Petr Chmelař

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Software engineer with 10+ years spanning embedded firmware, desktop applications, and platform infrastructure. Experience leading teams and designing systems from real-time control to data pipelines and ML infrastructure.

Experience

Innovatrics — Brno, Czech Republic
Software Engineer → Platform Team Lead — April 2021 - Present

- Lead design and development of R&D platform serving 20+ researchers and developers
- Designed and developed system for automatic Python environment distribution across 30+ repositories with CI pipelines and release automation; established process for keeping environments up-to-date with modern tooling `Python` `Docker` `GitLab CI`
- Designed and implemented data abstraction layer enabling seamless migration to Parquet and LMDB, achieving 20x faster loading and serving datasets with 100M+ images directly from filesystem `Python` `Pandas` `Arrow`
- Architected and implemented standardized data pipelines for research datasets `Python` `DVC` `MinIO`
- Led Kubernetes cluster initiative for ML workloads, improving GPU allocation from 50% to 80% `K8s` `Grafana` `Docker` `Kueue` `Linux` [devconf talk]
- Designed and developed infrastructure upgrades for ML platform over multiple years—all-flash storage, HPC nodes, networking `Linux`
- Led knowledge sharing initiatives and engineering talk sessions across the team

ELEDUS / MICo Vision — Brno, Czech Republic
Software Engineer — August 2015 - April 2021

- Designed and implemented firmware, bootloaders, and proprietary RS485 protocol for modular hydroponic system `C` `ATmega` `ARM Cortex-M4`
- Developed FreeRTOS-based control firmware for SCIOX X-ray machine with SPI daisy-chained stepper motors, X-ray tube serial interface, and custom USB protocol—deployed to 10+ production units `C` `FreeRTOS` `ARM Cortex-M4`
- Led UI/UX redesign of SCIOX X-ray machine application, improving code maintainability `.NET Framework` `WPF` `C#`
- Reverse-engineered B&R PLC internals and designed and implemented cross-platform development workflow, enabling hardware-free development and one-day integration `C++` `CMake` `B&R`
- Co-designed architecture and developed image processing pipelines, UI, and control daemon for 3 custom robotic X-ray defectoscopy systems `.NET` `gRPC` `Python` [video]

METEL — Česká Skalice, Czech Republic
Firmware Engineer, Part-Time — April 2014 - December 2014

- Developed firmware for PoE++ power controller implementing IEEE 802.3bt classification and negotiation protocol `C`

Projects

Fosh — 2016
Developed firmware for skateboard motion tracking device using accelerometer, magnetometer, and compass sensor fusion. Startup won all awards at Starcube accelerator finale [article]

Education

Brno University of Technology — Brno, Czech Republic
Master's Degree, Electrical, Electronic, Communication and Control Technology — 2016 - 2018
Thesis: HDR image reconstruction from X-ray DICOM sequences [repo]

Brno University of Technology — Brno, Czech Republic
Bachelor's Degree, Electrical, Electronic, Communication and Control Technology — 2013 - 2016

Skills

Programming: `Python` `C#` `C++` `C`
Frameworks: `.NET` `WPF` `FastAPI` `Flask` `SQLAlchemy` `Pandas` `Arrow` `NumPy` `OpenCV` `gRPC`
Embedded: `FreeRTOS` `ARM Cortex-M4` `ATmega` `B&R PLCs`
Infrastructure: `Kubernetes` `Docker` `GitLab CI` `Git` `CMake` `DVC` `Grafana`
Languages: Czech (native), English (B2)