

ELECTRICAL, ELECTRONICS AND COMMUNICATIONS ENGINEERING

PNRR - Green AI Applications

Funded By	MINISTERO DELL'UNIVERSITA' E DELLA RICERCA [P.iva/CF:97429780584] Politecnico di TORINO [P.iva/CF:00518460019]
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Context of the research activity	<p>To govern and reduce CO2 emissions from software assets, tools and methods to provide a reliable and realistic estimation of energy consumption of AI solutions are needed. The aim of the research is the development of tools for assessing the environmental impact of AI applications. The tools are envisioned as the starting point for implementing green AI approaches.</p> <p>PNRR M4C2, Investimento 1.4 - Avviso n. 3138 del 16/12/2021 - CN00000013 National Centre for HPC, Big Data and Quantum Computing (HPC) - CUP E13C22000990001</p>
Objectives	<p>The goal of the research is to provide tools and methodologies to assess the environmental impact of AI applications, so as to enable the design of solutions that have a limited environmental impact. Since AI solutions are being pervasively deployed and integrated in applications and they have a high computational complexity and, correspondingly, high footprint, coping with their environmental impact is needed and urgent.</p> <p>The outcome of the research consists of a set of methodologies, best practices, or potential tools that can be integrated into industrial processes for assessing the environmental impact of AI applications. In perspective, the possibility to rely on a careful assessment of the environmental impact of AI approaches enables the development of applications that are greener by design or are capable to adapt to the availability of energy and to its cost.</p> <p>A key output of the research will be a set of models that establish the relationship between the parameters of the considered AI algorithms and the environmental impact of the algorithms, assessed in terms of energy consumption and emissions. Through these models, it is possible to identify guidelines and recommendations that lead to applications designed with</p>

limited environmental impact. For example, these applications may be capable of dynamically seeking and utilizing low-emission computational resources or finding the most advantageous trade-off between computational complexity and performance levels.

Skills and competencies for the development of the activity

Knowledge on communications and networking. Programming skills. Competence on machine learning techniques.