DAVID HONZÁTKO

dawyd.d@gmail.com — +420774078076
PhD Candidate working in machine learning and computer vision,
with a focus on photometric stereo and defect detection

EDUCATION

EPFL - École polytechnique féd'erale de Lausanne 2018 - 2024
CSEM - Centre Suisse d'Electronique et de Microtechnique, Neuchâtel
PhD Candidate in Computer Science
Thesis title: Aggregating Spatial and Photometric Context for Photometric Stereo
Supervisor: Prof. Pascal Fua, Computer Vision Laboratory (EPFL)
Co-supervisor: Dr. Engin Türetken, Edge AI & Vision Lab (CSEM)
Selected courses: machine learning, computer vision, advanced computer graphics

Charles University in Prague 2016 - 2018
Master Student in Artificial Intelligence at Faculty of Mathematics and Physics
Thesis title: Generative Neural Networks in Image Reconstruction, Supervisor: Dr. Michal Šorel
Selected courses: signal and image processing, computer vision, machine learning, artificial intelligence, neuroscience

University of Ljubljana 2015 - 2016
Exchange Student at Faculty of Computer and Information Science
Selected courses: digital signal processing, biomedical signal and image processing, bioinformatics, cryptography

Charles University in Prague 2011 - 2015
Bachelor Student in General Computer Science at Faculty of Mathematics and Physics
Thesis title: GPU Acceleration of Advanced Image Denoising: Prof. Martin Krulisš
Selected courses: calculus, algebra, discrete mathematics, probability and statistics, C++, parallel computing, data structures, digital image processing

PUBLICATIONS

[1] **Honzátko, David**, Engin Türetken, L Andrea Dunbar, and Pascal Fua. A spatio-photometric neural architecture for photometric stereo with rendering in the training loop. In *Sumitted to ECCV*, 2024.

[2] **Honzátko, David**, Engin Türetken, Pascal Fua, and L. Andrea Dunbar. Leveraging spatial and photometric context for calibrated non-lambertian photometric stereo. In *3DV*, 2021.

[3] **Honzátko, David**, Engin Türetken, Siavash A Bigdeli, L Andrea Dunbar, and Pascal Fua. Defect segmentation for multi-illumination quality control systems. *Machine Vision and Applications*, 2021.

[4] **Honzátko, David**, Siavash A Bigdeli, Engin Türetken, and L Andrea Dunbar. Efficient blind-spot neural network architecture for image denoising. In *Swiss Conference on Data Science (SDS)*, 2020.

[5] Siavash Bigdeli, **Honzátko, David**, Sabine Süsstrunk, and L Andrea Dunbar. Image restoration using plug-and-play cnn map denoisers. In *VISIGRAPP*, 2020.

[6] **Honzátko, David** and Martin Kruliš. Accelerating block-matching and 3D filtering method for image denoising on GPUs. *Journal of Real-Time Image Processing*, 2017.

WORKING EXPERIENCE

CSEM - Centre Suisse d'Electronique et de Microtechnique 2018 - 2023
PhD Candidate at Edge AI & Vision Group, Neuchâtel, Switzerland (full-time position)
Basic and applied research in photometric stereo, collaboration on industrial projects, acquisition and management of a few small industrial projects

CAS - Czech Academy of Sciences 2018
Research assistant at the Department of Image Processing (part-time position)
at the Institute of Information Theory and Automation, Prague, Czech Republic
Basic research on conditional image generation

ARSIQA system 2012 - 2018
C# Developer in a small team of programmers, Mníšek pod Brdy, Czech Republic (part-time position)
Development of a desktop application and an API for production scheduling software

INDUSTRIAL PROJECTS

Sewer pipes inspection CSEM & Ville de Lausanne (2022)
At CSEM I've collaborated on acquisition, management and execution of a project, where the objective was to detect defects in CCTV videos from sewage pipe inspections. We used older inspection videos with textual annotations to train deep learning algorithms to automatically detect and classify defects.
Challenges: Cleaning, processing, and balancing the data; filtering out detailed defect inspections to avoid overfitting to the operator's commands; the subjectivity of the annotations. Presented at EURO-SAM 2023 workshop.

Optimal illumination conditions for highlighting defects on watch parts CSEM & watch-maker (2021)
For watch parts with highly anisotropic reflectance properties, we were looking for illumination conditions that would highlight all possible aesthetic defects. The outcome of the project was a photometric-stereo-based hardware setup for acquiring informative images of watch parts.

High-accuracy real-time OCR for tracking steel billets CSEM & SMS Concast (2020-2023)
For steel billets with freshly embossed IDs, we were looking for a suitable acquisition setup maximizing the contrast of the embossed ID and minimizing the hardware and maintenance price. We have created an over-specified photometric-stereo-based setup, acquired and annotated a dataset, and developed a deep-learning-based algorithm that can correctly classify 99.8% of steel billets using just two illuminators. To be presented at Photonics West 2024.

SKILLS

Programming	Python, TensorFlow, PyTorch, C++, CUDA, C#, ...
Languages	English (C1), Czech (Native), French (B1)

MISCELLANEOUS

- Co-organizer of a nautical summer camp for children
- Hobbies: Outdoor activities in general