

# Gopi Krishna Erabati

SOFTWARE ENGINEER, PERCEPTION | PHD

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*"Arise, awake and stop not till the goal is reached." -Swami Vivekananda*

## Experience

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Berlin, Germany

SOFTWARE ENGINEER, PERCEPTION

Jan. 2025 - Present

- Lead ML/Data initiatives for the perception stack of off-highway autonomous vehicles in harsh environments
- Developed a multimodal, multitask semantic occupancy prediction network from scratch using LiDAR/Radar–Camera fusion data
- Enhanced network performance and throughput by 15% while reducing data-loading latency by 20%

### Institute of Systems and Robotics (ISR)

Coimbra, Portugal

RESEARCHER

Jan. 2019 - Dec. 2024

- Designed novel algorithms for *Scene Understanding for Autonomous Driving*
- Improved performance ( $3\times$  speedup) and robustness in adverse weather for small-object detection by developing novel LiDAR-based and LiDAR–camera fusion 3D object detection approaches
- Achieved real-time inference (112 FPS) on NVIDIA Jetson edge GPU for panoptic driving perception and developed LiDAR-based 3D semantic segmentation, improving accuracy for distant objects in sparse LiDAR point clouds using retention

### Laboratory for Analysis and Architecture of Systems (LAAS - CNRS)

Toulouse, France

RESEARCH INTERN

Feb. 2018 - July 2018

- Designed a novel approach for 3D object detection and relative localization using a 3D sensor embedded on a mobile robot and Integrated the proposed module with ROS
- Designed a novel approach for forest fire mapping from low altitude aerial imagery

## Skills

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**Areas** Machine Learning, Computer Vision, 3D Perception, Deep Learning (CNNs, Transformers, VLMs)

**Libraries** PyTorch, Keras, TensorFlow, OpenCV, PCL, NumPy, Scikit-learn, ONNX, TensorRT, ROS, mmdetection

**Programming & Tools** Python, C++, MATLAB, VHDL, LaTeX, Git, Docker, CI/CD

**Languages** English, Telugu, Hindi, Portuguese (Elementary)

## Education

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### University of Coimbra

Coimbra, Portugal

DOCTOR OF PHILOSOPHY (PHD)

Sept. 2019 - Feb. 2025

- Thesis: *Learning to Perceive: Scene Understanding for Autonomous Driving*
- Part of EU H2020 Marie Skłodowska-Curie Actions Innovative Training Network ACHIEVE
- Supervisor: Prof. Helder Araújo

### Université de Dijon

Le Creusot, France

MASTER OF SCIENCE IN COMPUTER VISION (ERASMUS VIBOT)

Sept. 2016 - Aug. 2018

- Thesis: *3D object detection and relative localization using a 3D sensor embedded on a mobile robot*
- Courses: Visual Perception, Machine Learning, Probabilistic Robotics, Autonomous Robotics
- Grade: 15.0/20.0 (Rank: 2/16)

### Kakatiya University

Warangal, India

BACHELOR OF TECHNOLOGY IN ELECTRONICS AND INSTRUMENTATION ENGINEERING

Oct. 2009 - June 2013

- Thesis: *Development of quadcopter for search and rescue in natural disasters*
- Grade: 89.8 % (Rank: 1/66)
- Received Gold Medal for excellence in academics

## Projects and Training

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### PROJECTS

 (Click here for more details)

- Human Activity Recognition in Videos
- Mapping, Autonomous Navigation and Localization of Turtlebot using ROS
- Development of Computer Vision Toolbox in C++ and MATLAB using OpenCV
- Development of 3D Scanner using Kinect and PCL
- Development of Face Recognition software using PCA

## TRAINING

- Attended **Oxford Machine Learning Summer School** (OxML 2023) at University of Oxford, UK
- Deep Learning Specialization taught by Prof. Andrew Ng on Coursera
- Attended AI-DLDA 2020 International Summer School on Artificial Intelligence at Università di Udine, Italy
- Presented at ICRA 2025, WACV 2023, ICPRW 2022, ROBOVIS 2024, RECPAD 2021, DICTA 2020, ICDSC 2019

## Publications

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### **SCAM-P: Spatial Channel Attention Module for Panoptic Driving Perception**

G. K. Erabati, H. Araujo

*2025 IEEE International Conference on Robotics and Automation (ICRA), 2025*

### **RetFormer: Embracing Point Cloud Transformer with Retentive Network**

G. K. Erabati, H. Araujo

*IEEE Transactions on Intelligent Vehicles (IEEE T-IV), 2024*

### **SRFDet3D: Sparse Region Fusion based 3D Object Detection**

G. K. Erabati, H. Araujo

*Neurocomputing 593, 2024*

### **RetSeg3D: Retention-based 3D Semantic Segmentation for Autonomous Driving**

G. K. Erabati, H. Araujo

*Computer Vision and Image Understanding (CVIU), 2024*

### **Li3DeTr: A LiDAR Based 3D Detection Transformer**

G. K. Erabati, H. Araujo

*IEEE/CVF Winter Conference on Applications of Computer Vision (WACV), 2023*

### **MSF3DDETR: Multi-Sensor Fusion 3D Detection Transformer for Autonomous Driving**

G. K. Erabati, H. Araujo

*ICPR 2022 workshop on Deep Learning for Visual Detection and Recognition (DLVDR), 2022*

### **DeLiVoTr: Deep and light-weight voxel transformer for 3D object detection**

G. K. Erabati, H. Araujo

*Intelligent Systems with Applications 22, 2024*

### **DDet3D: Embracing 3D Object Detector with Diffusion**

G. K. Erabati, H. Araujo

*Applied Intelligence, 2024*

### **DAFDeTr: Deformable Attention Fusion Based 3D Detection Transformer**

G. K. Erabati, H. Araujo

*Robotics, Computer Vision and Intelligent Systems (ROBOVIS), 2024*

### **SL3D - Single Look 3D Object Detection based on RGB-D Images**

G. K. Erabati, H. Araujo

*2020 Digital Image Computing: Techniques and Applications (DICTA), 2020*

### **MOSNet: A lightweight Moving Object Segmentation Network for Autonomous Driving**

G. K. Erabati, H. Araujo

*RECPAD 2021 - 27th Portuguese Conference on Pattern Recognition, 2021*

### **Dynamic Obstacle Detection in Traffic Environments**

G. K. Erabati, H. Araujo

*13th International Conference on Distributed Smart Cameras, 2019*

### **Object Detection in Traffic Scenarios - A Comparison of Traditional and Deep Learning Approaches**

G. K. Erabati, N. Gonçalves, H. Araujo

*9th International Conference on Advanced Information Technologies and Applications (ICAITA 2020), 2020*

## Honors & Awards

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2021	<b>FCT PhD Scholarship Grant</b> , Fundação para a Ciência e a Tecnologia	Portugal
2019	<b>Marie Skłodowska-Curie Fellowship Grant</b> , European Commission	Portugal
2014	<b>Junior Research Fellowship Grant</b> , Defence Research and Development Organization	India
2013	<b>Gold Medalist</b> , Kakatiya University	India
2013	<b>Featured in the Roll of Honor Board</b> , Kakatiya Institute of Technology and Science	India