

SANJAR NORMURADOV

Seattle, WA, USA | 206 677-1874 | snormuradov@gmail.com | [LinkedIn](#) | [GitHub](#)

WORK EXPERIENCE

Graduate Teaching Assistant

Electrical & Computer Engineering Department UW

"The Self-Driving Car: Intro to AI for Mobile Robots"

Seattle, WA / Sep. '23 – Present (2 mo.)

Guided practical applications of Autonomous Vehicles fundamentals on 1/10th scale [MuSHR](#) rally car.

- Prepared course materials on PID/MPC control, PF/EKF localization, and Dijkstra/RRT/A* path planning.

Skills: Python, ROS, Rviz, Computer Vision, Deep Learning, Git

Graduate Research Assistant

UW & Amazon Science Hub

Robotic Manipulation in Densely Packed Containers

Seattle, WA / Jan. '23 – Present (10 mo.)

- Synthetic Data Generation: Utilized Scanned Objects from Google Research and NViSII to enhance synthetic imagery datasets, simulating diverse backgrounds and object arrangements.
- Improved the average precision of the STOW framework for Warehouse Picking Robots on the expanded 140K-image dataset: 0.424 to 0.646 overall, and 0.336 to 0.573 for stacked bins.
- Architecture Development: Investigated performance boosts in Instance Segmentation by integrating the Segment Anything Model by Meta AI.
- Simulation: Enhanced simulation environment precision and robustness by revising URDF/Xacro/XML files and creating a single source for all pod models, thereby expanding the system's versatility.
- Motion Planning: Optimized pod positioning relative to the robot workstation by automating test-run procedures and refining control and MoveIt parameters, such as collision checking frequency and discretization.
- Reachability Test: Reduced UR16e reachability failures from 20/1600 to 1/1600 via modifications above.

Skills: Python, XML, ROS, Gazebo, Rviz, MoveIt, Computer Vision, Deep Learning, PyTorch, NViSII, SLURM, Git

Mechatronics Intern

JSC "ENPO SPELS"

Robotic Arm, Mentor: Nekrasov P.V.

Moscow, Russia / Feb. '22 – Jun. '22 (6 mo.)

Developed a sophisticated 5-DoF portable Robotic Arm, with enhanced maneuverability, and versatile object handling, featuring a human-mimetic end-effector for advanced Mechatronics research.

- *Mechanical Engineering*: Utilized CAD and FDM/FFF 3D printing technologies on Tevo Flash/Tornado, employing diverse filaments (PLA, PETG, TPU, Nylon), to refine and optimize the robot's frame for functionality and portability.
- *Electrical Engineering*: Engineered dual-sided PCBs for the robot's base and controller utilizing Altium Designer, fabricated through photolithography, leveraging SLA 3D printer (Anycubic Photon S) and Ordl Alpha 350 dry film.
- *Software Engineering*: Developed software for the robot base (6 servo motors, nRF24L01 module) and controller (nRF24L01, OLED 128x64, 2 joysticks) using STM32F103 MCU and state machines.

Skills: C/C++, STM32, Debugging, PCB Design, Altium Designer, Photolithography, 3D Printing, T-Flex CAD

PROJECT EXPERIENCE

Robotic Fuselage Inspection for Dents and Scratches

UW ENGINE Capstone

Airbus Robotics

Jan. '23 – Jun '23 (6 mo.)

- Set up workstations in Gazebo, RoboDK, and RoboGuide with UR5e, UR16e, and Fanuc CRX 20-iA/L
- Generated motion plans using MoveIt and other built-in or proprietary packages to automate the inspection.
- Certified by completing on-site Core Training and online Core, Pro, and Application Tracks for UR e-series

Skills: Python, XML, ROS, MoveIt, Gazebo, UR e-series, Fanuc CRX-series, RoboDK, RoboGuide, Git

Autonomous Robotics

UW Graduate Studies

"Self-Driving Cars" / "AI – Robotics"

Oct. '22 – Dec. '22 | Mar. '23 – May '23

Applied novel methods in Autonomous Robotics to varied robotic platforms (MuSHR car, 3-DoF robotic arm)

- Control: Leveraged PID and MPC to manage the behavior of the rally car.
- Localization: Implemented PF/EKF (Odometry/Velocity Motion, and Landmark/Beam-based Sensor models)
- Path Planning: Applied RRT/RRT*, A*, and LPA* to navigate in robotic arm C-space, and A* to the rally car.
- Reinforcement Learning: Explored Behavior Cloning, DAgger, and Policy Gradient techniques in MuJoCo.

Skills: Python, ROS, Gazebo, Pybullet, MuJoCo, Git

TetrArm

UW Graduate Studies

"SWE for Embedded Applications"

Jan. '23 – Mar. '23

- Gained proficiency in testing code across various scenarios using Docker container images.
- Implemented a Finite State Machine using user-defined classes and events in ELMA and ENVIRO images.
- Leveraged STL containers, including vectors, maps, and deques to create custom ADTs.

Skills: C/C++11, Docker, ELMA, ENVIRO, Debugging, ADT, Code-based Testing, Git

EDUCATION

University of Washington

Seattle, WA

M.S. in Electrical and Computer Engineering, Robotics (GPA: 3.5)

Oct. '22 – Mar. '24

- Activities: Amazon Science Hub; Sensor System Lab; Robotic and State Estimation Lab.
- Courses: Self-Driving Cars; AI-Robotics; SWE for Embedded Applications; Machine/Deep Learning.