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AI for New Devices And Technologies at the Edge

D5.1 Specifications of the use cases of the domain "Digital Farming"

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Type	Report	**Dissemination Level**	*Confidential*
Version	1.1	**Status**	Final
Description	This document provides the specification of the use cases in the Digital Farming domain.		
Work Package	WP5 – Application Integration and Evaluation.		

Abstract (Published Summary)

This deliverable summarizes the specifications for the use cases: UC2.1 “Autonomous Weeding System” and UC2.2 “Tomato pests and diseases forecast”.

This document specifies these two use cases. A description of the demonstrator system for both UC is also provided.

Within the Digital Farming use-case, B-INP in charge of the use case 2.1, will use the neuromorphic devices developed in ANDANTE to implement an autonomous system for automatic weeding of vegetables. Indeed, vegetable production imposes a wide variety of farming operations and among these operations, an early weeding is necessary to avoid competition between weed and crop. If the competition is too strong, the farmer can have huge losses in crop yield.

To create a solution available to a wide range of culture and planting parameters, Bordeaux-INP will develop an autonomous weeding system embedded on an electrical tractor, based on AI vision to be adaptable to various cultural method without creating a new system. The AI will oversee:

- Identification of crops to be preserved and/or of weed to be destroy.
- Localization of both plant and weed.
- Giving a real-time response
- Performing real-time computation to give the destruction order to the weeding tool controller.

The solution needs high precision, to avoid crop destruction while detecting the weeds present in the field.

In this use case, the end-user will be the farmer. The weeding process must work in completely automated manner, be transparent and the least constraining possible.

The proposed solution will be integrated in a block that can be attached to any tractor with the possibly to put several blocks in parallel to perform multi-row weeding. Structurally, the weeding block consists of two parts: the vision system and the binning tools.

For the Digital Farming use case 2.2, INOV, CCTI, ITAL, T-PRO aims to conceive a platform to monitoring the tomato crops health progress. The neuromorphic devices developed in ANDANTE will make possible the automatization of visual inspection in the cultivation fields, insight on the imaging data collected periodically, and permitting the submission of this analysis, on low bandwidth networks to a Edge or Cloud model responsible for assessing predictions about the presence of tomato pests and diseases, based also in other images collected by drones and weather information.