This project has received funding from the Electronic Components and Systems for European Leadership Joint
Undertaking under grant agreement No 876925

ANDANTE

AI for New Devices And Technologies at the Edge

D4.7 Test and validation of the ANDANTE platform

Deliverable No.	D4.7	**Due Date**	*30-Sep-2023*
Type	Report	**Dissemination Level**	*Confidential*
Version	1.0	**Status**	Final
Description	This document describes the validation of the platforms developed in the ANDANTE project based on the Artificial (ANN) and Spiking Neural Networks (SNN) ASIC accelerators. These platforms will prepare the ground to demonstrate the technologies developed in ANDANTE as well as their performances for the different ANDANTE use cases.		
Work Package	WP4 – Implementation of ICs and Platforms.		

Abstract (Published Summary)

The overarching goal of ANDANTE is to leverage innovative hardware platforms for artificial neural networks (ANN) and spiking neural networks (SNN) as a basis for future products in the Edge IoT domain. The objective of WP4 “Implementation of ICs and platforms” is the implementation of the neuromorphic ASICs and platforms to cope with the use cases and system requirements defined in WP1 “Use case system architectures description and application requirements” and WP5 “Applications integration, validation and evaluation”. The platform development in WP4 is using the base technologies from WP2 “New Memory Technologies for AI applications”, the HW building blocks developed by WP3 “AI Building Blocks, Methods and Tools” and the ASICs and SoCs developed in Tasks 4.1, 4.2 and 4.3.

This deliverable is part of the Task 4.4 “Platforms development”. It describes the test and validation results as well as the test setups and procedures of the hardware platforms with its corresponding integrated ASICs and SoCs, which were applied in ANDANTE on several use cases.

In detail, deliverable D4.7 describes the activities regarding the test and validation as well as the test setups and procedures of the four hardware platforms and one ANMC evaluation board developed in ANDANTE, namely.

- Platform 4.1a: NeuroCorgi Platform with ASIC 2.1 for use cases 2.1, 2.2, 3.1, 3.2, 3.3 and 3.4
- Platform 4.1b: Audio Processing Platform with ASIC 1.3 for use cases 3.2, 5.1a, 5.1b and 5.1c
- Platform 4.2: Spiking Acceleration (SA) Platform with ASIC 1.1 for use cases 1.1 setup A and 4.3
- Platform 4.3: Fraunhofer platform with ASIC 3.1 for use case 5.1d
- Board 4.1: ANMC board for ASIC 3.2 for use case 1.2

Please note that a fifth platform, platform 4.4 of SynSense for use case 5.2, exists. This platform was not developed or adapted in ANDANTE. Hence, it is not part of this deliverable and was not listed with the others. Its description can be found in D4.2b. Nevertheless, the ANDANTE platform/board systems are widely differing regarding the features, basic technologies, and components, as well as the requirements from the various intended application domains and use cases. Furthermore, board 4.1 was called a board instead of a platform, because it is an extended version of a IFAG test bench from TEMPO. This entails it cannot directly be used for implementation of applications or the development of products compared to the other platforms.

The following table gives an overview of the platforms and board, whose validation results are covered by this deliverable as well as the use cases covered with them. For further details about the use cases see also deliverable D5.6 “Report about progress of the implementation of the use cases”.

ANDANTE Platforms covered by this deliverable with related use cases and application domains.

Platform / board and ASIC	Use case	Application domain
Platform 4.1a: NeuroCorgi platform with ASIC 2.1	Use Case 2.1: Autonomous Weeding System Use Case 2.2: Tomato pests and diseases forecast	Domain 2: Digital Farming
	Use Case 3.1: Drones/USV Use Case 3.2: Underwater Acoustic Signal Classification (Solution 3.2a with CNN architecture) Use Case 3.3: 3D Object Detection and Classification of Road Users based on LiDAR and camera Use Case 3.4: Robust Autonomous Landing	Domain 3: Transport and Smart Mobility
Platform 4.1b: Audio processing platform (Xylo-A2 HDK) with ASIC 1.3	Use Case 3.2: Underwater Acoustic Signal Classification (Solution 3.2b with SNN architecture)	Domain 3: Transport and Smart Mobility
	Use Case 5.1: Consumer Auditory Processing, with Sub Use Cases - 5.1a: Auditory anomaly detection for Safety in a Smart Home - 5.1b: Ambient Audio Scene Classification - Case 5.1c: Multi-microphone auditory processing	Domain 5: Digital Life
Platform 4.2: Spiking Acceleration (SA) Platform for ASIC 1.1	Use Case 1.1A: Indoor Positioning, Recognition and People Counting (setup A, Radar)	Domain 1: Digital Industry
	Use Case 4.3: Glucose Monitoring	Domain 4: Healthcare
Platform 4.3: Fraunhofer platform for ASIC 3.1	Use Case 5.1: Consumer Auditory Processing Sub Use Case 5.1d: Voice Activity Detection	Domain 4: Healthcare
Board 4.1: ANMC board for ASIC 3.2	Use Case 1.2: Color Classification at the Edge for Quality Control	Domain 1: Digital Industry