ENGLISH VERSION

Subject: Biomass estimation of an area through satellite images.

Objective: Design an AI model to predict the biomass of an area.

**Baseline**: To achieve the baseline we decided to implement two models.

- First model

For the implementation of such a model, we used a training pipeline based on the Sklearn library. In this pipeline we note three levels of data transformation. The first level consists in normalizing the images in each spectral band. Then the second level transforms each image into a vector (flatten). Thus, each image passes from (15,15,12) to a vector of 15*15*12 elements where each element is actually a pixel value. Finally, the last level uses the model chosen to do the training. To go further, we performed a **grisearch** by integrating different models with different hyperparameters in the pipeline. The model selected at the end was: **Lasso** and as hyperparameter **alpha: 0.1**.
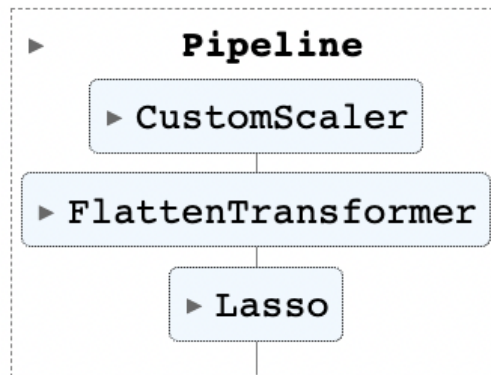
- Second model

The second model realized is based on convolutional neural networks (CNN) and uses the Pytorch library. The realized architecture is a block of 3 convolutions. The images are standardized before going to the first convolution block. Then, at the output of each convolution we apply a normalization (GroupNorm) and a ReLU activation function before entering the next convolution. Once the convolutions are completed, the results are transformed into a vector (flatten) that is passed into a fully connected network.
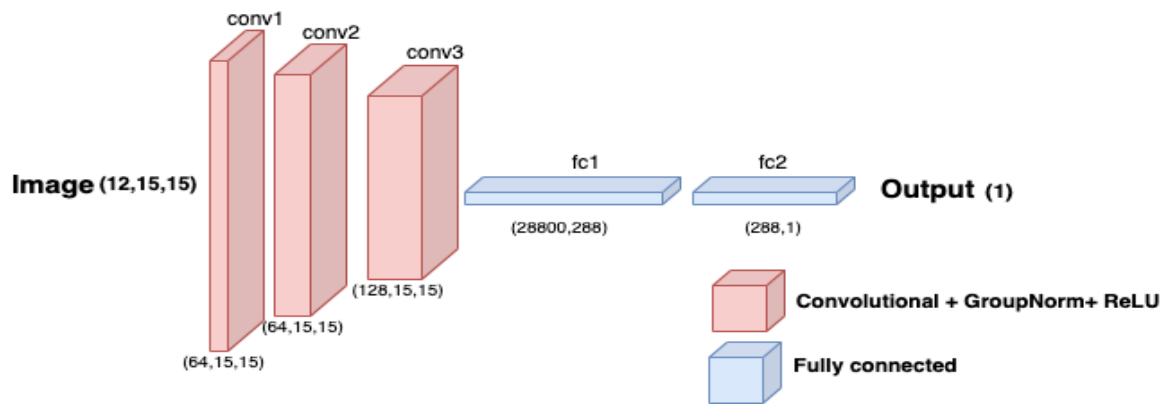
Results: The metric used is the RMSE

- First model : 52.93983
- Second model : 255.79233