DHRUV PATEL

OBJECTIVE

Passionate Roboticist & AI(Deep Learning & Deep RL) Enthusiast seeking a research opportunity to utilize my skills, experience & abilities in Robotics and Deep Learning domain.

EDUCATION

National Institute of Technology, Surat. **July 2016-June 2020**
Bachelor of Technology in Electronics and Communication Engineering
CGPA: 8.39/10

LANGUAGES & SKILLS

Languages: C, C++, Python, Java, Embedded C.
Tools & Framework: git, Arduino, TensorFlow (Keras), Pytorch(Beginner).
Technologies: Embedded Systems, Robotics, Computer Vision, Machine Learning,
Soft: Team Work, Project Management

WORK EXPERIENCE

Software Engineering Associate, Amdocs **August 2020 -Present**

- Working on API Enhancement & Development (Java, Microservices, tools such as Jenkins, Maven, Spring etc.) as well as UI Development (React JS) as a part of telecom software delivery to COMCAST

Research Internship, Swaayatt Robots. **April 2020 - July 2020**

Keywords: Robotics, Mathematical Optimization, SLAM, ICP, LiDARs.
Link: Swaayatt Robots Report

- Worked on simulation of Semantic Segmentation of LiDAR scans built upon RangeNet++ and SuMa(Efficient LiDAR-based Semantic SLAM) by Photogrammetry & Robotics Lab, University of Bonn on KITTI Dataset.
- Proposed a variant of ICP(Iterative Closest Point) algorithm for incrementally building maps using semantic information from point cloud data(LiDAR) for Autonomous Driving task. It was tested on Semantic KITTI Dataset and achieved real-time latency of approx. 4 scans/sec. Library used: PCL(Point Cloud Library).
- Received special appreciation from **Mr. Sanjeev Sharma** (Director, CEO & CTO, Swaayatt Robots) for the research work done during the internship.

Summer Internship: Deep Learning, NIT Surat. **May 2019 - July 2019**

Keywords: Face Recognition, Deep Learning.
Link: Face Recognition Report

- Worked under **Dr. K.P Upla**, Assistant Professor, ECED, NIT Surat on "Face Recognition using Deep Learning".
- Worked on different modules like Face Detection, Face Alignment and Recognition tested on a custom-made dataset of 25 students of over 100 facial images.

Executive Member, DRISHTI (Technical Club, NIT Surat). **July 2017 - June 2019**

- Represented NIT Surat at National Robotics Contest Robocon 2018 & 2019.
- Developed mini embedded projects - RFID based Identification, Real Time Digital Clock, Wireless Remote Control Mobile Robot etc. for learning purpose along with helping fellow team members.

PROJECTS / SEMINAR

Research Project: Unsupervised Image Super Resolution: **Aug 2020 – Dec 2020**

Keywords: GANs, Deep Learning, Super Resolution Link: Unsupervised Image Super Resolution

- Worked under Dr. K.P. Upla, Assistant Professor, ECED, NIT Surat.
- Worked on different modules such as patch GANs, triplet loss optimization, edge score based correspondence weighing in Discriminator, etc. for an unsupervised GAN based approach towards super resolution problem. The network scored 0.283 lpips metric on Real World SR Challenge Dataset.

UG Project- Autonomous Agricultural Robot (TEQIP III Sponsored): **Oct 2019 – June 2020**

Keywords: Robotics, Deep Learning, Sensor fusion, Autonomous Navigation, NVIDIA Jetson Nano.
Link: github.com/Dhruv2012/Autonomous-Farm-Robot

- Worked under **Dr. A.D. Darji**, HOD, ECED, NIT Surat on a Robot that autonomously navigate through the fields and is able to perform vision task - Crop Weed Classification which is a major problem in the field of farming.
- Neo M8N GPS and IMU 9265 are integrated through ROS on the onboard processor Nvidia Jetson Nano which would provide command signals to the slave controller Arduino Mega for driving the 4 wheel Skid-Steer Drive.
- Modelled and simulated different sensors like GPS, IMU, Magnetometer and Camera in Gazebo and tested Teleoperation & Autonomous Navigation of the robot in Gazebo as further development in hardware was not possible due to COVID-19 pandemic.
- Implemented and tested 2 segmentation models: UNet and Bonnet for Crop Weed Classification task. Bonnet Model was chosen over UNet due to its better class-wise prediction on CWFID & Bonn datasets and 100x lesser parameters. Final Bonnet model achieved 96.48% accuracy and 0.0168 units loss on CWFID whereas 99.471% mean accuracy, 98.035% mean iou and loss of 0.0035 units on Bonn dataset. Real-time latency of model is avg. 2.5 fps on i7 + NVIDIA 940MX which makes it possible to deploy for real-case scenarios.

UG Seminar/Thesis - Computer Vision for Farm Robot:

Keywords: Computer Vision, Deep Learning, Robotics, Agriculture, Image Segmentation, Classification
Link: Seminar Report - Computer Vision for Farm Robot

- Worked on a Seminar Report under **Dr. A.D. Darji**, HOD, ECED, NIT Surat which focuses on the system design of machine vision for automating the tasks of Farm Robot as a part of Robotic Vision.

National Robotics Contest ROBOCON **Aug 2017 - June 2019**

Keywords: Robotics, Odometry, Path Planning, RaspberryPi, Control System, Image Processing, Computer Vision, Team Work, Embedded Systems.
Link: Robocon 2018 Report & Robocon 2019 Design Documents

- Worked in a team of 15-20 to design, manufacture and develop control systems for 4 Legged & Omni-Drive Robots and to achieve specific tasks according to the problem statement of the competition.
- Developed Line Following, Path planning and Odometry of Omni-Drive Robots & Vision system for Colour Detection using onboard processor Raspberry Pi in real-time. Cameras were interfaced with RaspberryPI 3B while all the other sensors with Arduino Mega which also controlled motor drivers & actuators.
- Worked on building software for Omni-Drive of 3 & 4 wheel Robots. Interfaced LSA08 line sensor, IMU, wheel encoders etc. for controlling the robot.

MOOCS

- Deep Learning and Applications, Webinar, One Week FDP, Ministry of Electronics & Information Technology (MEITY), Govt. of India, jointly organized by IIT Roorkee, IIT Guwahati, MNIT Jaipur, NIT Patna, IITDM Jabalpur.
- Deep Learning Specialization, Coursera
- Fundamentals of Reinforcement Learning, University of Alberta, Coursera.

- Machine Learning, Stanford University, Coursera (Status: Ongoing).
- Academic & Business Writing, UC Berkeley.

ACHIEVEMENTS

- **Robocon 2018(Aug 2018 – March 2019):** 12th rank among 107 teams at the National Robotics Contest held at MIT, Pune.
- **Robocon 2019(Aug 2019 – June 2019):** 13th rank all over India in the final round at the National Robotics Contest held at IIT Delhi clearing 2 rounds of Design Details Document and Video Submission among over 100 teams from different universities.
- **Best Model - Stirling Engine:** Awarded the best working model for National Science Day Celebrations at Physical Research Laboratory (PRL), Ahmedabad.

INTERESTS

- Artificial Intelligence
- Deep Learning & Deep Reinforcement Learning
- Robotics & Computer Vision