

Mostafa Ibrahim

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EDUCATION

Northeastern University

Dec 2026 (Expected)

Master of Science in Electrical & Computer Engineering; Robotics Concentration; GPA: 3.70/4.0

Boston, MA

Courses: Sensing and Navigation, Mobile Robotics, Reinforcement Learning, Autonomous Field Robotics

The American University in Cairo

Sep 2019 – Jun 2024

Bachelor of Science in Computer Engineering; Minor in Mathematics; GPA: 3.72/4.0

Cairo, Egypt

Study Abroad: University of Edinburgh, Scotland, UK

Sep 2022 – Dec 2022

SKILLS

Languages: Python, C, C++, C#, Rust, JavaScript, Verilog, MATLAB, Embedded C

Frameworks & Software: Pytorch, Keras, OpenCV, Docker, Git, LangChain, Unity, Unreal Engine, Gazebo, MuJoCo, Isaac Sim

Systems & Tools: Linux, TCP/IP, CAN, gcc, RISC-V and MIPS Assembly Language

EXPERIENCE

Graduate Researcher

Nov 2024 – Present

Silicon Synapse Lab, Northeastern University

Boston, MA

- Built a deterministic simulation framework with aerodynamic and kinodynamic models of a flapping robot, enabling software-in-the-loop validation of perception, control, and autonomy modules under the robot's native Linux stack
- Developed robust multithreaded C++ software driver modules for IMU-camera synchronization, reducing sensor latency by 62% and improving SLAM estimator performance in a flapping robot
- Integrated ORB-SLAM3 pose outputs fused with IMU readings using EKF into a real-time PID controller, extending stable hover duration from ~3s to >30s and reducing position error by ~45% for a bio-inspired aerial robot

Applied Scientist

Jun 2024 – Dec 2024

Know Center GmbH

Graz, Austria

- Programmed a teleoperation controller mapping Omnideck treadmill motion and VR headset orientation to robot control, reducing task completion time by ~25% and ~30% lower motion sickness scores (SSQ) compared to joystick-only control
- Enabled multi-robot view switching and bookmarking in VR, improving target detection accuracy by ~18% and reducing operator confusion during navigation tasks
- Built a Dockerized cloud communication framework supporting heterogeneous robot platforms, enabling <30ms teleoperation latency and real-time multi-camera video streaming across quadruped, drone, and humanoid robots

R&D Intern

Sep 2023 – May 2024

Siemens EDA

Cairo, Egypt

- Developed an SDK in C++/Python to automate communication layer generation for digital twin platforms, reducing integration time by 40% and enabling deployment of 5+ robotics scenarios without manual reconfiguration
- Assembled and programmed a PX4-based drone and digital twin, achieving <35ms bidirectional latency and >90% communication uptime across 30+ flight validation tests
- Built a high-fidelity AirSim/Unreal Engine simulation with bidirectional cloud networking, supporting hardware-in-the-loop testing and enabling repeatable validation of autonomy features across multiple environments

AI Intern

Jul 2023 – Oct 2023

Nethermind

London, United Kingdom

- Integrated RAG pipelines to boost LLM query accuracy to 81% on large-scale (70M+) transaction datasets
- Developed a lightweight neural network for time-series forecasting with efficient real-time inference

PROJECTS

Self-Driving Car Modules Development

- Optimized monocular SLAM for low-feature, low-visibility environments, achieving ~90% trajectory overlap with ground truth in map-free navigation
- Implemented real-time dead reckoning via EKF sensor fusion (IMU + magnetometer), maintaining ~73% trajectory alignment in GPS-denied conditions

Teaching a Bird How to Fly Using Reinforcement Learning

- Implemented PPO, SAC, and TD3 actors for continuous-control flapping flight in a simulated bird model, achieving 30% increase in stability compared to baseline controller in areas with obstacles
- Engineered multi-objective reward functions integrating orientation stability, forward velocity, altitude regulation, and goal progression to optimize flight performance