



# Tensor-based Optimal Control approaches for Deep Learning (TOC4Deep)

Seed Funding

DIGITALIZED!

Data Science & AI

Sustainability

The awareness about the environmental impact of machine learning has recently increased. The carbon footprint of learning one large, but common, machine learning model is estimated to equal the CO<sub>2</sub> emissions produced by five cars over their whole lifetimes. Deep learning is a popular machine learning framework with state-of-the-art applications in image and speech recognition, and computer vision. Recently, a new viewpoint emerged from applied mathematics that interprets the learning phase as an optimal control problem (OCP) constrained by differential equations. This formulation opens the door to more advanced methods for OCPs, not previously exploited in deep learning. TOC4Deep will exploit powerful techniques from applied mathematics to solve the optimal control form of the learning problem.

## Details

**Third Parties:**

Neurality ·

Brainnwave

**Budget:** €11,000

**Duration of funding period:**

February 2022 -

September 2022

## Key contact

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## Partners involved

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