Polina Shopina

Skills

Software	Python, C/C++, Qt, Java, MATLAB, Git, Linux, Docker, NGINX, OpenCV, CUDA, ROS, Microsoft Office, Automation, PyTorch, Tensorflow
Electrical	RF Testing, Electrical Circuitry, Soldering, Arduino, Raspberry Pi, Programmable Instruments, Oscilloscope, Spectrum Analyzer, Multimeter, RF Generator, Multimeter (DMM), Altium Designer
Mechanical	Certified SolidWorks Associate (CSWA), SolidWorks Simulation (FEA), Design for Manufacturing, Machine Shop Drawings, Mill, ASME Y14.5 GD&T, AutoCAD, Laser Cutting, 3D Printing, Prototyping, Coordinate-measuring machine (CMM), Hand tools

Technical Experience

Autonomous Beer Pong Opponent (Capstone Project) Sept. 2024 – Apr. 2025
Stereo Vision and System Integration Lead *UBC, Vancouver, BC*

- Developed an autonomous robot which integrates mechanics and real-time computer vision to intercept tennis balls with a projectile mid-air; projectile angle was predicted by tracking ball trajectory using computer vision.
- Designed and deployed a high-speed stereo vision system using two Teledyne FLIR Blackfly S cameras, controlled via the Spinnaker SDK; performed full stereo calibration using the OpenCV and a chessboard.
- Developed custom calibration routines for hand-eye calibration between vision and actuation systems.
- Wrote a fully-featured C++ application with Qt-based GUI that integrated the stereo system with the actuators; the application allowed for real-time debugging, parameter tuning, visualization and calibration.
- Used OpenCV to track tennis ball trajectories at high speeds; used YOLOv8 for low-speed detection; implemented CUDA acceleration to achieve processing times of less than 16ms per frame.
- Developed custom calibration routines for hand-eye alignment between vision and actuation systems.
- Created the mechanical design in Onshape, 3D-printed it, and assembled it.

Orbital Research Ltd. May 2023 – Apr. 2024
Mechanical Engineer Intern *Burnaby, BC*

- Developed a custom Python GUI application to automate MIL-STD-810 vibration testing using programmable instruments and a vibration table.
- Used PyVISA and SCPI protocols to interface with signal generators, oscilloscopes, and environmental chambers, enabling fully automated test routines for rugged RF devices.
- Designed and fabricated rugged RF enclosures for satellite communications using SolidWorks; performed thermal FEA simulations and optimized for CNC machining.
- Produced machine shop drawings and communicated with machinists to ensure correct manufacturing.
- Manufactured and delivered multiple RF devices to clients on a tight deadline; managed end-to-end prototyping from CAD to validated hardware.

Autonomous Driving Robot Simulation Jan. 2023 – Apr. 2023
Course Project *UBC, Vancouver, BC*

- Developed an autonomous navigation agent in a ROS + Gazebo Gym environment for a vision-based driving challenge.
- Trained a convolutional neural network (CNN) using TensorFlow for imitation learning from expert trajectories.
- Implemented real-time character recognition using OpenCV and custom CNN models.
- Achieved top score in final competition by successfully completing all navigation and recognition objectives.

Neural Image Compression Research May 2024 – Aug. 2024
Undergraduate Researcher *UBC, Vancouver, BC*

- Trained and evaluated PixelCNN++ models using PyTorch to determine optimal parameters for lossless image compression.
- Researched state-of-the-art neural lossy image compression, and delivered an end-of-term presentation to supervisor and peers.

Education

University of British Columbia Vancouver, BC
Engineering Physics, BASc *Sept. 2020 - May 2025*