Miroslav Šimko, PhD

Computer vision / Python / C++ developer
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Education

2013–2021, Ph.D., Experimental Nuclear and Particle Physics
Czech Technical University
Faculty of Nuclear Sciences and Physical Engineering
Thesis: Study of Heavy Flavor at the STAR Experiment

2011–2013, M.Sc., Experimental Nuclear and Particle Physics
Czech Technical University
Faculty of Nuclear Sciences and Physical Engineering
Thesis: Design and Optimalization of the Optical Readout System for Electromagnetic Calorimeter FOCAL for the ALICE Experiment

2008–2011, B.Sc., Experimental Nuclear and Particle Physics
Czech Technical University
Faculty of Nuclear Sciences and Physical Engineering
Thesis: Detector Control System for the ALICE Experiment

Experience

2022–present: ioLabs AG: 3D-computer vision on meshes Trained model for 3D object recognition and segmentation of 3D models of buildings. Written in Python using the Pytorch framework and Mesh-CNN model.

2021–present: ioLabs AG: Computer-vision object detection on technical documents Developed object detection and automatic placement of a stamp in documents, including automatic orientation detection. Used Pytorch and Mask-RCNN. The model was pruned and quantized for deployment.

2019–2020: ioLabs AG: Geometry engine for collision detection, written in C++ and Python, using Open CASCADE and VTK

2014–2021: Analysis: Reconstruction of the Λ_c baryon at the STAR experiment Brookhaven National Laboratory, USA; Collaboration between Lawrence Berkeley National Laboratory, USA, and Czech Technical University; Analysis, using "big-data" techniques on computing clusters; Code written in C++ and Root, using machine learning from the TMVA package (Boosted-Decision Trees)

2015–2019: STAR Zero-Degree-Calorimeter on-call expert at Brookhaven National Laboratory, USA; Responsible for calibration, checks, maintenance, and upgrades of crucial detetector components; Calibration code written in C++ and Root

2013–2014: Lawrence Berkeley National Laboratory, USA: Simulations for the Pixel sensors at the STAR experiment; Written in C++ and Root

2011–2013: Detector-Control-System expert for the Silicon-Drift Detector for the ALICE experiment, LHC, CERN, Switzerland; Responsible for maintenance and smooth operation of the detector, written upgrades to the system in PVSS.

Languages and Skills

Czech/Slovak (native), English (fluent), Japanese (advanced intermediate), French (intermediate)

Statistical analysis, machine learning, programming for computing clusters, Docker, Jenkins, git

Programming in C, C++, Python, Root, Pytorch, BASH, PVSS, National Instruments LabView

Driver's license B

Teaching

Czech Technical University
Faculty of Nuclear Sciences and Physical Engineering
Student Physics Laboratory Practice, 2014–2019

Interests

Physics, informatics, photography, hiking, sport (bicycle, ski, canoeing), literature

Paper

J. Adam et al., Phys. Rev. Lett. **124**, 172301 (2020).

Conferences

Quark Matter 2018, Venice, Italy May 13–19, 2018
Poster: Measurement of $\overline{\Lambda_c}^-/\Lambda_c^+$ ratio in Au+Au collisions at $\sqrt{s_{\rm NN}} = 200\,\text{GeV}$ with the STAR experiment

3-Kings Conference 2018, Košice, Slovakia Jan 5, 2018
Talk: Measurement of open charm in relativistic-heavy-ion collisions

19th Conference of Czech and Slovak Physicists, Prešov, Slovakia Sep 4–7, 2017
Talk: Measurement of the Λ_c baryon at $\sqrt{s_{\rm NN}} = 200\,\text{GeV}$ with the STAR experiment

EPS Conference on High Energy Physics, Venice, Italy Jul 5–12, 2017
Talk: Measurements of open charm hadron production in Au+Au collisions by the STAR experiment

Hot Quarks, South Padre Island, Texas, USA Sep 12–17, 2016
Talk: Measurements of open charm hadrons at the STAR experiment

Quark Matter 2015, Kobe, Japan Sep 27–Oct 3, 2015
Poster: Λ_c baryon production at $\sqrt{s_{\rm NN}} = 200\,\text{GeV}$

ICPAQGP2015, Kolkata, India Feb 2–6, 2015
Talk: Heavy Flavor Tracker at the STAR Experiment

18th Conference of Czech and Slovak Physicists, Olomouc, Czech Republic Sep 16–19 2014
Talk: Simulations for the HFT–Pixel detector at the STAR experiment

Workshop VERTEX2014, Mácha Lake, Czech Republic Sep 15–19, 2014
Poster: Simulations for the HFT–Pixel detector at the STAR experiment

References

Github page:
`https://github.com/mirsimko`

PhD-analysis code
`https://github.com/mirsimko/auau200GeVLambdaCAna`

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