Centre Tecnològic de Telecomunicacions de Catalunya (CTTC)

Sustainable Artificial Intelligence Research Unit

one-page for internships

Who we are: The Centre Tecnològic de Telecomunicacions de Catalunya (CTTC) is a non-profit research institution based in Castelldefels (Barcelona), resulting from a public initiative of the Regional Government of Catalonia.
Research activities at the CTTC, both fundamental and applied, mainly focus on technologies related to communication systems, distributed computing and to the Geomatics.
More information at: www.cttc.es

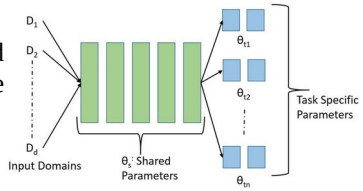
Our research: The Sustainable Artificial Intelligence research unit targets a twofold objective: we aim to address the sustainability of developing and using AI systems and, we direct AI usage towards the sustainable development goals. In other words, for us, it is of upmost importance to design AI systems for sustainable development as well as explicitly targeting the sustainability of AI training and usage.
More information at: https://www.cttc.cat/sustainable-artificial-intelligence-sai/ and https://supercom.cttc.es/

Topics for the internships

The research activities proposed here below aims to study different distributed machine learning paradigms to be run in edge devices (i.e., small devices with limited power and computing capability). We are focusing on the training phase of such different approaches.

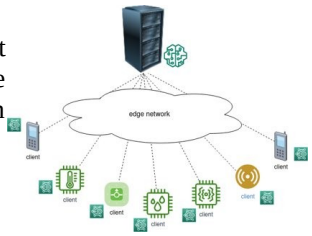
Topic 1: Multi-task learning for mobile traffic prediction

The aim of this work is to design a general prediction framework to deal with data captured from operative cellular networks in Spain. The model should be able to execute multiple tasks, being one task the prediction at one base station (antenna) site.



Topic 2: Client selection for energy minimization in federated learning

In this research topic, we aim to schedule the optimal number of clients participating at each federated learning round so that the total energy is minimized, while at the same time maintaining an adequate level of accuracy and short training time (algorithm convergence).



Topic 3: Path and node selection for peer-to-peer federated learning from distributed data sources

This work aims at designing a peer-to-peer federated learning framework using a methodology derived from the continual learning paradigm. In particular, here we focus on the identification of the optimal policy to select the best nodes across a learning path, so that the training time (algorithm convergence) is minimized.