

# Maciej Ziaja

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## Experience

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Since October  
2020

KP LABS, Gliwice

**Machine Learning Software Engineer** – Development and prototyping of deep neural networks for image processing with Python, deployment on embedded Linux devices with C++.

- Involved in creation of several deep learning image processing models for segmentation (roads, buildings, clouds, etc.), regression (arctic ice cover properties), and super-resolution (single-image, multi-image, pansharpening) in satellite imagery. Responsible for data management, preprocessing, training pipelines, model architecture (CNN, Transformers, GANs), and optimization.
- Designed neural networks deployment and benchmarking processes for AI-capable satellite mission Intuition-1. Enabled on-board neural network inference hardware acceleration utilizing *Xilinx's Vitis AI* framework in Python and C++. The satellite platform equipped with the deep learning models currently operates in-orbit.
- Maintained in-house data processing and experimentation MLOps systems based on DVC, MLflow, Docker, and Jenkins. Deployed selected deep learning models in cloud using Kubernetes and Kubeflow.
- Involved in preparations and orations at various industry and scientific events. Published R&D research results in several venues redacted by Nature, Springer, and IEEE.

July–October  
2019

DISPLAY LINK, Katowice

**Intern Development Engineer** – Embedded C++ programming in real time environment for video processing devices.

## Skills

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### Python programming for machine learning, application development and scripting

- Deep learning with *Tensorflow*, *PyTorch* and *PyTorch Lightning*,
- Machine learning with *Scikit-learn*,
- Data manipulation with *NumPy* and *Pandas* from SQL & NoSQL sources,
- Computer vision with *Scikit-image* and *OpenCV*,
- Experiment and data management with *MLflow*, *Kubeflow*, and *DVC*,
- Pipelines orchestration with *Airflow*,
- Code quality with *pytest*, *flake8*, and *mypy*.

### C++ programming in modern standards

*STL* familiarity, *CMake* build tool, unit testing with *Google Test* and *Google Mock*, *Clang* toolchain familiarity (*clang-tidy*, *clang-format*, *lldb*).

### Developer tools

*Git* version control system, *Docker* containerization and *Kubernetes* orchestration, familiarity with *GitHub Actions*, *GitLab CI/CD* automation tools, familiarity with *AWS* cloud computing services, *architecture-as-code* with *Terraform* and *Ansible*, typesetting in *Latex*, ability to work in *Scrum*.

### Linux operating system

Administration and development, shell scripting (*bash*), text processing with *awk* and *sed*.

### Languages

Native Polish, proficient English, basic German.

## Education

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- Since 2022* SILESIAIAN UNIVERSITY OF TECHNOLOGY  
**Doctor of Philosophy (PhD) Candidate** – *Computer Science, Department of Algorithmics and Software.*
- 2020–2021* SILESIAIAN UNIVERSITY OF TECHNOLOGY  
**Master of Engineering** – *Computer Science, System Software major.*  
Thesis topic: *Data augmentation for super-resolution reconstruction using deep convolutional neural networks.*  
Graduated with distinction.
- 2016–2020* SILESIAIAN UNIVERSITY OF TECHNOLOGY  
**Bachelor of Engineering** – *Automatic Control and Robotics, Information Technologies major.*  
Thesis topic: *Grains detection in thermal images with use of neural networks.*  
Graduated with distinction.

## Scientific publications

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- M. Kawulok et al., Hyperspectral Image Super-Resolution: Task-Based Evaluation, IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing, Volume 17, 2024
- B. Grabowski et al., Squeezing adaptive deep learning methods with knowledge distillation for on-board cloud detection, Engineering Applications of Artificial Intelligence, Volume 132, 2024
- P. Kowaleczko et al., A Real-World Benchmark for Sentinel-2 Multi-Image Super-Resolution. Sci Data 10, 644 (2023)
- M. Ziaja et al Benchmarking Deep Learning for On-Board Space Applications. Remote Sens. 2021, 13, 3981
- M. Ziaja et al., "Hyperspectral Image Pansharpening: The Prisma Case Study," IGARSS 2023 - 2023 IEEE International Geoscience and Remote Sensing Symposium, Pasadena, CA, USA, 2023, pp. 1633-1636
- M. Kawulok et al., "Understanding the Value of Hyperspectral Image Super-Resolution from Prisma Data," IGARSS 2023 - 2023 IEEE International Geoscience and Remote Sensing Symposium, Pasadena, CA, USA, 2023, pp. 1489-1492
- B. Grabowski et al., "Are Cloud Detection U-Nets Robust Against in-Orbit Image Acquisition Conditions?," IGARSS 2022 - 2022 IEEE International Geoscience and Remote Sensing Symposium, Kuala Lumpur, Malaysia, 2022, pp. 239-242
- B. Grabowski, M. Ziaja, M. Kawulok and J. Nalepa, "Towards Robust Cloud Detection in Satellite Images Using U-Nets," 2021 IEEE International Geoscience and Remote Sensing Symposium IGARSS, Brussels, Belgium, 2021, pp. 4099-4102

## Certificates

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- October 2021 – *AWS Cloud Technical Essentials* authorized by Amazon Web Services, offered through Coursera platform.

## Personal projects

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- *IT Jobs Meta* – Data pipeline and meta-analysis dashboard for IT job postings from *No Fluff Jobs* website. Features data scraping, cleaning, analysis, and interactive dashboard. Implemented in *Python* and *Pandas*, deployed with *Ansible* and *Terraform* to *AWS*.
- Other small software on my GitHub: Linux dotfiles, mobile robot, shell-based blogging engine, high-altitude balloon embedded software, and more.

I agree to the processing of personal data provided in this document for realising the recruitment process pursuant to the Personal Data Protection Act of 10 May 2018 (Journal of Laws 2018, item 1000) and in agreement with Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation).