Arihant Gaur

arihant.gaur@gmail.com | LinkedIn | GitHub | Website

Experience

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

- Working on holistic 3D scene understanding by plane segmentation on 2D wireframes, for obtaining an accurate 3D representation of the scene

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)

Key Achievements

August 2020: Secured 1st position in Smart India Hackathon 2020, a nationwide competition conducted by the Government of India
December 2019: Presented a paper at SoCPaR 2019 in Hyderabad, India and published in Springer Journal
May 2016: Bagged Governor's Gold Medal for class X examinations

Education

Visvesvaraya National Institute of Technology 2018 – Present
Bachelor of Technology in Electrical and Electronics Engineering (CGPA: 9.25/10, Rank: 3/138) *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*

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]

Projects

Visual Odometry
March 2020 – Present

- 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
- Developing an end-to-end deep learning pipeline for visual odometry

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
- Recognized as 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, to understand the working of stereopsis
- Stereo rectification is performed using epipolar geometry with SIFT feature matching and then making epilines parallel

Health Estimation of an Electrical Machine Using an Optimal Estimator

July 2021 – Present

- Developing an estimator for the health of a three phase transformer using fuzzy logic and artificial neural network, as a part of my Bachelor's thesis

Technical Skills

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

Relevant Courses

Degree Courses:

MAL101, MAL102: Single and Multivariable Calculus
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]

Supporting Courses:

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

Extracurriculars

- Core Member at IvLabs, 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