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**ANDANTE**

**AI for New Devices And Technologies at  
the Edge**

## **D5.8 Demonstrations of the domain “Digital Farming”**

<b>Deliverable No.</b>	D5.8	<b>Due Date</b>	<i>31-Jan-2024</i>
<b>Type</b>	Demonstrator	<b>Dissemination Level</b>	<i>Confidential</i>
<b>Version</b>	1.3	<b>Status</b>	Final
<b>Description</b>	This document describes the implementation and main achievements obtained from the UC2.1 and UC2.2 use case demonstrators related to Digital Farming application domain.		
<b>Work Package</b>	WP5 – Application Integration and Evaluation.		

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## Abstract (Published Summary)

This document serves as proof for the completion of the demonstrator deliverable 5.8 “Demonstrations of the domain “Digital Farming””. Furthermore, it describes the final setup of demonstrators planned to be based on ASIC 2.1 and platform 4.1a for the use cases 2.1 and 2.2 of the Digital Farming domain, in the context of WP5 Task 5.2 of the ANDANTE project. For both use cases, this deliverable provides information about the overall setup as well as details on the hardware and the software components including the AI algorithm realized during the project. All those aspects have been developed and tested via a simulated environment and reference boards due to the delay of platform 4.1a, and to no new developments could be made after February 29, 2024. Nevertheless, all the work documented in this deliverable serve as a base for the evaluations that are documented in D5.12.

In detail, the use cases present the following information and results in this deliverable:

In context of the **use case 2.1 “Automated Weeding System”**, B-INP and CEA show and discuss the setup of the BipBip and VineLapse vision systems which are sub-use-cases of UC2.1. Furthermore, they show the weeding robot based on the BipBip system and the sensor developed in ANDANTE for VineLapse. Afterwards, they present the algorithm for the classification task of both sub-use-cases more in detail. With all this information B-INP and CEA prove the achievement of finalizing a test and demonstration setups for the evaluation of neuromorphic technologies in agrarian vision systems like the ones used for BipBip and VineLapse. Additional to that the following results were obtained for this use case:

- For the weeding system, it was showed that the circuit can provide enough precision with some re-trained layer, in a difficult case like plants detection.
- The simulated environment can't provide relevant processing time (real-time capacity) and relevant power-consumption.
- Power consumption of the ASIC 2.1 on other use cases shown during the final review are very promising and having this ASIC directly integrated in IoT devices (like the VineLapse) would benefit to digital farming applications.

**In UC2.2 “Tomato Pest and Disease Forecast”**, the partners INOV, CCTI, ITAL, T-PRO and CEA created an intelligent insect's trap designed to monitor the emergence of insects in the fields. Additionally, a platform was implemented to integrate this trap's data with weather information, satellite, and drone imagery, enabling a continuous tracking of tomato crop health over time. In this deliverable, the partners show and discuss the platform and trap as well as the demonstration setup of a trap integrated with the NeuroCorgi SDK in a simulated environment, as an intermediate step to a demonstrator with platform 4.1a and ASIC 2.1 which were delayed. With this discussion the partners prove the completion of the achievement of realizing a test and demonstration setup for evaluating neuromorphic technologies in the context of pest monitoring. Furthermore, initial results of the setup are promising, demonstrating the SDK ability to track trends in the insect emergence overtime. However, conclusive findings regarding energy efficiency and consumption are still pending and require to be explored after the project.