admatazz** — Mumbai, India
  Data Analyst — *Dec 2019 - Dec 2020*
  Built web applications for business lead generation with the Django web framework hosted on AWS EC2 servers
  Implemented unsupervised clustering algorithms for customer segmentation for informed & data-driven advertising
  Developed re-marketing tools by deploying object detection deep learning models to analyze customer behavior
  Built back-end application for real time lead acquisition from social media platforms like Reddit & Product Hunt

Projects

- **Deep Image Segmentation With Attention - Github**:
  Developed the U-Net model with attention mechanism for semantic segmentation of Kvasir dataset with PyTroch
  Implemented training pipelines & validated 2.3% improvement in the Dice mean coefficient with attention mechanisms
- **Classical and Deep Image Stitching - Github**:
  Developed Python scripts to create panoramas with Harris corner detection, non-max suppression & RANSAC with OpenCV
  Built HomographyNet from scratch in PyTorch & validated Spatial Transformer Network for homography estimation
- **Deep Pose Estimation - Github**:
  Implemented the Deep Pose paper from scratch to estimate human body pose in 2 dimensional space with TensorFlow
  Observed 12% decrease in MSE by cascading the network through interest region cropping & key-point normalization
- **Task Specific Optimization Of Object Detection Model - Github**:
  Fine-tuned a pretrained mask-rcnn on Tencent traffic sign dataset sampled by synthesizing motion blur, rain & dew effects
  Observed 15% increase in mAP scores through sample redistribution & annotation correction during training
- **Structure From Motion / SLAM - Github**:
  Calibrated a Samsung S22 with Zhang's method & constructed a 3D cloud point of a scene from 2D monocular images
  Implemented Python pipelines for camera pose estimation, non-linear optimization, triangulation, PnP & bundle adjustment
- **Plasma Actuators - Link**:
  Constructed a novel design for plasma-induced wall-bounded jet actuators inside hollow pipes using high-voltage transformers
  Conducted experiments at aerospace facility of IIT & measured 9000 litres/hr airflow without using conventional devices