Bota Duisenbay

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.

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SELECTED WORK EXPERIENCE

Robotics Research Fellow
ISTC-CNR (Consiglio Nazionale delle Ricerche)

Jan 2024 – Present

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. Deployed drones in agricultural data collection campaigns (e.g., tomato fields in Puglia) to validate and refine simulation in real-world conditions.
- **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; Currently working with LiDAR data. Accepted for publication in a peer-reviewed journal.

Artificial Intelligence Engineer
Botshelf.ai

Sept 2022 – Sept 2023

Rome, Italy

- **Document Segmentation**: trained **classification** and **layout analysis** models for 10 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
Baker Hughes

Nov 2020 – Jul 2021

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
Robotics lab, Nazarbayev University

Jun 2017 – May 2018

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
La Sapienza University of Rome ("Don't miss your chance" full merit-based scholarship)   *Rome, Italy*
Selected coursework: Computer Vision, Reinforcement Learning, Natural Language Processing, Cloud Computing

BSc Robotics and Mechatronics
Nazarbayev University (State full merit-based scholarship)   *Astana, Kazakhstan*
Selected coursework: Embedded Systems, Machine Learning, Industrial Automation, Robotic System Design

TECHNICAL SKILLS

Programming: Python, C/C++ **AI**: TensorFlow, PyTorch, AWS (S3, SageMaker), CI/CD **Robotics**: ROS/ROS2, Gazebo, MATLAB, Simulink **Hardware**: UR10, PX4, NVIDIA Jetson, Kinect, Arduino