

# SPAPPERI



**BROCHURE**  
**SA - IA**

**horticultural product range / soil care**

# The revolution in In-Row Weeding - fast, easy and reliable



# Testimonials....

**Each row unit replaces 10 manual workers!**

**Reduce my weeding costs up to 90%**

**Adjustable and optimizable speed based on crops**

**The system can learn new crops within a few hours**

**Working 24/7 – in every sun altitude**

**It works on crops at different stage of growth**



**Ready-to-use artificial intelligence,  
built to overcome every challenge.  
Our technology adapts to any crop, soil,  
and business need.**

**Maximum effectiveness everywhere, even on  
the most difficult and weed-infested fields.**

**Dual solution with vertical rotary tillers  
and horizontal fixed knives.**





No calibration required



No extensive setup required



Stit on your tractor and weed in nearly any crop

**Weed removal and soil aeration  
in a single pass,  
with millimeter precision.**

**The SA-IA confirms itself as the ideal choice for those seeking innovation, productivity, and maximum crop care completely chemical-free.**

**built by Spapperi for the farmers  
with proven results**

### how it works?



1  
Camera detects the crop and the flashlights provide consistent light for best recognition



2  
AI sees multiple pictures of one plant and calculates about 5-6 times if it is a plant or not



3  
If it is a plant:  
Knives or vertical tiller open / keep opened



4  
After the plant:  
Knives or vertical tiller close



5  
The farmer is satisfied:  
weeds are eliminated and roots are aerated to grow better.

### TIPE OF WEEDING

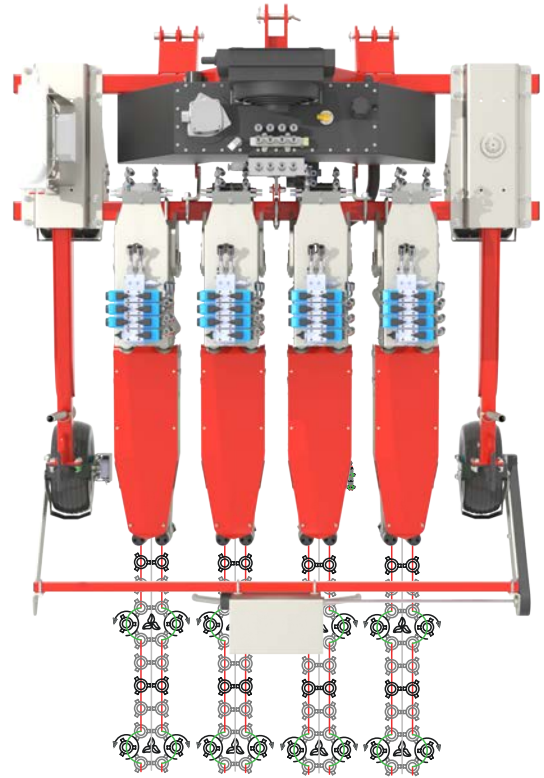
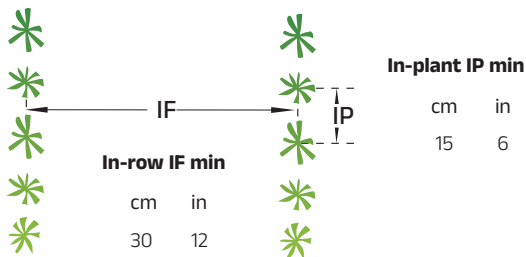


Weeding on open field



weeding on bed

### LAYOUT PLANTING



### REGULAR EQUIPMENT

- Frame and number of elements according to the setup.
- Dedicated and independent hydraulic circuit. Pump with PTO attachment, oil tank common for all elements
- AI-driven optical guidance controls the opening and closing of the rotary tillers, as well as the 3D hydraulic for featuring vertical shifting to adapt to the terrain and horizontal shifting for row alignment,
- **Tablet interface** for machine settings and movement configuration.
- **Excluding all required specifications and accessories** (weeding arms, vertical tiller, ecc)

#### Number of rows

1 - 4

#### Trasmission

Hydraulic  
Pump with PTO attachment

#### In-plant - IP

Starting from 15 cm / 6 in

#### In-double row - IB

Starting from 60 cm / 25 in  
Max value according to frame width

#### Sesto di impianto

Single row  
Double row

#### Seduta operatore

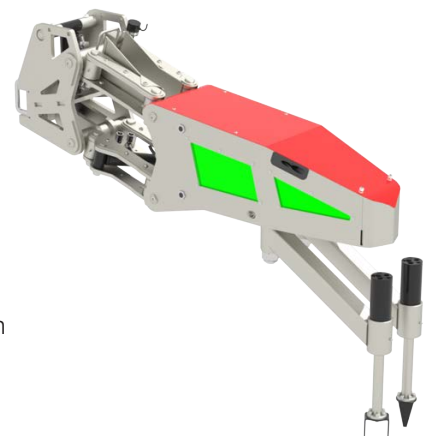
No operator on board

#### In-row - IF

Starting from 30 cm / 12 in  
Max value according to frame width

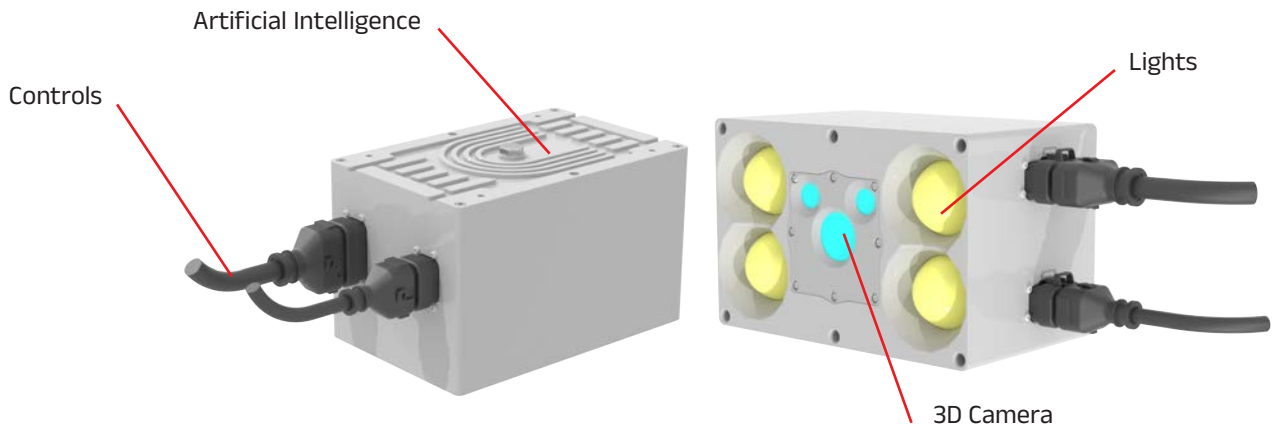
#### Estimated Productivity

4.500 - 8.500 plants/h per row  
According to in-plant distance

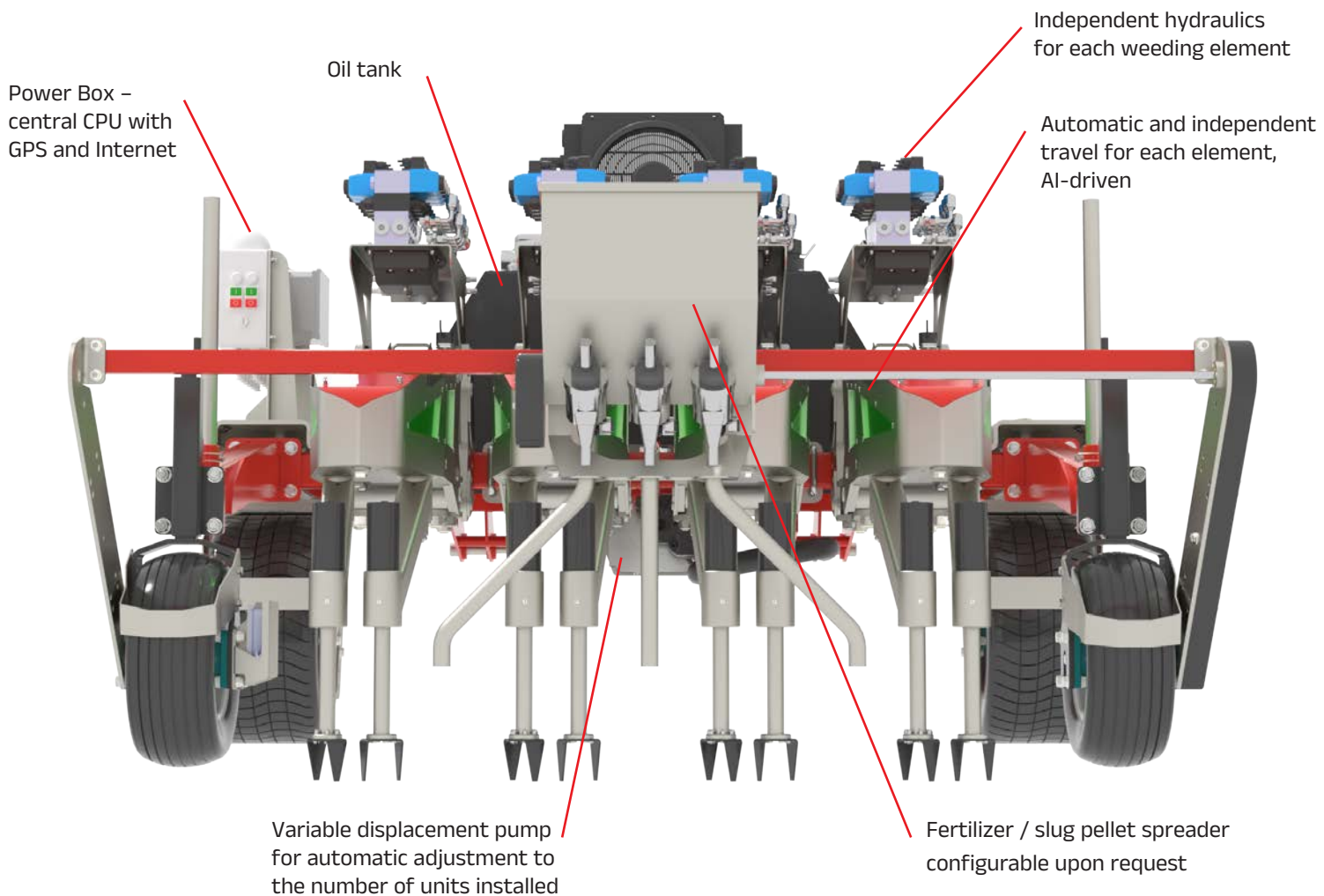


# Key Elements of the Weeder

## BOX AI - Ullmanna System



## Hydraulic weeder



## Element

3D parallelogram linkage for terrain adaptation and row alignment.

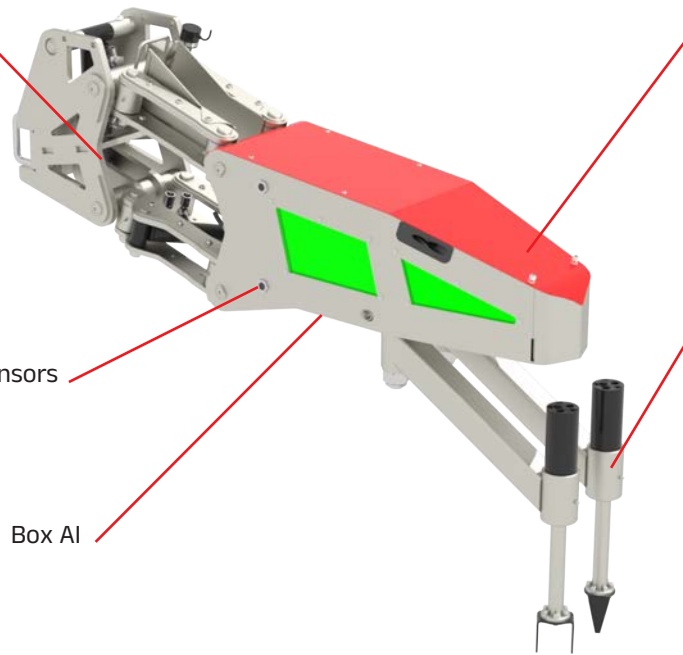
Adjustable opening/closing of the weeding arms for different crops and plant growth stages.

Anti-collision sensors

Box AI

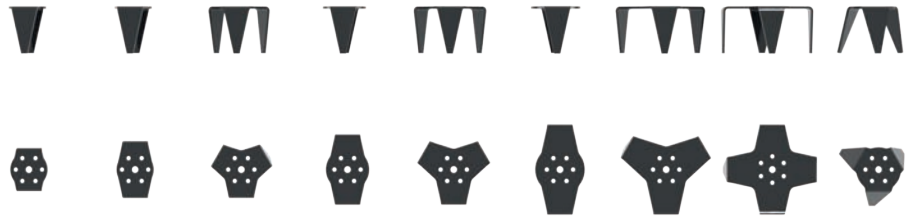
Weeding arms:

- Continuous rotation vertical tillers with adjustable speed
- Horizontal fixed knives



### REQUIRED SPECIFICATIONS

#### Weeding arms



Within the vertical rotary tiller kits, solutions with 2, 3, and 4 knives are available, with diameters ranging from 80 to 150 mm and working depths up to 75 mm. Custom solutions can be produced in request, subject to allowable torque limits.

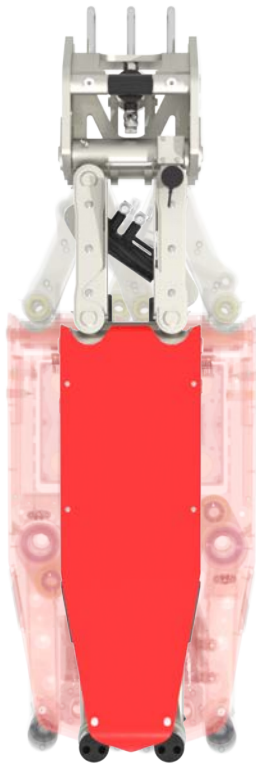
#### KIT ROTATION VERTICAL TILLER



Within the horizontal fixed knife kits, various solutions are available. Custom knives can be produced in request.

#### KIT HORIZONTAL FIXED KNIVES

## ROW ALIGNMENT



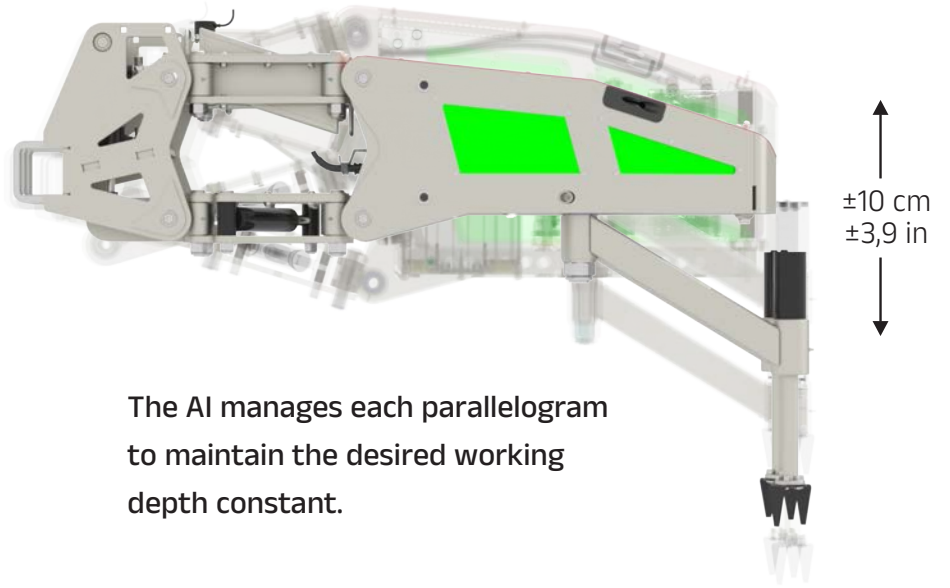
±10 cm  
±3,9 in



The AI detects the center of the plant and controls each parallelogram to optimize weeding proximity and prevent crop damage.

This also allows the system to compensate for any steering or transplanting errors.

## VERTICAL GROUND CONTOURING

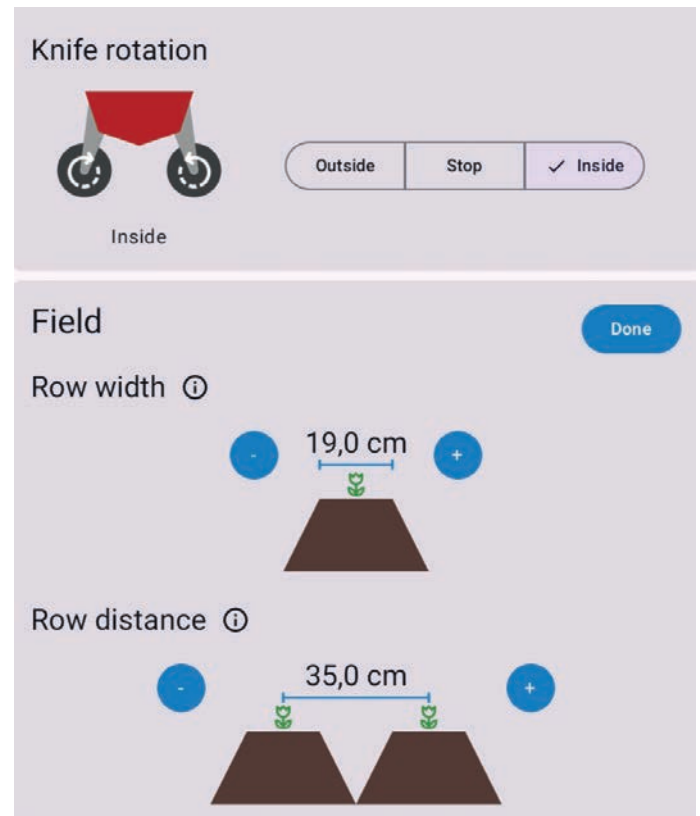
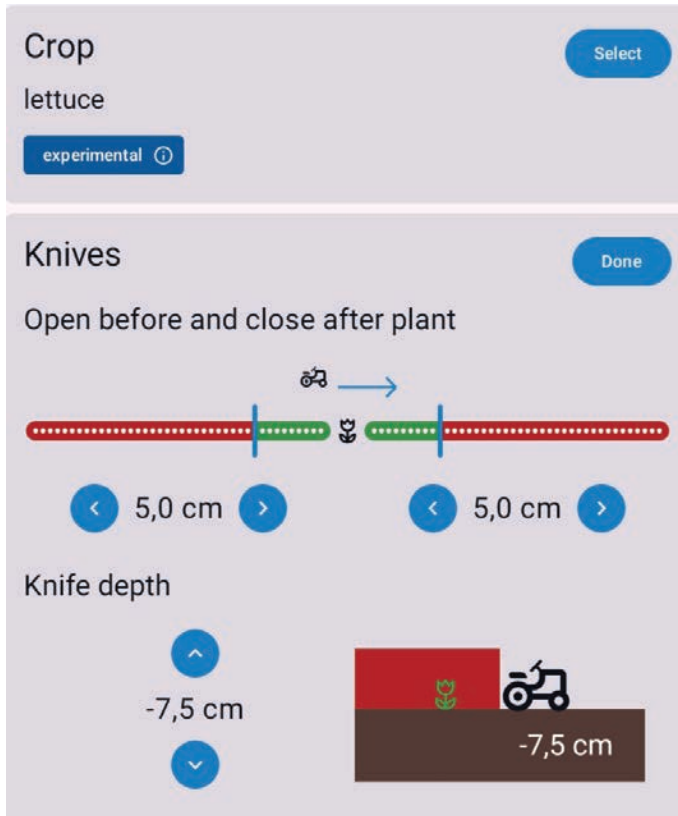


The AI manages each parallelogram to maintain the desired working depth constant.



## SETUP

SA-IA is extremely simple to configure and can be easily controlled from any tablet or smartphone via a dedicated Android app. With just a few intuitive settings, the system is immediately ready for use, straightforward to understand, and accessible to everyone.



### CHOOSE THE CROP:

Select the correct AI model for tilling.

### OPEN BEFORE:

Select how many centimeters before the plant the tillers should open.

### CLOSE AFTER

Select how many centimeters after the plant the tillers should close.

### DEPTH:

Select your target working depth.

### TILLER ROTATION:

Select the rotation direction of the tillers.

### ROW WIDTH:

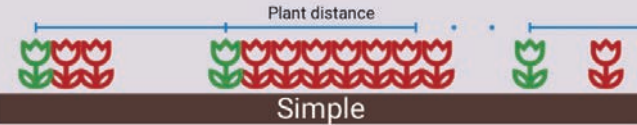
Define the camera's viewing width to manage the correct working depth.

### IN-ROW SPACING:

Define the distance between rows.

Enabled


Mode



Simple

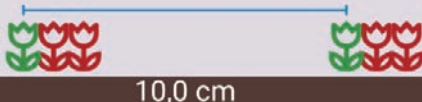
**⚠** In the simple mode, the knives won't open again, unless there is a sufficiently large opening between plants.

Current estimated plant size ⓘ



4,0 cm

Sowed plant distance ⓘ




10,0 cm

**THINNING OPTION:**

Select plant size and in-plant spacing; the knives will not open in order to perform thinning.


Manual vertical movement



63,6 cm

Take control

Manual horizontal movement



Take control

Camera box position

0 1 2


**MANUAL MOVEMENTS:**

Manually move each element during testing.

All cameras


Depth offsets Edit

Adjust the knife depth of individual weeding units relative to the global depth setting.



Flying height Edit

Minimal height at which the camera boxes will switch into their flying operating mode. This should happen any time the tractor lifts the machine for transport or changing rows.




40,0 cm

**DEPTH MANAGEMENT & FLYING MODE:**

Define depth variability relative to the general value and the switch threshold for flying mode.

Camera 1 ✓



State

Operating mode	Flying
Horizontal distance to plant	?
Camera distance to ground	63,6 cm
Vertical motor position	9,4 cm

Knives Auto ⚡ Lamp On ⏻ Active

Knives

Knife 0 State:?  
Should Close:No

Take control

**OVERVIEW:**

Monitor the settings of each weeding unit and view the live camera feed.

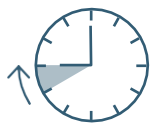


## How does our system learn new crops?

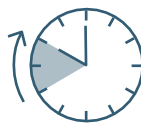
IT JUST TAKES ABOUT 6 HOURS



8:00  
Machine drives  
over the new  
crop in FLYING MODE  
and takes pictures



9:00  
Automatic  
upload  
of picture



10:00  
Tell the  
system where  
are crops



12:00  
System  
updates  
model



14:00  
Automatic Update!  
The machine can  
now work in the  
new crop



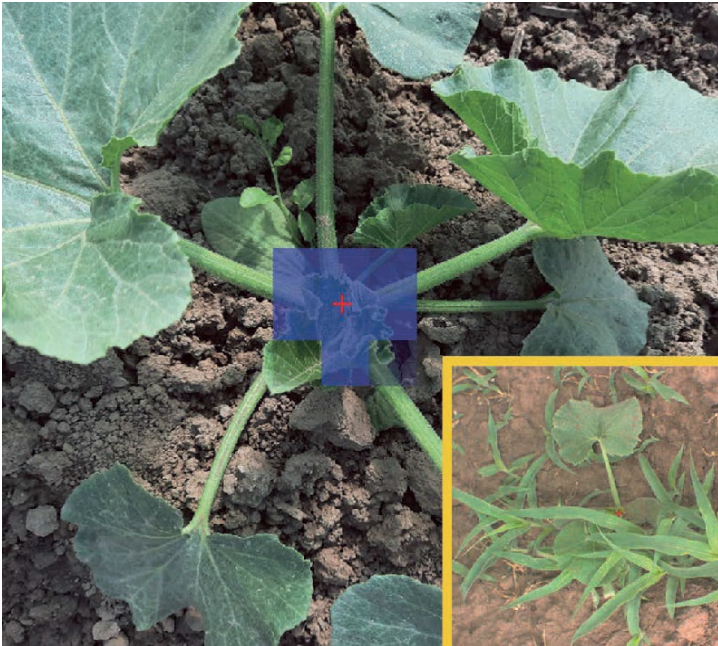
### Connected ecosystem:

Every machine learns from every other machine, and the updates get always distributed via Internet.

### Progressive effectiveness:

AI recognition gets better and better with every plant

## Alcuni esempi di cosa vede l'intelligenza artificiale



### Pumpkin

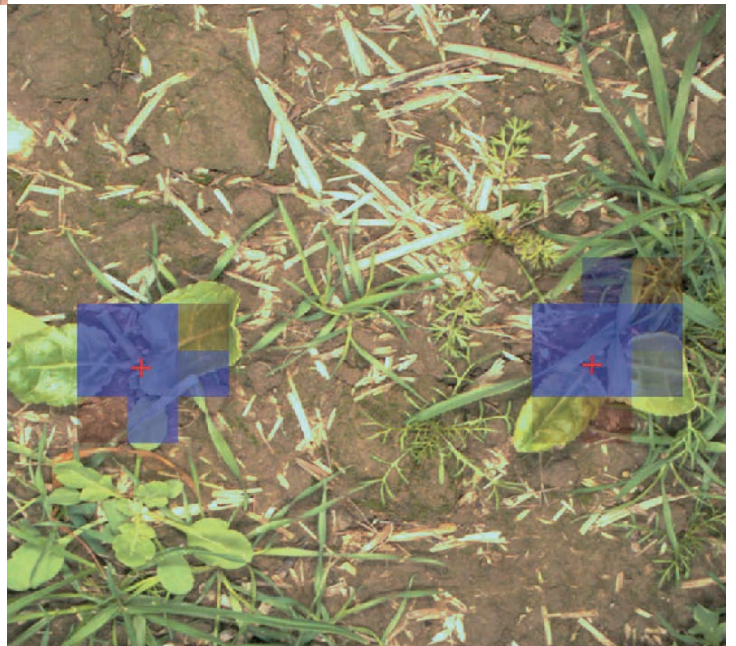


AI can accurately detect the center of pumpkin plants, even when they are overlapped, and is able to chop under the plant.

### Sugar Beets



Accurate recognition of plants even on bad fields is no problem.



### Cabbage



Due to crosswinds or growing paths, the roots and leaves of plants can become separated.

Our AI identifies the roots of plants (marked with +) and weeds around the blue area.



## Boost productivity and cut costs with AI technology signed by Ullmann.

### HERE IS WHAT WE OFFER...



99% Recognition of  
plants within weeds



Cultivation possible  
starting from  
2 germinating leaves



Independent of crop,  
in-row distance starting at  
roughly 15 cm possible



More than thousands of  
hectares already done



Side wind is not an issue -  
we steer based on the root  
part of the plant



Day or Night -  
due to our lighting even  
different sun angles  
are no problem



No need for  
any calibration



Every tractor driver  
can work with SA-IA



High speeds increase  
efficiency on the field



Works on nearly all crops



No ground  
contamination -  
no chemicals



Reduce my weeding  
costs up to 90%



Nearly no manual  
labor necessary!



Sustainable solution  
for future growth





**ORIGINAL EQUIPMENT MANUFACTURER**

**SPAPPERI**

**SPAPPERI NT S.r.l.**

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