KONSTANTY SZUMIGAJ

Computer Vision & Software Engineer

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Summary

Computer Vision and Software Engineer with 5+ years of experience developing CV/ML solutions. Specialized in 3D vision, neural rendering (NeRF, Gaussian Splatting), and production-grade C++ implementations.

Technical Skills

Programming: C++, Python, CUDA, Swift
Computer Vision: NeRF, Gaussian Splatting, Structure from Motion, Facial Landmarks, Segmentation, Object Detection, Perspective Correction
Machine Learning: PyTorch, MLflow, TensorFlow, Model Training & Optimization, Hyperparameter Tuning
3D Technologies: 3D Scanning, 3D Reconstruction, Point Cloud Processing, Photogrammetry, LiDAR
Development Tools: Docker, CMake, Git, Linux, CI/CD, Code Review
Libraries: OpenCV, Eigen, NumPy, Pandas, Matplotlib
Project Management: Scrum/Agile, Jira, Cross-functional Collaboration

Experience

Software Engineer

March 2023 – Present

Samsung Electronics — *Warsaw, Poland*

- Maintained and improved production sign language avatar project, resolving critical bugs and ensuring system stability
- Development of proof of concepts based on computer vision technologies: **facial landmarks detection**, **background segmentation**, **Structure from Motion (SfM)**, **Gaussian Splatting** and **NeRF**
- Conducted comprehensive literature reviews of recent CV papers and translated research into practical implementations
- Trained and optimized deep learning models with hyperparameter tuning for production deployment
- Managed ML experiments using MLflow for reproducibility and model versioning
- Developed dataset capturing applications with **AR** guidance for **Android** and **iOS**
- Developed high-performance C++ implementations with CUDA acceleration for real-time processing
- Technologies used: **C++**, **Python**, **PyTorch**, **CUDA**, Docker, **CMake**, Jira, Git, MLflow, Windows, Linux, Android, iOS

Computer Vision Engineer

July 2021 – February 2023

Mnemosis — *Warsaw, Poland*

- Co-developed MVP software for ski jumping training analysis as part of cross-functional team, enabling coaches to optimize athlete performance
- Implemented perspective correction algorithm for accurate spatial measurements from arbitrary camera viewpoints, critical for biomechanical analysis
- Engineered 2D CV algorithms including **object detection, tracking, and geometric transformations** for sports analytics
- Designed and developed **3D/4D algorithms** in C++ for fitting 3D human rig animations to point cloud data
- Architected multithreading and distributed computing solutions for processing large-scale point cloud datasets
- Prototyping computer vision algorithms in Python
- Collaborated in **Agile/Scrum** environment with code reviews, **CI/CD** pipeline maintenance, and **unit testing**
- Technologies used: **C++**, **Python**, **OpenCV**, **Docker**, **CMake**, Jira, Git, Windows, Linux

Junior C++ Developer

August 2020 – June 2021

Smarttech3D Metrology — *Warsaw, Poland*

- Developed proof-of-concept 3D scanner based on **Arduino** platform
- Implementation of algorithms and solutions for image processing or 3D scanning in C++
- Working with **LiDAR** and **photogrammetry**
- Prototyping solutions in Python language

- Technologies used: **C++**, **Python**, **OpenCV**, Eigen, Git, Arduino

Education

Master of Science in Engineering – Mechatronics 2021 – 2022
Warsaw University of Technology, Warsaw, Poland

Bachelor of Science in Engineering – Mechatronics 2017 – 2021
Warsaw University of Technology, Warsaw, Poland

Publications

DeepVID: deep-learning accelerated variational image decomposition model tailored to fringe pattern filtration
Maria Cywińska, **Konstanty Szumigaj**, Michał Kołodziej, Krzysztof Patorski, Vicente Mico, Shijie Feng, Chao Zuo and Maciej Trusiak
Journal of Optics, IOP Publishing, 2023
DOI: 10.1088/2040-8986/acb3df

Languages

Polish – Native | **English** – C1 | **German** – A2

Hobbies

- Music production
- Playing guitar
- Computer games
- Gym
- Math
- Cooking