


KARLO KOLEDIĆ

Computer Vision and Robotics Researcher

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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