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ANDANTE

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

**D5.11 Demonstrations of the domain
“Digital Society/Life”**

Deliverable No.	D5.11	Due Date	31-Jan-2024
Type	Demonstrator	Dissemination Level	Confidential
Version	1.0	Status	Final
Description	This document describes the final implementation of the demonstrators related to the Use Case Domain 5 / Digital Life, i.e. the ANDANTE Use Cases UC5.1 with its sub Use Cases and the UC5.2.		
Work Package	WP5 – Application Integration and Evaluation.		

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Abstract (Published Summary)

This document serves as proof for the completion of the demonstrator deliverable 5.11 “Demonstrations of the domain “Digital Life/Society”. Furthermore, it describes the final setup of demonstrators as well as components for the implementation of the setups that were not developed in other WPs for the use cases in the Digital LIFE domain, in the context of WP5 Task 5.5 of the ANDANTE project. Within this task, two use cases were defined: use case 5.1 about “Consumer Auditory Processing” developed by SynSense and FHG, which is divided into 4 sub-use-cases, and use case 5.2 about “Vision-Based Human-Computer Interaction” implemented by CSEM. The demonstrators for these use cases described in this deliverable are leverage for the evaluation work by the corresponding partners that is documented in D5.12.

In detail the partners present in context of UC5.1 the following:

- **UC5.1a “Auditory Anomaly Detection for Safety in a Smart Home”** is one of sub-use cases developed by SynSense based on ASIC 1.3 and platform 4.1b. Besides the general setup SynSense discusses the WaveSense algorithm, which was published on arXiv and implemented with Rockpool library, and the preprocessing steps of the demonstrator pipeline. With this SynSense proves the achievement of the completion of a prototype for a continuous audio monitoring based on SNN algorithm and hardware.
- **UC5.1b “Ambient Audio Scene Classification”** is one of sub-use cases developed by SynSense based on ASIC 1.3 and platform 4.1b. Additionally to presenting the overall setup, SynSense outlines the details about the SynNet algorithm that was implemented by them for this use case with the QUT-NOISE data sets and based on the Rockpool library. With this description SynSense proves the finalization of a prototype for continuous temporal signal monitoring in the context of portable audio devices.
- **UC5.1c “Multi-Microphone Auditory Processing”** is one of sub-use cases developed by SynSense based on ASIC 1.3 and platform 4.1b. For the setup of this use case, they present some details about simulation components, the SNN model and Hilbert-transform-based event encoding method that were developed for UC5.1c. With this, SynSense proves the achievement of completing the implementation of a reverse beamforming using a novel approach, designed for SNN implementations.
- **UC5.1d “Voice Activity Detection”** was developed by FHG based on ASIC 3.1 and platform 4.3. Besides an overview about the architecture of this demonstrator, FHG discusses details of the processing pipeline, the CNN model implemented for this use case and the different execution modes of the platform used in the demonstrator. With all this FHG proves the finalization of a prototype of an energy efficient voice detection system for digital voice assistants.

For **UC 5.2 “Vision-based Human-Computer Interaction”**, CSEM presented information on the overall configuration of the UC5.2 demonstrator, the algorithm developed for this use case, its deployment pipeline, the results of the preliminary evaluation and the 4.4 platform, since it was not developed in ANDANTE. All this information combined shows that CSEM has successfully created a demonstrator for detecting user attention on a device.