

Service ID S00362



Location At user's premises, Spain

Validation of Weed Detection Systems

Provider service

Universitat de Lleida (UdL)

Link to content

<https://agrifoodtef.eu/catalogue-of-services/validation-weed-detection-systems>

Type of Sector

Arable farming, Horticulture

Accepted type of products

Data, Design / Documentation, Physical system, Software or AI model

Type of service

Collection of test data, Performance evaluation, Provision of datasets, Test design, Test execution, Test setup

Description

This service evaluates the accuracy and effectiveness of AI-driven weed detection systems, ensuring their accuracy in real agricultural conditions. By combining field trials (both in experimental and real-farm fields), drone-based imaging, and ground truth validation, the service assesses the system's ability to detect weeds with high precision, minimising false positives (incorrect weed detection) and false negatives (missed weeds). The service also validates the system's adaptability to different environmental conditions, such as varying soil types, weather, and crop growth stages, and it is applicable to herbaceous and arable crops, offering valuable insights for improving targeted weed control and reducing unnecessary herbicide use.

How can the service help you

The service supports developers of machine learning models, sensor-equipped sprayers, and robotic weeding systems in optimising their technology for precision agriculture.

- Before the service, clients may have a weed detection system that works in controlled environments but lacks real-field testing under varying weed densities, lighting conditions, and crop types.
- After the service, they will receive quantitative accuracy assessments, error analysis (false positives and false negatives), and performance comparisons with alternative detection methods (e.g., drone imaging).

This allows technology providers to fine-tune their models, improve decision-making algorithms, and increase the system's reliability for commercial agricultural applications.

How the service will be delivered

The service can be customised to test specific field conditions, crop types or weed species. Seasonal availability is limited to active crop growth periods, aligned with weed emergence periods (spring and summer). Customers should discuss customisation needs during the planning phase to ensure feasibility. If required, additional data processing or AI model evaluation services can be included.

Service customisation

The service will take place at controlled experimental farms and later at commercial farms, depending on the testing phase or the company's needs. Trials can be repeated across different crop types and growth stages to ensure diverse field conditions. This process can take up to 6-8 months, depending on the crop and system evaluation, and includes setup, treatment application, and data analysis evaluation. Testing can involve:

- Ground-based weed detection systems mounted on sprayers, robots, or other platforms.
- Comparison with drone-based weed maps for accuracy validation.
- Real-time and post-processing performance assessment, including detection errors.

Deliverables may include a detailed performance report with detection accuracy metrics. Customers must provide their weed detection system and specify detection parameters.