

# Gholibjon Qasobov

## Automation and Robotics Engineer

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### Skills and Interests

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**Programming Languages:** C++, Python, MATLAB, IEC 61131-3 (ST, LD)

**Robotics:** ROS1 Noetic, ROS2 Humble, RoboDK, Nav2, Gazebo, Computer Vision, Machine Learning, Reinforcement Learning, Isaac Sim & Isaac Lab

**Electronics and Hardware Skills:** Raspberry Pi 4/5, ESP32, Nvidia Jetson, OpenCR, Modicon M340/M241 PLCs, Lidar (LS-LIDAR-C32, LDS-02), Intel RealSense D435i

**Design & Prototyping:** Autodesk Fusion 360, 3D Printing

**Software & Tools:** Git, GitHub, Linux, Docker, Jenkins

### Experience

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**Robotics Laboratory Assistant**, Kazakh-British Technical University January 2024 - Present

- Developed an automated inspection system using a mobile-legged robot with integrated elevator control, reaching 95 % inspection accuracy and 90 % success in multi-floor transitions.
- Collaborated on designing and simulating an innovative dual-function end-effector integrating a screwdriver and suction cup for automated power bank assembly using RoboDK
- Built an AprilTag-based pick-and-place system using a DoBot robotic arm, enabling 95 % positioning accuracy and autonomous object handling within a 30 cm workspace.
- Contributions to the development of laboratory practice manuals and documentation for robotics laboratory work.

**Robotics Software Engineer**, Alma Valley - Borealis Laboratory November 2024 – May 2025

- Recorded Raspberry Pi tutorials for Uni-X platform to support educational initiatives.
- Designed an autonomous water drone for environmental cleanup using NVIDIA Jetson Orin NX and RealSense D435i, achieving 90 % detection accuracy and 2 kg debris capacity.
- Developed a Kazakh voice control system for the Unitree Go2 robot using an offline LLM integrated with ROS2 Humble.

**Research Intern**, Constructor Knowledge Labs, Zurich, Switzerland (remote) June 2025 - August 2025

- Researched and implemented Retrieval-Augmented Generation (RAG) for multi-domain question answering.
- Focused on optimizing context retrieval and structured response generation using Large Language Models (LLMs).
- Evaluated system performance across diverse domain corpora to improve accuracy and coherence.

### Projects

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**Autonomous Warehouse Mobile Robot Integration Using TurtleBot3 and OPC U**

([Publication](#) )

- Collaborated on developing a LIDAR-based navigation and grid-positioning algorithm for the TurtleBot3 Waffle Pi to enable autonomous warehouse operation. Integrated a 3D-printed lifting mechanism and OPC UA connectivity with Wiren Board 7 and Honeywell Experion PKS for seamless industrial communication.
- Tools Used: Python, ROS1 Noetic, Wiren Board, Honeywell Experion PSK, Fusion360

**Autonomous Multi-Floor Inspection Mobile Legged-Robot with Elevator Integration**

- Designed and implemented an autonomous inspection mobile legged-robot capable of elevator-assisted

multi-floor navigation, achieving 95 % inspection precision and 90% reliability in floor transitions.

- Tools Used: C++, Python, ROS2 Humble, Nav2, Fusion-360, OpenCV, YOLO

#### **Semi-Autonomous Water Drone for Trash Collection with Computer Vision**

- Collaborated in developing of a semi-autonomous water drone for trash collection with 90% detection accuracy, 4h continuous operation, and 2 kg debris capacity
- Tools Used: Python, C++, YOLOv11, Nvidia Jetson Orin Nx, RealSense d435i camera, Fusion-360

#### **Design and Simulation of a Dual-Function End-Effector for KUKA Power Bank Assembly**

- Co-designed and simulated an innovative dual-function end-effector integrating a screwdriver and suction cup for automated power bank assembly
- Tools Used: RoboDK, KUKA, Fusion-360

#### **Vision-Guided Pick-and-Place System Using AprilTag Recognition**

- Designed and implemented a vision-based pick-and-place system using the DoBot Magician manipulator and AprilTag markers for precise object localization, achieving 95% placement accuracy within a 30 cm workspace
- Tools Used: Python, ROS1 Noetic, Fusion-360

#### **Tic-Tac-Toe Playing Robot Against Human**

- Designed and implemented an interactive Tic-Tac-Toe-playing robot using the DoBot Magician manipulator, YOLOv8 object detection, and the minimax algorithm.
- Tools Used: Python, ROS2 Humble, Fusion-360, YOLO

### **Activities and Achievements**

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**Digital Bridge 2025 Robotics Hackathon Winner:** Developed an autonomous navigation system for the Unitree Go2 robot dog to patrol complex maze-like environments, with a custom web interface for setting routes and viewing live camera feedback.

**KazEnergy Eco-Shell Finalist:** Recognized for the innovative design and implementation of a Semi-Autonomous Water Drone for trash collection.

**Electrical Engineering Olympiad Finalist:** Demonstrated excellence in problem-solving and electrical engineering concepts at olympiad held by Satpayev University.

**Judge in Robo-Football competition:** Served as a judge in Robo-Football competition in ITFest 2024.

### **Education**

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**Kazakh-British Technical University**, BS in Engineering and Technology Sept 2022 – May 2026

- **Coursework:** Foundations of Electrical Engineering, Theory of Linear and Non-linear Control Systems, Autonomous Mobile Robots, Industrial Robot Operations, Introduction to Machine Learning, PLC Programming, Automation Components and Devices, Robotics in Manufacturing

### **Portfolio**

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