

**Service ID** S00048



**Location** At user's premises, Austria

## Testing of AI-based sensor performance

### Provider service

Josephinum Research

### Link to content

<https://agrifoodtef.eu/services/testing-ai-based-sensor-performance>

### Type of Sector

Arable farming, Horticulture, Tree Crops, Viticulture

### Accepted type of products

Physical system

### Type of service

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

### Description

Our service thoroughly evaluates AI-based sensors by measuring key metrics like accuracy, mean squared error, and other tailored parameters. Testing is conducted in real-world environments where the sensor will be used, with reference data recorded or labelled for analysis. For certain sensors, we also utilise benchmark datasets to validate performance. We assess consistency under identical conditions, adaptability to environmental changes (e.g., light, temperature, or weather), and improvements in accuracy over time. Additionally, we measure power consumption, processing efficiency, and memory usage to ensure optimal resource utilisation. Response time between detection and action is evaluated for real-time applications, while extreme condition testing (e.g., bright light, rainy conditions, compacted soil) ensures robustness in challenging environments. We also verify data security and resilience against adversarial attacks. This comprehensive testing is essential, ensuring sensors meet high standards of precision, reliability, and efficiency. Benchmark datasets, standardised data collections used for validation, provide a reliable baseline for performance comparison. By addressing these aspects, our service ensures your sensor technology is ready for real-world deployment, delivering the performance and adaptability your application demands.

## **How can the service help you**

This service provides clear, objective insights into the performance of AI-based sensors. It helps identify potential issues or edge cases, ensuring that the sensors meet precision. Before the service, customers may lack clarity on sensor accuracy or functionality under specific conditions. After the service, they receive detailed performance metrics and statistical analysis depending on the sensor, enabling them to address shortcomings and enhance their sensor technology for e.g., weed detection, bale mass estimation, or growth state analysis.

## **How the service will be delivered**

Customisation options include testing under specific environmental conditions, selecting targeted performance metrics, and integrating existing datasets for comparison. The service is tailored to match the unique requirements of the sensor's application, whether it is arable farming, horticulture, tree crops, or viticulture. Limitations may involve compatibility with existing datasets or constraints in replicating specific environmental conditions. Customers should communicate their specific needs and challenges during the initial consultation phase.

## **Service customisation**

The service is delivered at Josephinum Research's facilities in Austria or at the customer's premises, depending on the application requirements. Testing involves measuring key metrics such as accuracy and error rates in real-world or controlled environments, potentially using existing benchmark datasets. The duration of the service depends on the complexity of your sensor system and testing conditions, typically ranging from a few days to weeks (e.g., a dawn detection sensor is more complex than a volume estimation sensor). Customers receive a comprehensive report documenting the findings, including performance metrics and recommendations. They need to provide the sensor, relevant documentation, and details about the intended application environment.