# Applied Deep Learning Models for Autonomous Robotics in Dynamic Environments

## About us

THEKER Robotics is a robotics and artificial intelligence company headquartered in Barcelona, building intelligent and adaptable robotic systems designed to operate in real-world industrial environments. The company is tackling one of the defining challenges of this century: redefining how physical work is performed at scale, beyond the limits of traditional automation.

THEKER develops robotic platforms that address problems where conventional approaches fail, particularly in dynamic, unstructured, and high-variability settings. By combining advanced AI models with custom hardware and system-level engineering, the company focuses on scalable solutions that reduce deployment complexity while increasing autonomy and adaptability.

The team brings together expertise in robotics, computer vision, deep learning, mechanics, and system integration, working in a fast-paced and highly collaborative environment. This multidisciplinary setup enables rapid experimentation, direct validation in realistic conditions, and continuous iteration at the boundary between research and industrial application.

THEKER is building a generation-defining robotics company, with a strong emphasis on applied research and real-world impact. Research projects are embedded in operational systems, giving contributors exposure to real data, practical constraints, and the opportunity to help shape the future of intelligent, autonomous robotics.

## Abstract

This project focuses on the application of deep learning to enable autonomous robotic systems to operate in dynamic, unstructured, and highly variable environments. Unlike traditional industrial robotics, which relies on rigid setups and predefined conditions, the goal is to explore learning-based approaches that allow robots to perceive, adapt, and act robustly in real-world scenarios.

The work will primarily address perception and intelligence at the intersection of computer vision, data-driven learning, and robotics. Typical challenges include detecting and understanding heterogeneous objects, dealing with environmental variability, and producing perception outputs that can be effectively used by autonomous robotic systems. Emphasis is placed on robustness, generalization, and applicability beyond controlled laboratory conditions.

The project is grounded in realistic industrial contexts and real data, bridging academic research with applied robotics. The exact technical focus, methods, and scope will be

defined jointly with the student, allowing the project to adapt to their background, interests, and strengths, while maintaining a strong applied and research-oriented nature.

The result is a hands-on research project combining deep learning theory with practical experimentation, aimed at developing scalable AI solutions for autonomous robotics in real environments.