MIROSLAV PURKRABEK

Computer Vision Researcher & Sports Coach

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SELECTED PUBLICATIONS

For the full list, see my website – MiraPurkrabek.github.io

Detection, Pose Estimation and Segmentation for Multiple Bodies: Closing the Virtuous Circle
ICCV 2025
Three small specialized models, each conditioned by the others, form a self-improving loop: *BBox-Mask-Pose*. The loop improves consistency of different representations, beats large foundation models and sets a new SOTA on OCHuman.

ProbPose: A Probabilistic Approach to 2D Human Pose Estimation
CVPR 2025
ProbPose introduces a probabilistic modeling with calibrated probability maps and a presence probability, which handle partially visible individuals better and reduce false positive predictions. Using out-of-image keypoints is necessary for more reliable modeling of the underlying distribution and robust evaluation.

Improving 2D Human Pose Estimation in Rare Camera Views with Synthetic Data
Face and Gestures 2024 Best Poster Award
RePoGen, a novel method for the generation of synthetic humans in unusual poses, is not focused on realisticity but the diversity of generated poses. Training on RePoGen data significantly improves accuracy for rare viewpoints without compromising performance on common views.

EXPERIENCE

Researcher
Visual Recognition Group, Czech Technical University in Prague
February 2019 – Ongoing Prague, CZ
- Specialized in analyzing the human body, including Pose Estimation, 3D Shape, and UV Map estimation, along with detection and segmentation
- Co-supervised more junior colleagues in writing their first papers
- Managing the annotation process for our team of annotators
- Supervised by prof. Jiri Matas

Research Assistant
Visual Cognitive Systems lab, University of Ljubljana
October 2018 – March 2019 Ljubljana, SLO
- Initial experience in computer vision research during my Erasmus stay
- Supervised by prof. Matej Kristan

Head Coach + Assistant Coach
TJ Sokol Kralovske Vinohrady
August 2017 – Ongoing Prague, CZ
- Leading a floorball team to the quarterfinals of the highest Czech league

Software Developer
Porsche Engineering Services
March 2020 – July 2022 Prague, CZ
- Developed Porsche's (then) most powerful supercharger

IN ONE SENTENCE

I enjoy connecting basic research with real-world applications.

MOST PROUD OF

Found a way
to combine my two big passions: computer vision and sports

SKV's Growth
from the second league to the top 8 teams in Czech

Best Poster Award
for my communication and presentation skills

RESEARCH FOCUS

Human 2D Pose, 3D Pose and Shape
Human Body UV Map Estimation
Person Detection and Segmentation

LANGUAGES

Python
C
C++

ACTIVITIES

Invited Talks
CVWWs 24 and 25, SCCH Research Day

Co-organized and Talked at
Ai4Sports 2024

Outstanding Reviewer
CVPR 2025

Summer Schools
ICVSS 2025, V3S 2022

EDUCATION

Ph.D. in Computer Science
Computer Vision, AI
Czech Technical University in Prague
Feb 2023 – Ongoing

M.S. in Computer Science
AI, Computer Vision, Cyber Security
Czech Technical University in Prague
Oct 2020 – June 2022

Erasmus – University of Ljubljana, SI

PROJECTS

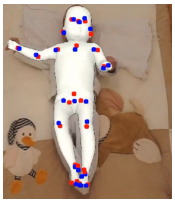
For more details and latest information, see my website – **MiraPurkrabek.github.io**

Set of Forensic Analytical Tools for Image and Video Processing for Criminal Police Service

The project, a collaborative effort with VUT (Brno University of Technology), involves creating a suite of advanced forensic tools for the Czech Republic Police, funded by the Ministry of Interior. These tools focus on the automatic processing of images and videos, specifically using human poses to enhance the efficiency and accuracy of criminal investigations.

Modeling Infant Sensorimotor Development

The project led by Matej Hoffman focuses on the behavior of infants to gain a deeper understanding of human development. My contribution to this project involves the precise estimation of 2D poses of babies in videos, a crucial aspect that helps in analyzing and interpreting infant movements and interactions. This work is part of a larger effort to model human behavior, particularly in the early stages of life, providing valuable insights for various applications.

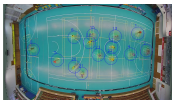


Detection, Identification and Monitoring of Animals by Advanced Computer Vision Methods

The project led by Lukas Picek from University of West Bohemia focuses on the identification of wild animals (especially lynxes) in camera trap images. My contribution to this project involves the estimation of 2D poses of animals, which improves identification accuracy as each animal has a different texture on each side. The project is part of a larger effort to protect the environment using computer vision and AI.

Advanced Video Analysis for Floorball Player Tracking

This project extends my long-standing interest in sports analysis, a journey that began with my bachelor thesis and evolved through my master's work. The aim is to harness video analysis to gain insight into player movements and team dynamics, enhancing coaching strategies and game understanding.



PoseAnnotator

A lightweight, local alternative to CVAT and LabelStudio. Originally developed to create the RePoGen dataset, we have since used it for multiple datasets. This easy-to-use Python tool features a simple GUI for annotating 2D human poses in images. Ideal for researchers and developers, PoseAnnotator simplifies the data labeling process for human pose estimation projects. Our research group already used it not only for annotating pose but also for other structured keypoints like facial landmarks.