Neural architecture search (NAS) for aerial drones

I. Overview:

Neural architecture search (NAS) is a cutting-edge technique in the field of deep learning that automates the process of designing and optimizing neural network architectures. The traditional approach to designing neural networks involves the manual selection of the network architecture, followed by a trial-and-error process of tweaking the hyperparameters to achieve the desired performance. This process can be time-consuming and highly dependent on the researcher's expertise. On the other hand, NAS searches through a vast space of potential neural network architectures and selects the most optimal one for a given task. This approach not only saves time and effort but also has the potential to discover novel and highly efficient network architectures that might have yet to be discovered through manual design.

NAS can be applied to various deep learning tasks such as image classification, object detection, speech recognition, and natural language processing. It has the potential to significantly improve the performance of these tasks by finding the best neural network architecture for the given data and problem. NAS also applies to scenarios with limited computational resources, such as mobile devices and edge computing, as it can identify lightweight and efficient neural network architectures that can run on such devices.

II. Project Description:

We propose using a NAS to identify the most effective design for a neural network to control an aerial drone. By ``effective'', we mean the design that can provide the best accuracy, defined through an appropriately defined loss function. The idea is to start with a supernet that resumes all the possible choices that can be taken with respect to the architecture and subsequently simplify it.

III. Requirments:

- Good knowledge of machine learning and deep learning.
- Knowledge of Mathematical programming is considered a plus
- Excellent programming skills (Python is mandatory. Keras, TensorFlow and PyTorch are a plus).

IV Supervisors:

Pegah ALIZADEH. Ericsson R&D center, Paris, France.
pegah.alizadeh@gmail.com
Emiliano TRAVERSI. Université de Montpeller, France. emiliano.traversi@gmail.com