# Arihant Gaur

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## Experience

**Metacube Software Pvt. Ltd.** October 2023 –
*Contractor* *Remote (from Germany)*

- Designed and implemented pipeline to parse movies using computer vision algorithms, whose semantics are used by LLMs for downstream tasks such as scene description and retrieval based on given prompt
- Current work involves automating commentary and scorecard for cricket matches using 3D skeletal human pose estimation and action recognition

**Mitsubishi Electric Research Laboratories (MERL)** August 2022 – March 2023
*Research Intern* *Cambridge, MA, United States*

- Collaborated on cutting edge 3D computer vision research under supervision of Prof. Pedro Miraldo [Link]
- Proposed novel geometric encoder for structured 3D implicit representations. Work was published at 3DV 2024 conference in Davos, Switzerland

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

- Worked on research projects related to 3D pointcloud registration and segmentation using PointNet related architectures, under supervision of Prof. Pedro Miraldo [Link]

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

**Universität des Saarlandes** 2024 –
*Masters of Science in Visual Computing* *Saarbrücken, Germany*

**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*

## Publications

Arihant Gaur, G. Dias Pais, Pedro Miraldo, **"Oriented-grid Encoder for 3D Implicit Representations"** in *International Conference on 3D Vision (3DV 2024), Davos, Switzerland* [Paper]

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]

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]

## Relevant 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

**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

## Technical Skills

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

## Relevant Courses

**Bachelor's courses:**

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

**Master's Courses (ongoing):**

**Image Processing and Computer Vision**: Prof. Joachim Weickert [Link]
**High-Level Computer Vision**: Prof. Bernt Schiele [Link]
**Machine Learning**: Prof. Isabel Valera [Link]
**Convex Analysis and Optimization**: Prof. Peter Ochs [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