

Pathway to Edge AI Focus Topic

KDT JU's Call 2023

Workshop on Edge AI – EFECS 2022

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EUROPEAN
PARTNERSHIP



BACKGROUND OF EDGE AI FOCUS TOPIC IN CALL 2023

- **Call 2021:** Focus topic: **Processing solutions for AI at the edge.**
- KDT JU started drafting Focus Topic text for **Call 2023**, based on inputs from previous workshops, ECS SRIA, EPoSS white paper, past and current relevant projects, as well as other EU and industry roadmaps and agendas.
- **KDT JU office** together with EPoSS Task Force on 'AI at the Edge' (including some key experts from of the other 2 associations) hosted the preparation of a **draft text for the focus topic.**
- KDT JU organized a **consultation** with the community in **this workshop**, and the text was updated with considerations to **the feedback.**

CONTEXT OF FOCUS TOPIC ON EDGE AI (CALL 2023)

Integration of trustworthy edge AI technologies in complex heterogeneous ECS

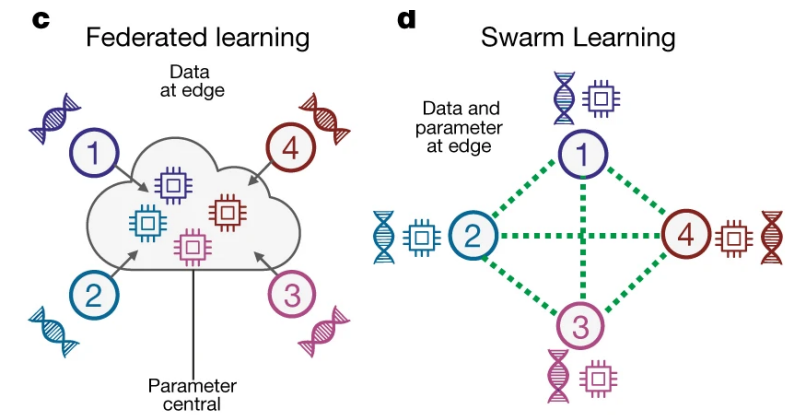
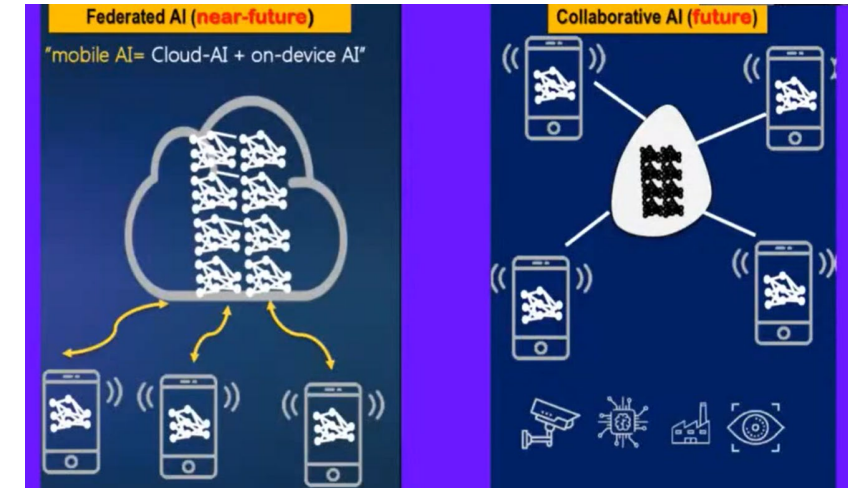
- Edge AI market features a *fragmented offering of heterogeneous solutions*.
- EU has unique opportunity in Edge AI by building up on its *strengths in designing trustworthy, complex, heterogeneous ECS that are interoperable*.
- A new paradigm of truly *collaborative edge AI* will emerge, as featured by intelligent edge devices automatically & securely cooperating to perform complex tasks.
- This level of autonomy raises all kinds of *trustworthiness and sovereignty challenges* that must be addressed.



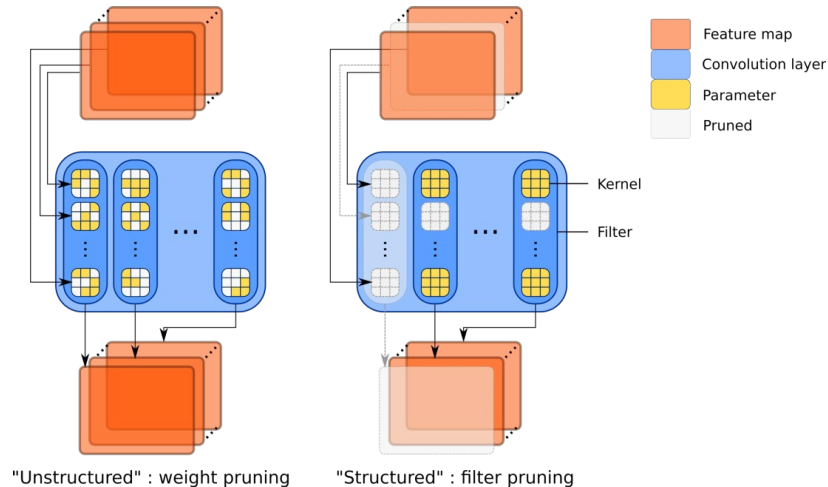
EXPECTED OUTCOMES AND SCOPE (1/3)

1. Interoperable & replicable edge AI HW/SW solutions

- **End-to-end edge AI architectures** including the continuum of AI-based algorithms, devices, as well as interoperability and trusted exchangeability through standardized APIs.
- **AI integration and packaging approaches at the chip level**, which facilitate a tight combination of logic and memory providing wide interface lanes (also including interfaces between sensing and computation) and low latency
- Next generation HW/SW edge AI technologies that support **fully collaborative AI** by allowing devices to learn & evolve learning at the edge (supporting e.g., transfer learning and meta learning), as well as coordination tasks (potentially including cognitive reasoning tasks).
- Development of HW/SW architectures that support software **upgradability** under resource-constrained scenarios.



EXPECTED OUTCOMES AND SCOPE (2/3)



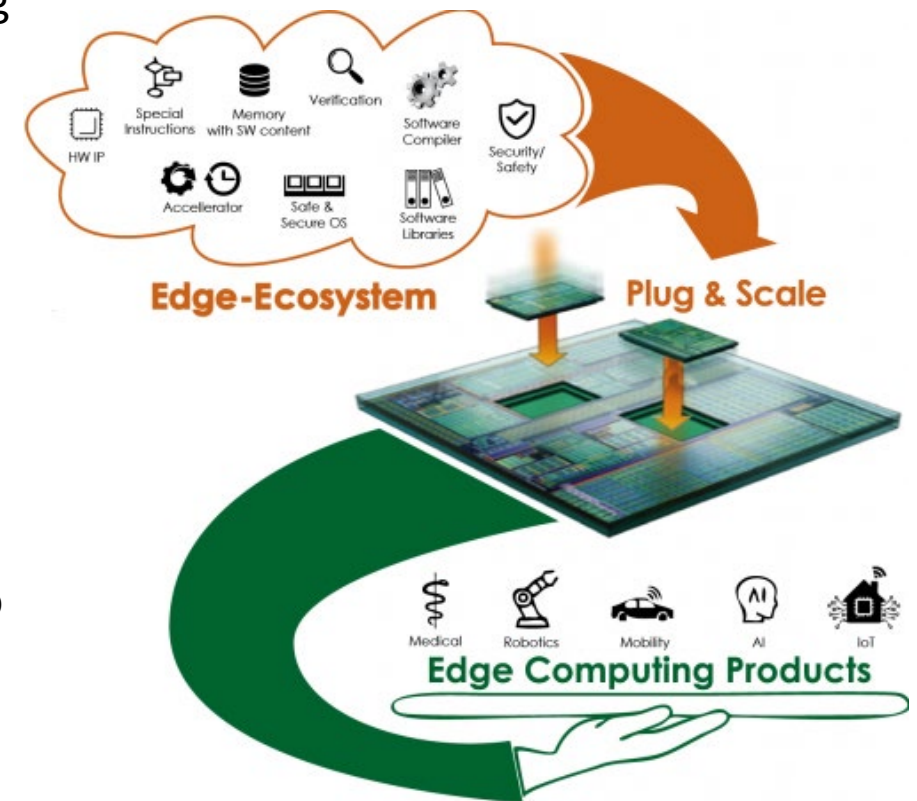
2. Efficient & standard engineering methods and tools

- Design **tool chains featuring automated tasks & standardized interfaces** to deliver optimized edge AI solutions in heterogeneous embedded systems.
- Tool chains for **deployment, optimization and validation** of heterogeneous edge AI components and systems. The tool chains should support fast and **early exploration and efficient mapping** of complex AI structures such as DNNs on embedded architectures.
- Assurance frameworks for edge AI **trustworthiness** with particular focus on **privacy, robustness, safety, security** as well as **evaluation of associated error/uncertainty bounds** and **certification/qualification management**, and paths towards **explainable AI**.
- Methods and implementation of algorithms for selection, compression, handling and collection of **meaningful data sets**, in order to generate efficient collaborative AI applications at a rapidly accelerated pace.

EXPECTED OUTCOMES AND SCOPE (3/3)

3. Open & integrated platforms and ecosystems

- Sustainable impact & creation of industry-driven community by building **tightly integrated open edge AI platforms & ecosystems**, from system to the device level, including design toolkits supported on standards.
- **Supply chain integrity** for development capability, development tools, production, and software ecosystems, with support for the **entire lifecycle of edge AI-based solutions**. A special care on measuring the environmental impact of the developed solutions.
- Promoting edge AI sovereignty by developing trusted and transparent **governance frameworks**.
- **Benchmarking frameworks** with meaningful metric sets of relevance to edge AI, with particular focus on at-scale technology availability, energy efficiency, security, safety and privacy.
- **Open-source** is particularly encouraged to make the platforms (open-source hardware, software, training datasets, etc.) accessible and to spread it easily in the edge AI community and in the market.



IMPORTANT FOR THIS FOCUS TOPIC CALL

While many EU projects/initiatives already exist, this call focuses on large-scale integrated/integrable edge AI technologies at greater levels of energy efficiency, connectivity, collaboration, complexity and diversity.

Projects selected under this call are expected to **incrementally co-create a strong European edge AI ecosystem** with these existing projects/initiatives and other related communities, to strengthen established platforms/technologies & enable interconnections between them.

Some additional aspects:

- Type of Action: **IA** (targeted TRLs from 4 to 6 at the end of the project)
- Expected strong participation of SMEs (for both development & exploitation of the ecosystem)
- Expected tasks for road-mapping, co-creation and cohesion activities with related initiatives.
- Liaising to TEF EDGE AI, is strongly encouraged.

THANK YOU!

SCHEDULE CALL 2023

Tentative Schedule	Calls 2023	Calls 2024
Calls LAUNCH (IA, RIA, CSA)	07-02-23	06-02-24
Calls PO Deadline for IA & RIA call and CSA Call	03-05-23	14-05-24
Calls IA and RIA PO/CSA evaluations	30/05 -09/06/2023	10/06-14/06/2024
Calls IA & RIA FPP Deadline date	19-09-23	17-09-24
Calls: IA & RIA FPP Evaluation in Brussels (Covent Garden Building)	23- 27/10/2023	21- 25/10/2024

- Focus topics still under discussion
 - Edge AI focus topic **to be approved by Dec 2022**

EDGE AI: KEY INPUTS FOR CALL 2023

Relevant Workshops

- **ECS-SRIA Workshop: AI, IoT, Advanced Control and Edge Computing** (May 2021).
- **European Workshop on the Future of Edge AI** (Jun, 2022) organized by EPoSS.

Relevant Documents

- **ECS SRIA 2021 & 2022**
- **"AI at the Edge" white paper by EPoSS**
- **Strategic Research, Innovation and Deployment Agenda (AI, Data and Robotics Partnership)**

Relevant Initiatives

- **EU Cloud Edge IoT Initiative**, aiming at accelerating the adoption of Cloud, Edge & IoT (CEI) technologies in Europe.
- **Edge AI and Vision Alliance** (about 100 members), located in USA but has EU members: ST, NXP, ...

Projects

- **Edge AI TEF**
- **ECSEL and KDT projects up to Call 2021** (see next slides)
- **IPCEI on microelectronics** (Sensing, power electronics, photonics technologies to be integrated in Edge AI)
- **Other projects from PENTA, EURIPIDES2** (e.g., MANTIS on Vision techs for AI-capable edge nodes)

SOME ECSEL & KDT PROJECTS RELATED TO EDGE AI

ECSEL (<2020)

ECS for embedded systems



SafeCOP

Cooperation through wireless

ECS for IoT



SCOTT

Connected IoT

ECS for automobile, sensing and control



OCEAN12 PRYSTINE

Electronic subsystems

Electronic enabling technologies

ECS for automobile, including security and autonomous driving



DENSE



3CCAR



AUTODRIVE



ROBUSTSENSE

ECSEL (2018-2022)



REFERENCE



5G-GaN2

Enabling technologies for low-latency 5G – access to the edge

Connectivity

* Landscape prepared by CLEVER project

