Tadeáš Fryčák

Tadeáš Fryčák
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I am an 20-year-old student with a keen interest in **AI & Machine Learning** (specifically **Computer Vision + Natural Language Processing**) and **Electrical Engineering.**

Education

01/20-08/24

Palacký University in Olomouc
Program Newton for Gifted High Schoolers

Calculus, Bayesian methods, Integral Transformations, Data Science Seminar, Image Analysis, Complex Systems, Computer Networks Security

since 09/24

Delft University of Technology
BSc in Computer Science and Engineering

GPA 9.15/10.00 (1=worst, 10=best), ranked top 3%, teaching assistant, participating in Honors Research Project (designing robotic gripper for berries)

Research and Industry Experience

since 05/22

Palacký University in Olomouc
Computer Vision Researcher

Developed deterministic CV model for plant root tracking in harsh conditions (roots hidden beneath substrate, etc.). Created algorithm for worm pose detection. Made algorithm for root germination detection. Trained CNNs for Tardigrade classification.

since 04/22

AgreFlex s.r.o.
Head of Hardware Department

Designed ultra-low power device APU for smart-metering and demand-based electricity regulation with STM32 and NB-IoT. Contributed to patent application and CE certification. Represented AgreFlex on ForArch exhibition.

03/22-08/24

Seznam.cz, a.s.
Machine Learning Researcher

Developed algorithms for user's home and work location prediction based on user's activity on the internet for targeting/recommendation purposes. Worked with NLP and LLMs (zero/few-shot, ...). Represented Seznam at international conference ML Prague.

since 01/22

Bellmer Czech s.r.o
Computer Vision Developer

Developed algorithm to detect flow (velocity, streamlines) of Non-Newtonian fluid in the pulper. Used Fast Fourier Transform to detect frequency of motor vibrations. Programmed computer vision software for impurities detection in paper.

01/22-12/22

ÚTIA of the Czech Academy of Sciences
AI Researcher

Researched neural network architectures. Trained convolutional neural network for segmentation and volume computation of spindle apparatus in 4D data (sequence of 3D images in time). Developed cross-platform application with web UI.

03/21-12/21

Abradatas s.r.o.
Data Scientist & Web Developer

Performed risk-benefit evaluation of face recognition for Czech bank. Created design and frontend of portal for Traion members. Developed a crawler for Czech news including an automatic information analysis tool.

06/18-09/20

OLC Systems s.r.o.
SW & HW Developer

Created remote printer readout software, developed CHSystem, grasped programming principles (OOP, data structures, ...). Programmed in NodeRED, Python and C++. Dealt with LoRaWAN, BLE, Arduino, ESP32. 3D modeled (Solidworks) and 3D printed.

Publications

- **Peer-reviewed papers**
  - *PLoS ONE:* Fryčák T., Fürst T., Koprna R., Špíšek Z., Mišijovský J., Humplík J. Crop growth dynamics: Fast automatic analysis of LiDAR images in field-plot experiments by specialized software ALFA. 2024.
  - *International Journal of Infectious Diseases:* Fürst T., Bazalová A., Fryčák T., Janosek J. Association of COVID Vaccination Status and All-Cause Mortality in 2.2 Million Individual Health Records. 2024.
- **Conferences**
  - 15th International Symposium on Tardigrada: Tardigrade phenotype classification using neural networks. Vítek, Fryčák, Fürst, Lacey, Vavruša & Voller. 2022 Krakow.
  - Vítek, Fryčák, Fürst, Lacey, Vavruša, Voller, Hajdúch, Slavkovský. Stress response in Hypsibius exemplaris. IMTM REACTOR: 6th Annual IMTM Retreat. 2022 Velké Karlovice.
  - Vítek, Berger, Fryčák, Fürst, Lacey, Hajdúch, Slavkovský, Pavlík, Nováková, Voller. Stress response in Hypsibius exemplaris. IMTM REACTOR: 7th Annual IMTM Retreat. 2023 Velké Karlovice.
  - Vítek, Slavkovsky, Nováková, Machová, Fryčák, Pavlík, Neumanová, Hofmanová, Szymczysková, Hajdúch, Voller. Stress response to ionizing radiation and heavy metals in Hypsibius exemplaris. IMTM Reactor: 8th Annual IMTM Retreat. 2024
- **Software**
  - Fryčák T., Fürst T., Voller J. WormSkeleton 1.0. 2021.
  - Fryčák T., Humplík J. Software for the detection of individual beet cyst nematodes in the root system of in vitro-grown sugar beet plants. 2024.

Grants

- Use of imaging methods for automated phenotyping in breeding for resistance to biotic and abiotic stresses in wheat; NAZV QK1910041 (2018-2023); PI Dr. Jana Chrpová, VÚRV v. v. i., Praha-Ruzyně
- Methodology for evaluating plant resistance to beet cyst nematode infestation and a pilot test of protective technologies in crop production; TAČR SIGMA č. TQ03000647 (2024-2025); PI Dr. Alena Kadlecová, UPOL
- High-throughput screening of new anthelmintics; Dedication: InterCOST grant LTC19030 of Czech Ministry of Education and sports; PI Mgr. Jiří Voller, Ph.D.
- Digitalized support for SKR9000 manufacturing processes; TAČR FW03010716 (2021-2023); PI RNDr. Tomáš Fürst, Ph.D.

Projects and awards

– Root Tracker –

Created a deterministic CV model for plant root tracking. In comparison to existing solutions Root Tracker (thesis) tracks all the roots individually, therefore the output metrics (depth, root area, lateral root count, ...) are non-aggregated (Root Tracker output on the left; each root system visualized using different color). Currently used at Palacký University to evaluate ~60 images/day; saves ~3 h/day of research time.

Awards:

- 1st place in the national round of Student Research Competition (SOČ; SPA) 2023 in the informatics category
- 1st place in the national round of Student professional activities (STOČ) 2023
- 2nd place in the national round of Czech Brain 2023

Frycak

– AgreFlex Pulse Unit –

Created device (HW, FW, case, ...) for remote consumption readouts of electricity/gas meters. Optimized power consumption; with 1-minute readout and 5-minute transmission interval the devices is predicted to last up to 10 years (average consumption is ~0.2 mA).

Awards:

- 1st place in the national round of Electrotechnical Olympiad (EO) 2023
- 1st place in the national round of Student professional activities (STOČ) 2024
- 2nd place in the national round of Student Research Competition (SOČ; SPA) 2024 in the electronics category

Other **Computer Vision projects**, including Worm Skeleton and ALFA, are available on my website. Additional **software** and **hardware work** is showcased on my GitHub page.

— Other awards —

- Finalist in the international round of Stockholm Junior Water Prize 2024
- 1st place in the national round of Programming Olympiad 2024
- 1st place in the national round of Hellathon 2022
- 2nd place at the Conference of Young Natural Scientists 2023, 2022
- 3rd place in the national round of Technological Olympiad 2022

- Radio-Electrotechnical Championship organized by Czech HAM professionals
  - 1st place the national round 2019 in the category Ž2 (13-16 y.o.)
  - 2nd place the national round 2023, 2022, 2016 in categories M (17-19 y.o.) and Ž1 (< 13 y.o.)

- Best Czech High School Student 2024 (by MICRORISC org.)
- TOP 3 Czech High School Student of the Year 2024 (by Prostředoškoláky org.)
- Talent of the Olomouc region 2024, 2023, 2022, 2019, 2017
- Litovel's Hope 2023, 2019, 2017, 2016

— Languages —

English:	C1
Czech:	Native
Slovak:	Full Comprehension
Russian:	B1