

Bota Duisenbay

+39 3515754636 | bota.duisenbay@gmail.com | linkedin.com/in/botad | github.com/botastark

AI and Robotics Engineer with hands-on experience in both industry and research, with a focus on developing **AI-driven** end-to-end pipelines and implementing advanced control and manipulation strategies for **UAV** and **UR10** robotic platforms. Skilled in **Python/C++**, **ROS**, and **deep learning frameworks**. Inspired by the challenge of turning research ideas into real-world robotics and AI systems.

SELECTED WORK EXPERIENCE

Robotics Research Fellow

Jan 2024 – Present

ISTC-CNR (Consiglio Nazionale delle Ricerche)

Rome, Italy

- **UAV:** Planned and executed outdoor drone missions, enabling autonomous navigation by integrating onboard computers (Jetson) with flight controllers (PX4). Developed services for real-time monitoring and control, establishing IP/TCP and UDP protocols for state feedback, camera streaming, and command transmission from an offboard computer.
- **Path Planning:** Studied and developed an information-gain-based path planning method for mapping, leveraging real aerial imagery from drones to optimize autonomous navigation and improve efficiency of field monitoring. Accepted at IAS-19 (oral presentation).
- **Peer Review Contributions:** Co-reviewed submissions for *Communications Engineering* (Nature) and *Artificial Life Journal* (MIT Press), focusing on drone swarm technologies and collective learning methods.
- **Industrial Collaboration:** Facilitated technical coordination with industry partners, including supporting technical exchanges with UVify for drone operations, and contributing to preliminary discussions with Leonardo regarding swarm research collaboration.

Artificial Intelligence Engineer

Sept 2022 – Sept 2023

Botshelf.ai

Rome, Italy

- **Document Segmentation:** trained **classification** and **layout analysis** models for document types of varying format, and **segmentation** model for images with a cluttered background and overlapping document pages.
- **Key Information Extraction:** experimented with OCR (MS Azure, GCP, Paddle) and LLM to extract required fields for unstructured (83%) and structured documents (98%). Redesigned the pipeline, boosting from 67% to 89% by proposing and training end2end three models that leveraged image crop, spatial position and the text.
- **License Plate:** collected and curated open source datasets of European plates and trained YOLOv5 for **detection** in cluttered environments and **recognition** for license number with 98% and 96.5% accuracy respectively.

AI and Robotics Intern

Nov 2020 – Jul 2021

Baker Hughes

Florence, Italy

- **Optical Character Recognition (OCR)** for the engraved character on a metal: collected and annotated relevant data set, performed image processing, implemented state-of-the-art OCR algorithms and fine-tuned available open source libraries to achieve 91% accuracy;
- **Industrial robot arm UR10:** developed a simulation of the task and motion planning of the UR10 robot to perform grip and placement of objects.

Robotics Research Assistant

Jun 2017 – May 2018

Robotics lab, Nazarbayev University

Astana, Kazakhstan

- **Robotics pick and place:** built ROS based control of the UR10 robotic manipulator with a mounted anthropomorphic hand grippers and localised grasp affordance from 3D Kinect Image;
- **Hand prosthesis:** developed a finger position control algorithm for several grasp types using Arduino and Simulink. Implemented tele-operation using gloves with flex sensors;
- **Permanent Magnet Synchronous Motor (PMSM) control:** implemented the Direct-Torque control method together with the Maximum Torque Per Ampere technique for PMSM using MATLAB/Simulink. Presented the resulting paper at ELEKTRO 2018 IEEE conference DOI:10.1109/ELEKTRO.2018.8398286.

EDUCATION

MSc Artificial Intelligence and Robotics

July 2023

La Sapienza University of Rome ("Don't miss your chance" full merit-based scholarship)

Rome, Italy

Selected coursework: Neuroengineering, Computer Vision, Reinforcement Learning, Cloud Computing

BSc Robotics and Mechatronics

June 2018

Nazarbayev University (State full merit-based scholarship)

Astana, Kazakhstan

Selected coursework: Embedded Systems, Power Electronics, Robotic System Design

TECHNICAL SKILLS

Programming: Python, C/C++

AI/ML: TensorFlow, PyTorch, AWS (S3, SageMaker), CI/CD

Robotics: ROS, Gazebo, MATLAB, Simulink

Hardware: UR10, PX4, NVIDIA Jetson, Kinect, Arduino

PUBLICATIONS

Duisenbay, B., Ognibene, D., Toscano, P., Boschetti, M., Berton, A., & Trianni, V. (in press). Information gain-based informative path planning for UAVs in agriculture: Towards field deployment. In *Proceedings of the 19th International Conference on Intelligent Autonomous Systems (IAS-19)* (June 30–July 4, 2025), Genoa, Italy.

Nurtay, B., **Duisenbay, B.**, & Do, T. D. (2018, May). Direct-torque control system design using maximum torque per ampere method for interior permanent magnet synchronous motors. In *Proceedings of the 12th International Conference ELEKTRO 2018* (May 21–23, 2018), Mikulov, Czech Republic. IEEE. (ISBN 978-1-5386-4760-8)