# Eitan Niv / Robotics Engineer

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**Motion Planning •Optimization• Robotics • Control theory • Software Development • Signal Processing • Technical Writing • ROS • Computer Vision • Teaching/Training • Program integration with drivers and cameras on the market**

## Summary

Robotics engineer specializing in path planning, control theory, and real-time hardware-software integration. Experienced in deploying production-grade systems across industrial, airborne, and research environments. Skilled in bridging the gap between high-level algorithmic development (C++/Python) and low-level hardware control, with a focus on solving complex problems through modular architecture and system-level optimization.

- **Languages:** Hebrew (Native), English (Full proficiency), Russian (Limited working)

- **Software Languages:** C++, Python, C#, LabVIEW, MATLAB

- **Robotics & Frameworks**: ROS2, Gazebo, Mujoco, NAV2, OpenCV, Pybind (C++/Python Interop), Arduino, Raspberry Pi, STM32.

- **Control & Simulation**: MPC (Model Predictive Control), MPPI, PID Control, Kalman Filtering, Simulink, classic controllers.

- **Technical Specialties**: Motion Planning (5DoF systems), Signal Processing, Sensor and Actuator Integration, Requirements Analysis.

- **Protocols & Tools**: UART, RS-232/422/485, SPI, I2C, Git, Linux/Windows.

## Education

### MS: Mechatronics and Robotics @ New York University       2024-Current
**Current GPA:** 3.96
**Selected Graduate Coursework:** Autonomous Mobile Robots, Reinforcement Learning and Optimization, Localization, Gait and Manipulation, Advanced Mechatronics, Foundations of Robotics, Mathematics for Robotics.

### BSc: Electronics Engineering and Computer Science @ Tel Aviv University     2014-2018
*Specializing in Control Theory*

With multiple electives focusing on Robotics, including a  motion planning course and workshop:
**Selected Undergraduate Coursework**: Introduction to Modern Linear Control Theory, Algorithms for Robotic Motion Planning & Workshop, Digital Control, Practical Feedback Systems.

## Experience

### Robotics Graduate Teaching Assistant @ NYU Tandon School of Engineering.     Sep 2025 - Present

Robotics Graduate Teaching Assistant | September 2025 – Present

- Support graduate-level coursework for Mechatronics, Dynamics, Mathematics for Robotics, and Foundations of Robotics.
- Provide technical guidance on kinematics, state-space control, system modeling, and estimation techniques including Kalman filters and SVD.

## Software Engineer @ Zalirian Ltd.                          June 2021 - Dec 2023

Developed and maintained the company's robotic system, including axes control, cameras, optics, UI.

- Sole programmer in charge of the company's main application, working with the system architect.
- Implemented and adapted the requirements made by the lead system engineer, including complex logic.
- Designed code in a flexible way to allow for adaptive changes according to evolving requirements in a rapid R&D environment.
- Worked in conjunction with algorithm developers to integrate their code into the application.
- Developed both the FrontEnd - GUI, and the BackEnd- infrastructure, communications with hardware and external libraries, and data handling.
- Interfaced directly with various motor and camera SDKs and drivers.
- Developed real time synchronized solutions involving complex decision making, axes control, as well as camera captures and image processing.
- Implemented a Motion Planning algorithm to assure movement efficiency and safety in a 5DoF system with physical limitations and obstacles.
- Logged the data according to different levels of priority and urgency, whether it's for debriefing or real-time data for the system engineer/operator.
- Multiprocessing and multithreading.
- Utilized a variety of design patterns in order to maximize the efficiency, code correctness and readability.
- Developed in both C++ and Python, with interop using Pybind.
- Used Git(Azure) for source control.

## SW & HW Developer @ Israeli Air Force / GAF 1                          Oct 2018 – April 2021

Developed SW & HW systems designed to improve aircraft safety & maintainability. Additionally, led the project management aspects, including: CDR, Gants, budgets etc.

- Designed & developed multiple real-time control and simulation systems, end-to-end - hardware, software, and deployment.
- Reverse engineered legacy airborne systems, to interface, upgrade and redesign the systems.
- Interfaced with complex sensory systems to acquire and analyze data, using signal processing to gain critical insights about the accuracy & safety of different aircrafts parts.
- Provided software & electrical analysis for flight investigation reporting.
- Advised and mentored projects by practical engineering college students.
- Trained and advised new engineers on the team, helping them to ramp-up to routine work.

## Selected Projects

**Autonomous Mobile Robot (AMR) Simulation**: Developed a full AMR simulation including dynamics, motion planning, and multiple controllers.

**RL and Optimization projects:** Implemented a variety of algorithms such as MPPI, MPC, SQP, PPO, DWN for optimization of simulated systems

**SCARA Robotic Arm Artist**: Programmed a SCARA robot arm to reproduce intricate sketches in real-time by following user drawings.

- Integrated Raspberry Pi, Arduino, and ArUco markers for precise motion and perception, connecting all processes using ROS2.

**6DOF Robotic Arm Simulator**: Built a simulator for forward and inverse kinematics of a 6DOF robotic arm

**Self-Balancing Quadrotor Drone**: Designed and implemented a self-balancing control system for a quadrotor drone as a B.S. final project.

**3DOF 1-Legged Robot Hopper**: Created a simulation for a 1-legged robotic hopper, focusing on the associated motion planning and stability using ROS2.

# Leadership & Volunteering

## Robotics Team Member @ FIRST Robotics Competition / Dbug #3316          Sep 2011 – Jun 2014

Participated in the FRC robotics competition multiple years, played an active part in developing all of the robot aspects-mainly focusing on the software and electronic systems.

- Programming team lead, leading a team of 4 programmers developing the robots software.
- In charge of the electronics for the robot, also contributing to mechanics, modeling and overall design.
- Implemented **PID** controls, sensor data acquisition, and vision processing.

## STEM Mentorship & Education

- Advised and trained new engineers and practical engineering students during tenure at the Israeli Air Force.
- Teaching and overseeing a highschool robotics team in the design & creation of their robot, helping the team to navigate the project and overcome obstacles along the way.
- Mentoring highschool student projects for robotics matriculation exams.