Maciej Ziaja

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Experience

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.) and regression tasks (arctic ice cover properties) in satellite imagery. Responsible for data management, preprocessing, training pipelines, model architecture (CNNs and Transformers), and optimization.

- Designed neural networks deployment and benchmarking processes for AI-capable state-of-the-art 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.

- Involved in *super-resolution* tasks (single-image, multi-image, pansharpening, data fusion) applied to satellite imagery, such as data generation, dataset curation, and super-resolution deep neural networks training including Transformer-based and GAN models.

- Maintained in-house data processing and experimentation MLOps systems based on DVC, MLflow, Docker, and Jenkins.

- 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

Python programming for machine learning, application development and scripting deep learning with *Tensorflow* and *PyTorch*, machine learning with *scikit-learn*, data manipulation with *NumPy* and *Pandas* from SQL and NoSQL sources, data visualization with *Matplotlib* and *Dash & Plotly* combo, Jupyter notebooks, computer vision with *Scikit-image*, data versioning with *DVC*, experiment management with *MLflow*, 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*).

Embedded programming and C programming in Linux environment *STM32* microcontrollers, *FreeRTOS* real time operating system, *make* automation tool.

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

Linux operating system administration and development, shell scripting, text processing with *awk* and *sed*.

Hardware design and multimedia processing *Autodesk Fusion360 and Eagle*, *Affinity* suite for image editing, *DaVinci Resolve* and *Final Cut Pro X* for video editing.

Languages native Polish, proficient English, basic German.

Education

Since 2022   SILESIAN UNIVERSITY OF TECHNOLOGY
Doctor of Philisophy (PhD) student – *Computer Science, Department of Algorithmics and Software.*

2020–2021   SILESIAN 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   SILESIAN 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

- 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.

Personal projects

- *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*, available online at itjobsmeta.net.

- Other small software on my GitHub: Linux dotfiles, mobile robot, shell-based blogging engine, high-altitude balloon embedded software, and more.

Certficicates

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