Bohdan Ivaniuk-Skulskyi

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Education

University of Lille, CRIStAL — Lille / Paris, France
Doctor of Philosophy candidate, Computer Science — *October 2023 – Present*

National University of Kyiv-Mohyla Academy — Kyiv, Ukraine
Master's degree in Applied Mathematics (Honour degree, GPA: 97.45 / 100) — *September 2020 – July 2022*

National University of Kyiv-Mohyla Academy — Kyiv, Ukraine
Bachelor's degree in Applied Mathematics (Honour degree, GPA: 93.78 / 100) — *September 2016 – June 2020*

Experience

Cyclope.ai (VINCI Autoroutes) — Paris, France
Machine learning Engineer — *January 2023 – Present*

Stack: Python, PyTorch, Tensorflow, Darknet, Docker, Bash, AWS

- Implemented a service for estimating vehicle speed, road position, dimensions, and distance to the camera (bird eye view transformation, camera alignment, and multi-camera tracking).
- Achieved multi-GPU processing with 200ms end-to-end pipeline and managed applications handling up to 300M POST requests daily, providing near real-time road awareness. Developed services includes vehicle speed estimation, road position, and multi-camera tracking.
- Road Surveillance project: Enhanced inference speed by 60% through engineering improvements and updates to the YOLO object detection model. Refined object detection model accuracy from 0.91 mAP to 0.96 mAP and optimized model serving using OpenVino. This optimization allowed the application to run on a CPU, eliminating the need for GPUs and resulting in significant cost savings. The application handles approximately 100M POST requests per day to client servers.

TietoEvry (Infopulse) — Kyiv, Ukraine
Machine Learning Engineer — *October 2021 – January 2023*

Stack: Python, PyTorch, scikit-learn, bash, Triton Inference Server, CI/CD

- Designed technical specifications for ML infrastructure and fully implemented data science projects, including dataset collection, annotations (recommendations rankings, text classification, token classification), and versioning.
- Developed functionality and conducted token classification Distil-BERT model training from scratch for advanced item filtering, giving clients better search capabilities.
- Improved search engine functionality through trained embeddings for textual descriptions, utilizing the Distil-BERT model. Additionally, employed contrastive learning with image embeddings using the CLIP model, enhancing search request fulfillment from 0.55 to 0.84 for top-5 requests.
- Deployed models using the Triton Inference Server, handling approximately 30,000 gRPC requests per day.

University of Toronto, Wearable Robotics Group — Kyiv, Ukraine (remote)
Machine Learning Research Intern — *April 2022 – September 2022*

Stack: Python, PyTorch, Tensorflow, scikit-learn, Google Cloud

- Worked as part of the Intelligent Assistive Technology and Systems Lab under the supervision of Dr. Laschowski and Dr. Mihailidis.
- Research focused on video classification for stair environments on hardware-constrained devices for lower-limb exoskeleton control. Employed 2D CNN image encoder models (e.g., MobileNet, MobileViT, EfficientNet) merged with temporal models (e.g., LSTM, Transformer) and 3D CNN video classification models (e.g., MoViNet).
- Results show state-of-the-art performance on the StairNet dataset - 98.3% Accuracy and 98.2 F1-score, adding about 200 more correctly classified walking environments daily for those with lower-limb disabilities.

Samsung Research — Kyiv, Ukraine
Software Engineering Intern (Machine Learning Research) — *April 2021 – December 2021*

Stack: Python, PyTorch, Tensorflow, Keras, Scikit-Learn, C++, Bash, Docker

- Member of the Intelligent Security Lab, I developed and showcased demos by enhancing and implementing newly released research papers and ideas, adapting them to existing hardware solutions.
- Speaker identification: deployed the Google TRILL model on mobile devices with user-refined fine-tuning.

- Spoof audio detection: S-vectors and RawNet models on an in-house dataset for mobile user authentication.
- Compressed video processing: implemented the CoViAR model for efficient video file storage and processing on mobile devices.

Anadea Kyiv, Ukraine

Machine learning Engineer *March 2020 – October 2021*

Stack: Python, PyTorch, Tensorflow, Keras, Bash, Docker

- Improved Zillow's image captioning model using GPT and object detection, raising the BLEU score from 0.39 to 0.48. This enhancement makes housing searches more accessible for people with vision impairments.
- Enhanced a CLIP-based social media post duplication service, boosting the F1-score from 0.76 to 0.94, and saving storage space for the aggregation feed.

Concorde Capital Kyiv, Ukraine

Investment Banking Intern *May 2019 – September 2019*

- Market research in various spheres (agriculture, IT, heavy industry, logistic) for acquisition purpose.
- Preparation of financial reports and pitching presentations.

YouScan Kyiv, Ukraine

Summer Intern *May 2017 – September 2017*

- Performed social media data analysis and classification for big multinational companies.
- Preparation of social media activity reports.

Teaching

Teaching Assistant, Introduction to Machine Learning by Dr. Ignatenko, National University of Kyiv-Mohyla Academy
September 2022 - December 2022; Sepetember 2023 - December 2023

Teaching Assistant, Introduction to Deep Learning by Dr. Ignatenko, National University of Kyiv-Mohyla Academy
September 2022 - December 2022

Teaching Assistant, Artificial Intelligence in Medicine (CSC2431HF) by Dr. Brudno and Dr. Laschowski, National University of Kyiv-Mohyla Academy, Ukrainian Catholic University, University of Toronto
September 2022 - December 2022

Publications

B. Ivanyuk-Skulskyi, A.-G. Kurbis, A. Mihailidis, B. Laschowski, Sequential Image Classification of Human-Robot Walking Environments using Temporal Neural Networks, *IEEE International Conference on Biomedical Robotics and Biomechatronics (BioRob), 2024.* (pre-print)

B. Ivanyuk-Skulskyi, N. Shvai, A. Llanza, A. Nakib, Towards Lightweight Transformer Architecture: an Analysis on Semantic Segmentation, *International Conference on Artificial Intelligence, Computer, Data Sciences and Applications (ACDSA), 2024.* (Accepted with oral presentation)

A.-G. Kurbis, D. Kuzmenko, B. Ivanyuk-Skulskyi, A. Mihailidis, B. Laschowski, StairNet: Visual Recognition of Stairs for Human-Robot Locomotion, *BioMedical Engineering OnLine journal, 2024.*

B. Ivanyuk-Skulskyi, G. Kriukova, A. Dmytryshyn, Geometric properties of adversarial images, *IEEE Third International Conference Data Stream Mining & Processing (DSMP), 2020.*

Skills

Languages: Ukrainian, Russian, English, French
Programming languages: Python, C++, Java
Data Science: Pandas, NumPy, Matplotlib, Scikit-Learn, PyTorch, Tensorflow, OpenCV
Technical skills: Flask, Docker and containerisation, git, gRPC, REST, AWS, GCP, LaTeX, Vim, Dagster, Plotly

Achievements

Kaggle Competitions Expert (Kaggle):
Quora Insincere Questions Classification (silver medal)
Mechanisms of Action (MoA) Prediction (silver medal)
Severstal: Steel Defect Detection (silver medal)
Scholar of ZAVTRA.UA stipend program of Victor Pinchuk Foundation, 2020