AI-Weeder

Chemical-free removal of weeds in lawn by AI based object detection and mechanical removal

04/2022 - 12/2023

Challenge

Every year, garden owners in Austria spray 720,000 liters of chemical weed killers, which damage soil organisms and insects and endanger groundwater.
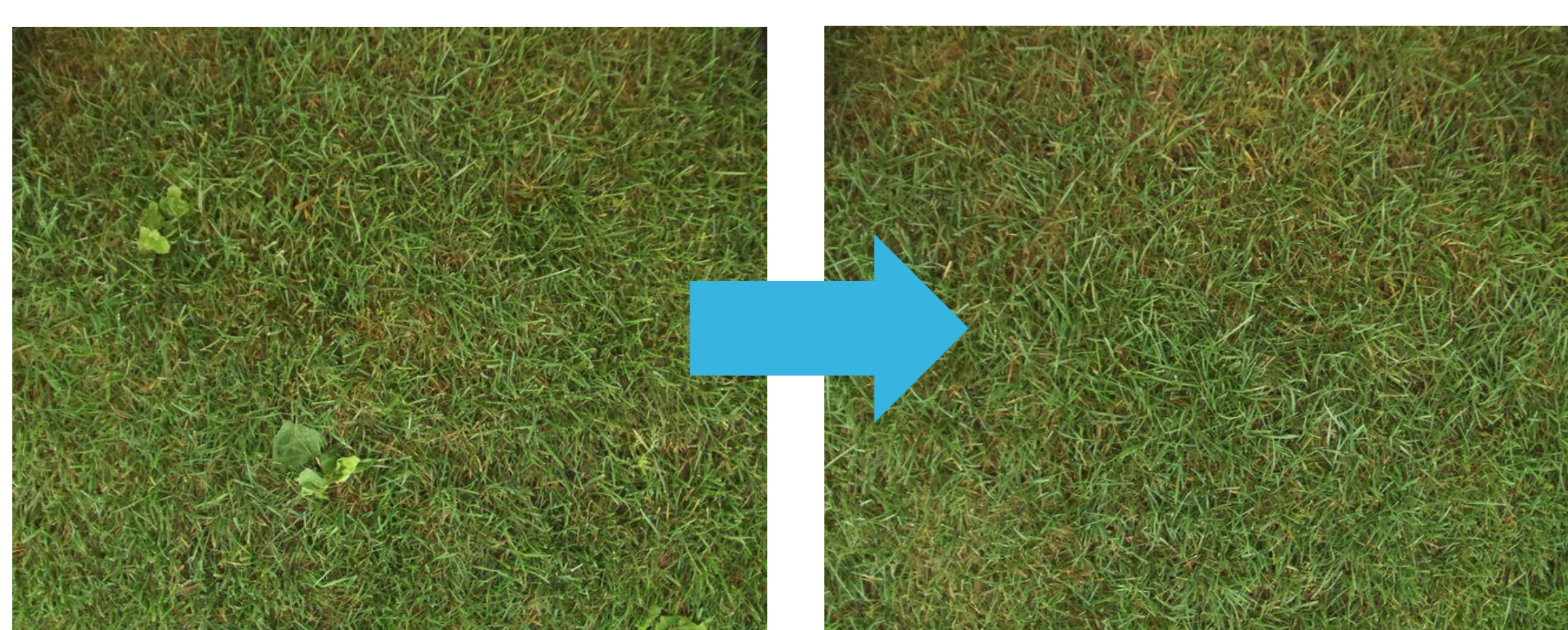
Solution

Edge-AI enabled mechanical weeder add-on for robotic mowers:

Three-step working process in the course of the mowing process:
#1:   Continuous weed detection by camera in front of the driving unit.
When weed is detected the mowing process stops for:
#2:   Servoing the robot to place the weeder hotspot above the weed.
#3:   Mechanical weed removal.
... after that, the robot continues to drive.
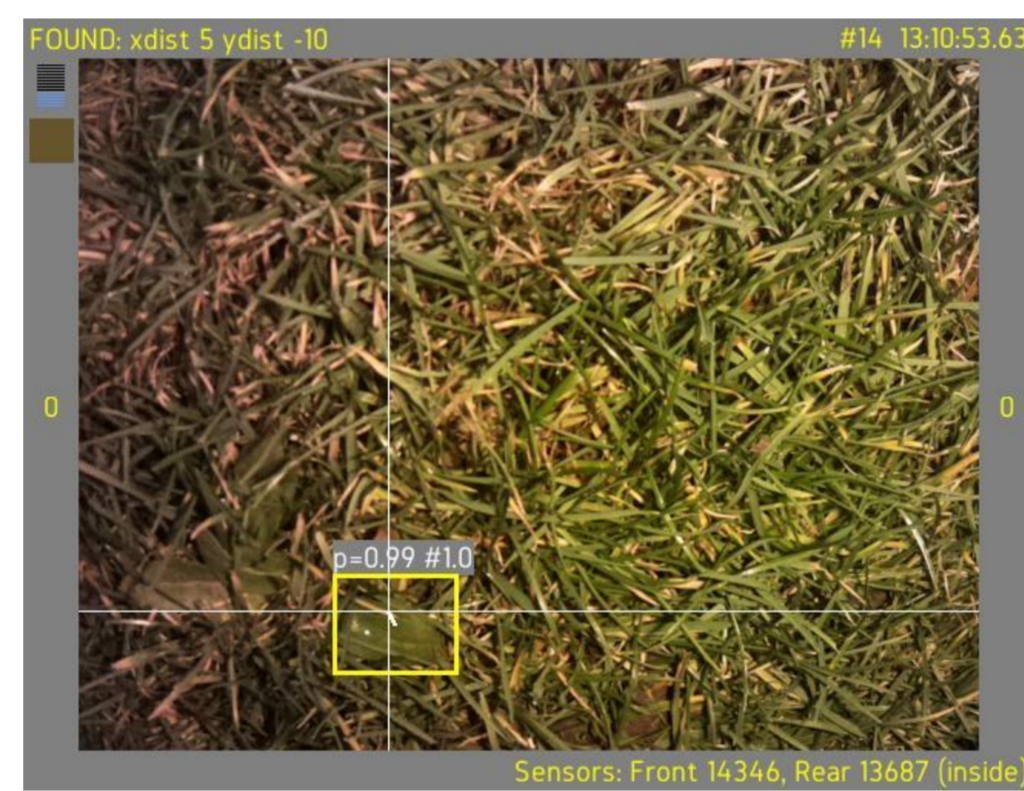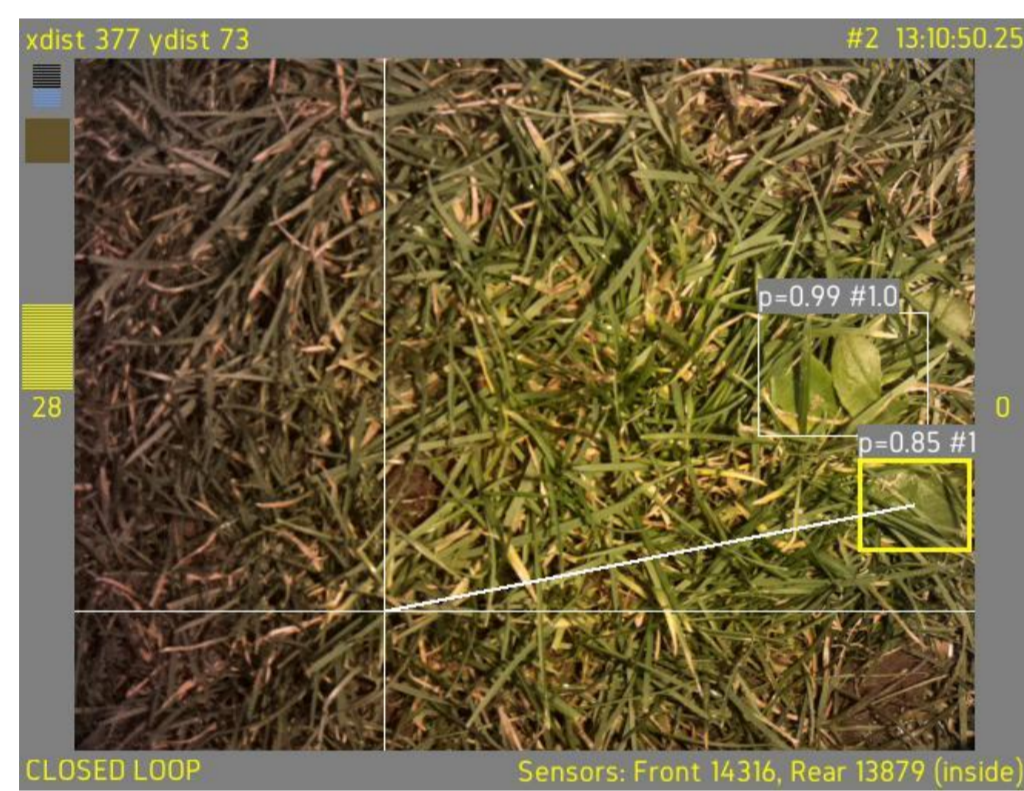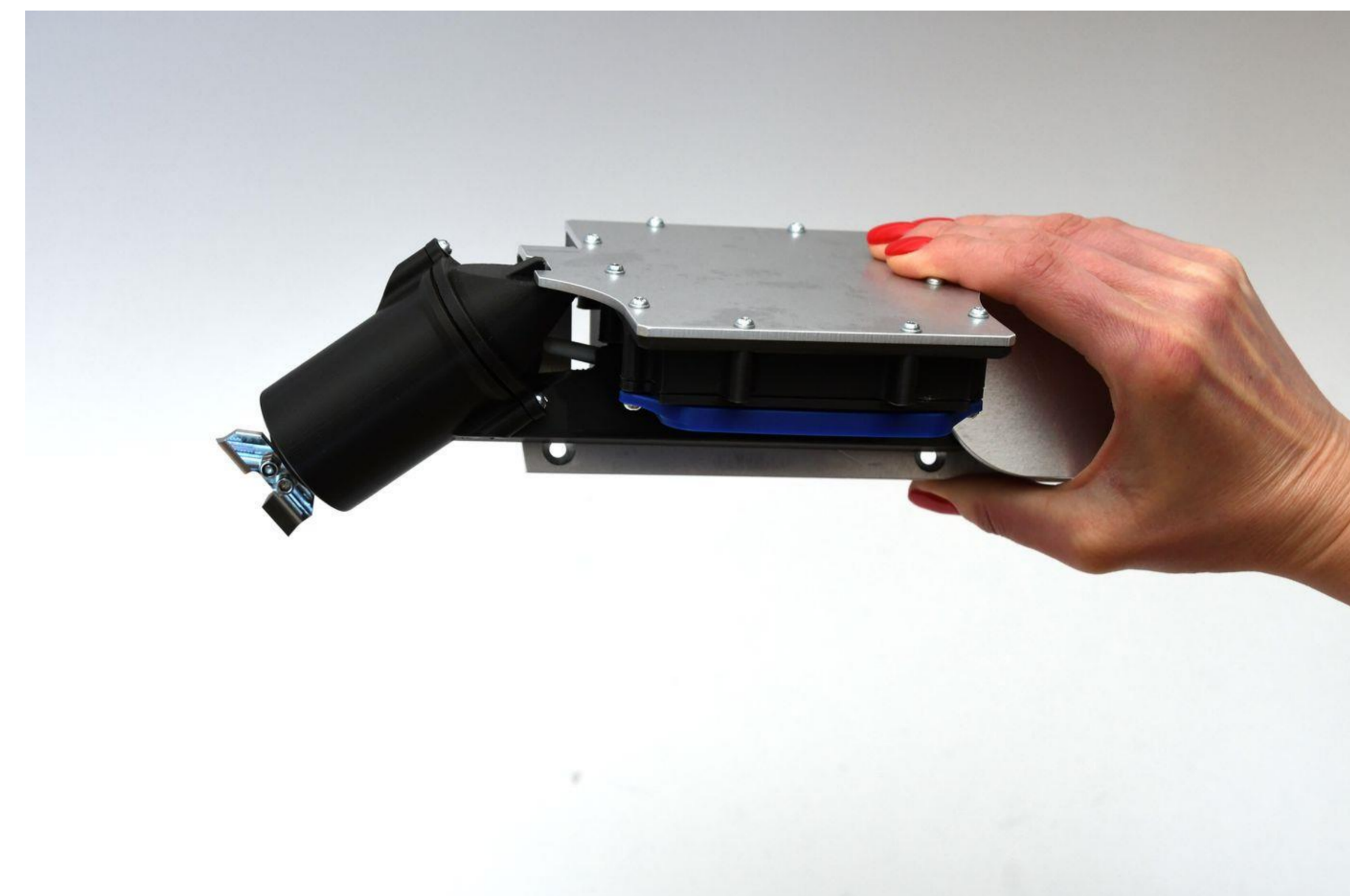
Project Goals and Achievements

• Database Generation

Robotized imaging of polluted lawn areas by GNSS controlled rover and manual image annotation.

• Model Generation and Implementation

Optimized frame size, network and implementation.

• Prototype

Hardware, integrated electronic board, and software established and optimized.

• Performance Verification

Test on area of 3000 m^2 successful: 5.3 fps, > 80% detection rate.

• Patent Application

Austrian patent granted, international patents pending.