ROS and MoveIT Cobot Programming

Level: Bachelor/Master (1-2 students possible)
Duration: 2-3 months
Start: By agreement
Mentors: Nikola Knežević
Institution: ETF Robotics

Overview and Technology: This project implements **real-time, sensor-driven robot motion** for an **ABB IRB120** using **ROS** as the high-level software framework and **ABB Externally Guided Motion (EGM)** as the low-latency motion interface. Instead of running only pre-programmed trajectories on the controller, the robot's TCP (tool center point) motion is continuously updated from an external computer (ROS PC), enabling **online path correction**, **interactive guidance**, and **adaptive automation**. The core idea is: **ROS computes motion targets** (pose, velocity, or corrections) from a planner, sensor, or operator input, and sends them at a fixed cycle to the ABB controller via **EGM**. The ABB controller executes these targets in real time, while still enforcing internal safety limits, kinematic constraints, and motion supervision

Platforms / hardware	**Software & tools**
• ABB IRB 120 6DoF • PC Workstation • Intel RealSense Camera	• Linux + ROS • Python, C++, OpenCV, MoveIT • ABB RobotStudio
Project options (projects can be modified based on student interests**)** • Bin pick and place • Conveyor pick and place • Palletizing	
Expected outcomes	**Recommended background**
• Literature review • Project code and documentation/video • Final report in IEEE research paper form	• Basics of robot programming and control • ROS basics + MoveIT • ABB RobotStudio
Literature • MoveIT tutorials • ROS Basics • ABB RobotStudio tutorials	