Arihant Gaur

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Experience

Mitsubishi Electric Research Laboratories (MERL) August 2022 – Present
Research Intern *Cambridge, MA, United States*

- Under supervision of Prof. Pedro Miraldo [Link]
- Working on implicit neural representation of 3D objects

Instituto Superior Técnico May 2021 – May 2022
Research Intern *Lisbon, Portugal*

- Under supervision of Prof. Pedro Miraldo [Link]
- Worked on 3D Pointcloud registration, 3D segmentation of Pointclouds using PointNet related architectures, and single image planar reconstruction

IvLabs, VNIT May 2019 – July 2019
Summer Intern *Nagpur, India*

- Developed a method for controlling laptop mouse using facial gestures as an aid for physically disabled people
- Published and recognized in Springer Journal - Advances in Intelligent Systems and Computing and presented at an international conference (SoCPaR 2019)

Education

Visvesvaraya National Institute of Technology 2018 – 2022
Bachelor of Technology in Electrical and Electronics Engineering (CGPA: 9.31/10, Rank: 2/138) *Nagpur, India*

Sheth N.K.T.T. College of Commerce and Science 2018
Science Stream (HSC, Percentage: 88.3%) *Thane, India*

Hiranandani Foundation School 2016
Science Stream (ICSE, Percentage: 96.5%) *Thane, India*

Projects

Open-Set Multi-Source Multi-Target Domain Adaptation [Paper][Video]
October 2021 – March 2022

- Designed a novel approach for domain adaptation of multiple target domains from source domains, without knowing exact label sets of the target
- Accepted at the pre - registration workshop, NeurIPS'21 [Link]

Visual Odometry
March 2020 – May 2020

- Designing a pipeline for estimating the current location of the vehicle using a monocular camera as the only sensor, useful in robot localization and mapping (in conjunction with autonomous systems)
- Implemented 2D - 2D and 3D - 2D visual odometry using classical vision techniques

Structure from Motion (SfM) [Code]
July 2020 – September 2020

- Implemented camera pose estimation in world coordinates and sparse 3D reconstruction of an ordered set of images and known calibration matrix, to enable mapping of an environment for robot perception and visual localization

Indian Number Plate Detection and Recognition using a Single Camera [Code][Video]
May 2020 – July 2020

- Trained YOLOv4 for detection, on a mix of Indian number plates from Kaggle and manually annotated images
- One of the winners of the Smart India Hackathon (Software Edition 2020), winning a cash prize of Rs.100,000

Image Stitching and Panorama [Code]
December 2019 – February 2020

- Developed and implemented a pipeline for generating a panorama from the camera footage of a room (known calibration matrix)
- Stitched images with homography matrix for partial panorama and translational stitching for cylindrical panorama

Semantic Segmentation using U - Net Architecture [Code]
January 2021

- Designed a pipeline for pixel-wise semantic segmentation using ResNet18 based architecture, to obtain semantics from camera feed, for perception of robots and autonomous vehicles
- Using the CamVid dataset, the framework was trained and tested

Stereo Dense Reconstruction [Code]
July 2020

- Created a dense 3D reconstruction from a pair of images using two-view stereo, for understanding stereopsis

Health Estimation of an Electrical Machine Using an Optimal Estimator [Draft]
July 2021 – May 2022

- Developed and implemented various estimators for determining health of a three phase distribution transformer as a part of my Bachelor's thesis

Publications

Arihant Gaur, Akshata Kinage, Nilakshi Rekhawar, Shubhan Rukmangad, Rohit Lal and Shital Chiddarwar, **"Cursor Control Using Face Gestures"** in *11th International Conference on Soft Computing and Pattern Recognition (SoCPaR 2019), Hyderabad, India* [Paper][Code][Website]

Rohit Lal, Arihant Gaur, Aadhithya Iyer, Muhammed Abdullah Shaikh, Ritik Agrawal and Shital Chiddarwar, **"Open-Set Multi-Source Multi-Target Domain Adaptation"** in *35th Pre-registration workshop (NeurIPS 2021), Remote.* [Paper][Code][Website]

Technical Skills

Languages: Python, C/C++, MATLAB+Simulink
Software Tools: PyTorch, LaTeX, Git, COLMAP
Libraries: NumPy, SciPy, Matplotlib, OpenCV, Open3D, Pandas, scikit-learn

Relevant Courses

Degree Courses:

MAL101, MAL102: Single and Multivariable Calculus, Matrix Theory, Infinite Series and Ordinary Differential Equations [Link1, Link2]
MAL201: Integral Transforms and Partial Differential Equations [Link]
MAL205: Numerical Methods and Probability Theory [Link]
MAL407: Statistics and Optimization Techniques [Link]
EEL202: Signals and Systems [Link]
EEL305: Control Systems - I [Link]
EEP208: MATLAB Programming and Simulation [Link]
EEL412: Digital Signal Processing and its Applications [Link]
EEL418: Control Systems - II [Link]

Supporting Courses:

Introduction to Computer Vision: Aaron Bobbick (Udacity)[Link]
Digital Image Processing: NPTEL [Link]
Photogrammetric Computer Vision: Cyrill Stachniss [Link]

Achievements

- Bagged first prize at the Smart India Hackathon, 2020 (Software Edition, Team IvLabs)
- Received Academic Excellence Prize for securing 2nd highest CGPA in B.Tech. Electrical and Electronics Engg. program (2018 – 2022)
- Received Academic Excellence Prize for exhibiting the best performance in the 3rd year of B.Tech. Electrical and Electronics Engg. program

Extracurriculars

At VNIT:

- Core Member at IvLabs [Link], Robotics and AI Lab of VNIT, Nagpur
- Conducted workshops on Image Processing under IEEE VNIT Student Branch with more than 100 students
- Mentor Coordinator at Avanti Fellows VNIT Chapter
- Elected as a student mentor for 15 freshmen on college and academic related issues