


# KARLO KOLEDIĆ

Computer Vision and Robotics Researcher

 [koledickarlo.github.io](https://github.com/koledickarlo)

 Zagreb, Croatia

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## RESEARCH INTERESTS

My research is focused on applications of deep learning methods in state estimation and 3D perception for robotics

**Computer Vision:** Monocular Depth Estimation, 3D Reconstruction, Domain Generalization, Multi-view Geometry

**Robotics:** Sensor Fusion, Visual Odometry, SLAM, nonlinear optimization,

## EXPERIENCE

### Researcher

*Faculty of Electrical Engineering and Computing*

March 2021 – Present

*Zagreb, Croatia*

- Developed a novel visual odometry algorithm, outperforming all state-of-the-art methods on the KITTI dataset
- Created a novel monocular depth estimation method, enabling generalization for arbitrary camera parameters
- Coursework: Estimation Theory, Robotic Sensing, Perception and Actuation, Autonomous Mobile Robots
- Creating and conducting exams and exercises, mentoring students during projects and master theses

### R&D student intern

*Visage Technologies AB*

August 2020 – March 2021

*Zagreb, Croatia*

- Research and development of EKF/UKF with state constraints
- Worked in a team focused on multiple object tracking for a major automobile company

### Deep learning intern

*RealNetworks, Inc.*

July 2018 – July 2019

*Zagreb, Croatia*

- Implemented face detection/face recognition networks in native CUDA/cuDNN/cuBLAS code. Achieved a 2.5 times faster performance than the TensorFlow CUDA implementation
- Implemented face detection algorithm for Android NDK using TensorFlow Lite
- Research on various frequency and movement based techniques for face liveness detection
- Generated synthetic data in MakeHuman/Blender and implemented a face pose estimator in TensorFlow

## EDUCATION

### Ph.D. in Electrical Engineering and Computer Science

*University of Zagreb*

Feb 2022 – Present

### M.Sc. in Electrical Engineering (Robotics)

*University of Zagreb*

Sep 2018 – July 2021

- Took additional 60 ECTS focused on machine learning and computer vision

### Student exchange

*Politecnico di Milano*

Sep 2019 – July 2020

### B.Sc. in Computer Science

*University of Zagreb*

Sep 2015 – July 2028

## PUBLICATIONS

### GenDepth: Generalizing Monocular Depth Estimation for Arbitrary Camera Parameters via Ground Plane Embedding

Karlo Koledić, Luka Petrović, Ivan Petrović, Ivan Marković

under review in International Journal of Computer Vision (IJCV)

### Moft: Monocular odometry based on deep depth and careful feature selection and tracking

Karlo Koledić, Igor Cvišić, Ivan Marković, Ivan Petrović

2023 International Conference on Robotics and Automation (ICRA)

### Towards Camera Parameters Invariant Monocular Depth Estimation in Autonomous Driving

Karlo Koledić, Ivan Marković, Ivan Petrović

2023 European Conference on Mobile Robots (ECMR)

## SKILLS

**Programming:** Python, C++, Java, MATLAB, bash  
**Software:** Linux, Git, Docker, Numpy, PyTorch, TensorFlow, CVX, ROS, OpenCV, CUDA, LaTeX, Eigen  
**Languages:** Croatian (native), English (C1-C2), German (B1)

## AWARDS

### Rector's Award for best project

*Dental State Estimation using Deep Learning*

- Analyzed dental images to predict biological traits with the accuracy of 98% and age with a median error of 3 years.
- Assessed dental state via object detection and classification