ELECTRICAL, ELECTRONICS AND COMMUNICATIONS ENGINEERING

CNR/IEIIT - Distributed Machine Learning Over Heterogeneous Networks

Funded By	C.N.R. - CONSIGLIO NAZIONALE DELLE RICERCHE [P.iva/CF:02118311006]
Supervisor	CHIASSERINI CARLA FABIANA - carla.chiasserini@polito.it
Contact	Francesco Malandrino
Context of the research activity	The research topic concerns the design and development of techniques for distributed machine learning over heterogeneous networks, which have both data transfer and data processing capabilities. Data will refer to different mobile applications and network services, and the entities recipients of the the machine learning-based applications and services will include IoTs of various type as well as human hand-handled devices.
Objectives	The research topic concerns the design and development of techniques for distributed machine learning over heterogeneous networks. It will first require to model heterogeneous networks and their capabilities in terms of traffic transfer as well as data storage and processing. Then it will address the problem of optimally supporting emerging architectures of advanced machine learning models, including dynamic large models (language and visual) in resource-constrained network environments. The latter will include edge and far edge scenarios. Particular emphasis will be given to the need to handle multiple tasks and leverage data collected at different locations or through different user devices. The work will thus require methodologies that span from analytical system modelling, theoretical analysis, development of algorithmic solution frameworks, and experiments through testbeds in realistic operational conditions. The use cases that will be evaluated and for which the designed solutions will be implemented include different application scenarios ranging from mobile robots to e-health, and different network services such as image and video transfer over terrestrial and non terrestrial networks.
Skills and competencies for the development of the activity	- Knowledge of communication and computer networks - Knowledge of mobile networks. - Knowledge of machine learning approaches. - Programming and Python labriries for ML.