

Horizon Europe Project Factsheet

NetZeroAICT

Digital Contrast for Computerised Tomography

-Towards Climate Neutral and Sustainable Health Systems-

Project description:

The NetZeroAICT project is developing a novel AI solution, combining deep learning methods with non-contrast CT scans to synthesise contrast 'digitally'. Our goal is to reduce the environmental and health impact of contrast enhanced CTs (CECTs), which generate significant CO₂ emissions, iodine waste, and potential harm to patients.

We are creating a reference framework for scalable development of AI health tools for a future of sustainable health systems. We will develop and validate five use cases of CT 'Digital Contrast' for different clinical scenarios, such as stroke, cancer, and trauma. The NetZeroAICT platform will use cloud computing technology and user-friendly application interfaces to integrate, process, and interpret non-contrast CT scans and synthesise contrast images that are comparable to CECTs in quality and diagnostic value.

The digital contrast solution is designed not only to avoid the need to administer radiocontrast media (RCM) for CECTs, but also to enable the clinician to personalise the scan for each patient and receive accurate and meaningful results from the interpretation of this multi-modal data by Artificial Intelligence.

The universality of the NetZeroAICT solution will allow its uptake worldwide, including in low resource environments, which will benefit from its cost-effective and eco-friendly nature and access to international expert derived interpretive algorithms. By implementing 'Digital Contrast' for scans globally, we aim to reduce 30% of the CO₂e and iodine RCM waste generated from CECTs by 2033. NetZeroAICT has a grand vision to accelerate the EU's trajectory towards NetZero and advance EU's globally recognised leadership position on Healthcare sustainability.



Figure 1 Digital Contrast CTs do not require the insertion of needles. After the first non-contrast scan, the AI algorithm synthesises contrast digitally and overlays this over the original non-contrast CT image



Project facts:

Start date: 01/12/2023
End date: 30/11/2027

Duration in months: 48

EU budget: €3.79 M

HORIZON Research and Innovation Actions

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Ensuring access to innovative, sustainable and high-quality healthcare

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Project objectives:

Our ambition is to develop state-of-the-art trustworthy Green AI to synthesise 'CT Digital Contrast' and reduce the global reliance on iodinated radiocontrast media (RCM) for computerised tomography (CT) imaging.

To achieve the project aims, the following objectives have been set:

1. Implement legal, ethical and sustainable frameworks that promote the trustworthiness of NetZeroAICT.
2. Establish a centralised, trusted CT image repository for medical AI development which champions the FAIR principles.
3. Classify CT images by their characteristics through a central computation platform.
4. Implement a 'green', sustainable and integrated computational pipeline for the training, validation and deployment of medical AI.
5. Develop and validate **5 clinical applications** (Indication for Use (IFU): CT angiogram of aorta, pulmonary artery, neck and brain arteries, limb arteries, coronary arteries) of 'Digital Contrast' for CT imaging. Each IFU is validated using 1,000 cases.
6. Validation of the trustworthy NetZeroAICT products through engaging stakeholders
7. Demonstrate the environmental impact of our innovations through comprehensive social-life cycle analyses. A global reduction of 900,000 tonnes of CO2 emission is expected if conventional contrast imaging is reduced by 30%. Projected savings of €2B in EU and UK per year.
8. Define the roadmap to wider exploitation and impact for the NetZeroAICT ecosystem – towards sustainable and climate-neutral health systems.
9. Promote awareness of NetZeroAICT innovations to key stakeholders, with additional focus on 5 key economies (Germany, UK, France, Italy, Spain) in Europe.

Expected impact:

The impact of our innovation is to reduce the environmental footprint created by CT scans, which are one of the most commonly performed clinical scans in healthcare systems. CT scans are estimated to result in 3 mega tons of CO2 emission globally (9kg/scan) and iodinated RCM required for CT scans further accounts for 3% of pharmaceutical waste released into the wastewater (estimated 200,000 tons of iodine/year). We aim to reduce 30% of this environmental footprint by 2033 by deploying the Digital Contrast AI in all European countries.

Ultimately, NetZeroAICT is expected to refine the AI / deep learning pipeline to simulate contrast enhancement in CT images in a pathology-agnostic manner

Project consortium



Consortium:

CM	Sweden
RH	USA
Z-Visie	Netherlands
Unilabs	Sweden
BETT	Czech Republic
AMI	Czech Republic
CHUN	France
OPO	Poland
PAGNI	Greece
ZAS	Belgium
AZSTJB	Belgium
UoO	United Kingdom
USP	Brazil
UFF	Brazil
UI	United Kingdom
UoL	United Kingdom
UoG	United Kingdom
USYD	Australia

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#GreenAI #Innovation #Healthcare
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