

Automating Broad Leaved Dock Treatment

Using a SCARA Robot and Vision Systems

Graduate



Robin Ehrensperger

Introduction: This study explores the automation of Broad-Leaved Dock (*Rumex obtusifolius*) treatment using a SCARA robotic arm mounted on an autonomous rover. The research focuses on developing a software solution to control the SCARA for precise hot-water application, assessing its accuracy, repeatability, and settling time. The robotic arm is controlled via ROS2.

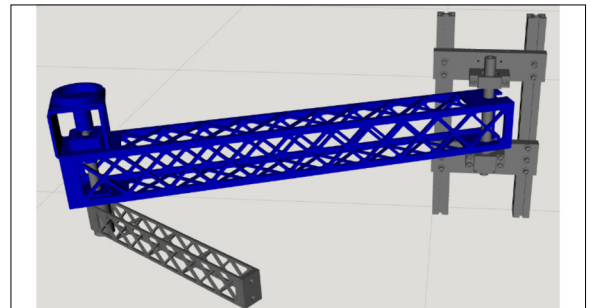
Initial Situation: The automation of the treatment of *Rumex obtusifolius* was achieved through the implementation of an autonomous robotic platform, referred to as the ISF-Rover. The hardware and software of the rover are based on the Open Field Automation concept. For the manipulator arm and the treatment tool, the system uses already provided hardware, while the software was developed during this study.

Result: Experimental evaluation confirms that the SCARA can position the treatment tool within an acceptable error margin, ensuring effective weed treatment. The results highlight the feasibility of using SCARA robots for autonomous weed management while identifying areas for improvement in mechanical design and sensing accuracy.

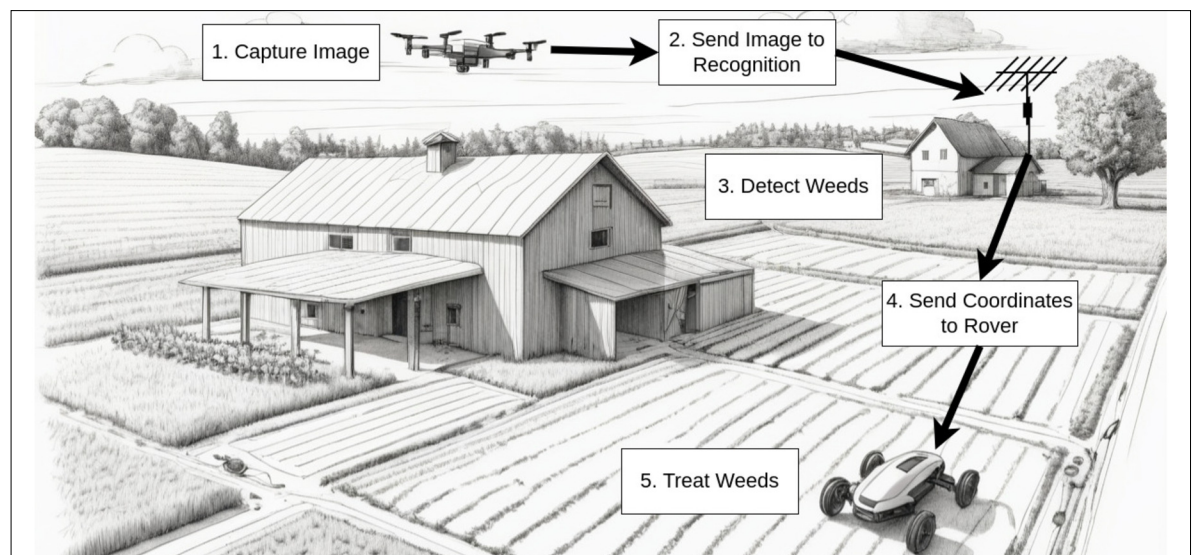
The ISF-Rover with tools in action
OSTPunkt Magazin



Simulation of the SCARA
Own presentation



Workflow for the autonomous treatment of Broad-Leaved Dock
Generated by https://huggingface.co/SG161222/RealVisXL_V4.0



Advisor

Prof. Dr. Dejan Šeatović

Co-Examiner

Prof. Dr. Dejan Šeatović, Winterthur, ZH

Subject Area

Mechatronics and Automation,
Mechanical Engineering