# Karlo Koledić

**Personal information**
Date of Birth: 12/12/1996
Nationality: Croatian

**koledickarlo.github.io**

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## RESEARCH INTERESTS

- Deep learning applications in 3D perception and state estimation

## WORK EXPERIENCE

### RealNetworks, Inc. — Intern focused on deep learning in computer vision
July 2018 – July 2019 — Zagreb, Croatia

- Implementation of the face detection/face recognition networks in native CUDA/cuDNN/cuBLAS code. Achieved 2-3 times faster performance than TensorFlow CUDA implementation.
- Implementation of face detection for Android NDK using TensorFlow Lite.
- Research on the face liveness detection using various frequency and movement based techniques.
- Development of the face pose estimator in TensorFlow.

### Visage Technologies AB — R&D student intern
August 2020 – March 2021 — Zagreb, Croatia

- Research and development of EKF/UKF with state constraints.
- Working on various parts of the level 3 autonomous driving software for major automobile company.

### Faculty of Electrical Engineering and Computing — Researcher
March 2021 – Now — Zagreb, Croatia

- **Research areas**:
  - State Estimation, Visual Odometry, SLAM
  - Deep Learning for 3D Perception, Monocular Depth Estimation, NeRF, Gaussian Splatting
  - Domain Adaptation, Domain Generalization
- **Teaching assistant:**
  - Estimation Theory
  - Robotic Sensing, Perception and Actuation.
  - Autonomous Mobile Robots

## PUBLICATIONS

- Karlo Koledić, Igor Cvišić, Ivan Marković, Ivan Petrović, "**MOFT: Monocular Odometry based on Deep Depth and Careful Feature Selection and Tracking**" in **Internetional Conference on Robotics and Automation (ICRA)**, 2023.
- Karlo Koledić, Ivan Marković, Ivan Petrović, **"Towards Camera Parameters Invariant Monocular Depth Estimation in Autonomous Driving**" in **European Conference on Mobile Robots**, 2023
- Karlo Koledić, Luka Petrović, Ivan Petrović, Ivan Marković, "**GenDepth: Generalizing Monocular Depth Estimation for Arbitrary Camera Parameters via Ground Plane Embedding", under review in International Journal of Computer Vision (IJCV),**

## EDUCATION

### B.S. in Computer Science
University of Zagreb, September 2015. – July 2018.

### M.S. in Electrical Engineering, track Automation and Robotics
University of Zagreb, September 2018. – July 2021.

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

### Ph.D. in Electrical Engineering and Computer Science, track Automation and Robotics
University of Zagreb, February 2022. - Now

### Student Exchange
Politecnico di Milano, Italy, September 2019. – July 2020.

## CORE SKILLS

- **Programming:** C++, Python, Java, MATLAB, bash
- **Software:** Linux, Git, Docker, Numpy, PyTorch, TensorFlow, CVX, Eigen, CUDA/cuDNN, LaTeX, ROS
- **Deep Learning:** dense prediction, implicit representations, domain generalization, sim2real, multi-view geometry
- **Robotics:** SLAM, visual odometry, state estimation, MPC, nonlinear optimization
- **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 sex with success of 98% and age with a median error of 3 years.
- Assessed dental state via object detection and classification