

# Dmytro Humeniuk

AI Developer | Machine learning & Computer vision

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## Summary

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AI Software Developer with a PhD in Computer Engineering and more than five years of combined experience designing, implementing, testing, and integrating machine learning and computer vision solutions. Strong programming background in Python and C/C++, with experience developing AI-enabled software on Linux, integrating perception models with robotic and hardware systems, and building end-to-end pipelines for data generation, model training, validation, deployment, and troubleshooting. Experienced in collaborating with multidisciplinary research and engineering teams and communicating technical solutions in both English and French.

## Skills

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**Programming:** Python, C/C++, SQL, Shell

**Machine Learning & AI:** PyTorch, TensorFlow, Scikit-Learn, Gymnasium, OpenCV

**Robotics & Simulation:** ROS 2, NVIDIA Isaac Sim, Gazebo

**Cloud & DevOps:** Docker, Kubernetes, AWS, Azure, Google Cloud, CI/CD, Weights&Biases

**Software Tools:** Git, Flask, Django, Linux

**Languages:** English (fluent), French (fluent), Ukrainian (native), Russian (native)

## Experience

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**Artificial Intelligence Developer**, Thales Digital Solutions, Montréal *Sept 2025 – May 2026*

- Developed Python software and AI components for collaborative autonomy, robotic-system simulation, and defence-focused research and development.
- Implemented perception-based obstacle-avoidance algorithms for autonomous robotic systems.
- Designed complex autonomous-agent behaviours using reinforcement learning and behaviour trees.
- Developed gRPC-based APIs and deployed AI software to edge computing platforms.

**Research Intern**, Sycodal, Montréal *May 2023 – Sept 2025*

- Developed an end-to-end Python framework for training, testing, and validating computer vision and robotic-perception models in NVIDIA Isaac Sim.
- Integrated a deep-learning object detector with robot motion-planning and control components to support automated object detection and pick-and-place execution with Kinova Link 6 and Flexiv Rizon 4s robotic manipulators. Integration to the real robot done with ROS 2.
- Generated synthetic image data using Isaac Sim and evaluated model performance under varying visual conditions. Used generative style transfer models (CycleGANs) to improve photorealism.
- Authored a paper published at the [IEEE/ACM International Conference on Automated Software Engineering](#).

**Teaching Assistant – Advanced Software Testing**, Polytechnique Montréal *Jan 2024 – May 2024*

- Designed and implemented five assignments covering fuzzing, search-based software testing, and large language model-based test generation. Presented lab sessions and graded assignments for a group of 12 students.

**Machine Learning Software Developer Intern**, Ericsson, Montréal *Jan 2023 – Jun 2023*

- Implemented decentralized and distributed gradient-descent algorithms in Python using PyTorch and BlueFog.
- Designed controlled experiments to measure communication-computation trade-offs across different network topologies in a real-world 10-node computing environment.

**Teaching Assistant – Software Testing**, Polytechnique Montréal *Sep 2022 – Dec 2022*

- Updated assignment templates to cover Pytest, fuzzing, mutation testing, load testing, and GitHub Actions pipelines. Presented lab sessions and graded assignments for a class of 40 students.

**Research Intern**, COGECO, Montréal *Feb 2021 – Jun 2021*

- Collected, cleaned, analyzed, and visualized large-scale preventive-maintenance data from cable modem networks using Python. Performed feature extraction, feature engineering, statistical analysis, and dimensionality assessment to identify indicators of equipment degradation.
- Developed and evaluated a predictive-maintenance model for forecasting equipment failures up to seven days

in advance.

- Teaching Assistant – Software Testing**, Polytechnique Montréal *Sep 2020 – Dec 2020*
- Developed a Naïve Bayes anti-spam system for educational exercises on software testing of machine learning systems. Authored five assignments and graded submissions for a class of 45 students.

## Selected Projects

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- **Dynasto** – Developed an open-source tool using reinforcement learning and search-based optimization to generate adversarial driving behaviours, increasing performance over baselines by 20%. Obtained distinguished paper award at ICST 2026 conference. Code: [Dynasto](#). Paper: [Dynasto](#).
- **VehicleDetector** – Developed an open-source computer vision pipeline covering data annotation, model training, validation, and performance evaluation for vehicle detection. Code: [VehicleDetector](#).
- **RILaST** – Developed a variational autoencoder-based Python framework using latent-space optimization to improve failure discovery in autonomous vehicles and drones, 3 to 4.6 times more effective than baseline approaches. Code: [RILaST](#). Paper: [RILaST](#).
- **RIGAA** – Combined reinforcement learning and evolutionary optimization for automated generation of safety-critical test scenarios outperforming the baselines by 20 to 37 %. Code: [RIGAA](#). Paper: [RIGAA](#).
- **AmbieGen** – Developed a configurable evolutionary search-based Python framework for simulation-based validation of autonomous systems. Obtained first place in an international competition for cyber-physical systems testing. Code: [AmbieGen](#). Paper: [AmbieGen](#).

## Education

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- PhD in Computer Engineering, with distinction**, Polytechnique Montréal *Sep 2021 – Dec 2025*  
Thesis: *Operational Knowledge Distillation for Efficient Testing and Enhancement of Autonomous Robotic Systems*, Supervisor: Prof. Foutse Khomh
- Master of Applied Science in Computer Engineering**, Polytechnique Montréal *Sep 2019 – Aug 2021*  
Thesis: *A Search-Based Framework for Automatic Generation of Testing Environments for Cyber-Physical Systems*, Supervisor: Prof. Foutse Khomh
- Bachelor Degree in Computer Engineering**, Kyiv Polytechnic Institute *Sep 2015 – Jun 2019*  
Final Project: *Automated System for Determining Solar Cell Model Parameters*

## Scholarships and Awards

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- Merit Scholarship for Foreign Students, PBEEE, 50,000 CAD *May 2024*
- FRQNT Doctoral Training Scholarship *May 2024*
- CodeML Hackathon – 2nd place, CNN-based model for plant disease prediction *Oct 2023*
- CodeML Hackathon – 1st place, NLP model for language classification *Oct 2022*
- Finalist, [Human Competitive Awards](#), GECCO Conference *July 2022*
- Winner, [SBST CPS Testing Competition](#), AmbieGen tool *June 2022*

## Other Activities

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- Member of the [organizing committee](#) of the international competition on autonomous drone testing *2024 – 2026*
- [Participant](#), Montreal Summer School in Robotics at Mila *Aug 2022*
- [Participant](#), IVADO/Mila Deep Learning School *Mar 2021*

## Volunteer Activities

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- Volunteer for an automated de-mining system project. Development of computer vision models for land mine detection, dataset collection and processing. *Feb – Sept 2025*
- Member of the organizing committee for the [AI Helps Ukraine conference](#). *June – Dec 2022*
- Volunteer for the Ukrainian community; organized [fundraising](#) for a VAC device for a hospital in Kyiv, raising 3,000 CAD; *Feb – Dec 2022*
- Volunteer at Entraide des Familles food bank, Montreal, 60+ hours. *July 2020 – Sept 2021*