

RELATECH: Advanced systems based on machine learning techniques and models for the prediction of crop and forest productivity in different climatic scenarios

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Objectives

- Predict agricultural yield basing on weather variables

▶ **Target:**

- ▶ Predict agricultural yield basing on weather variables

▶ **Dataset**

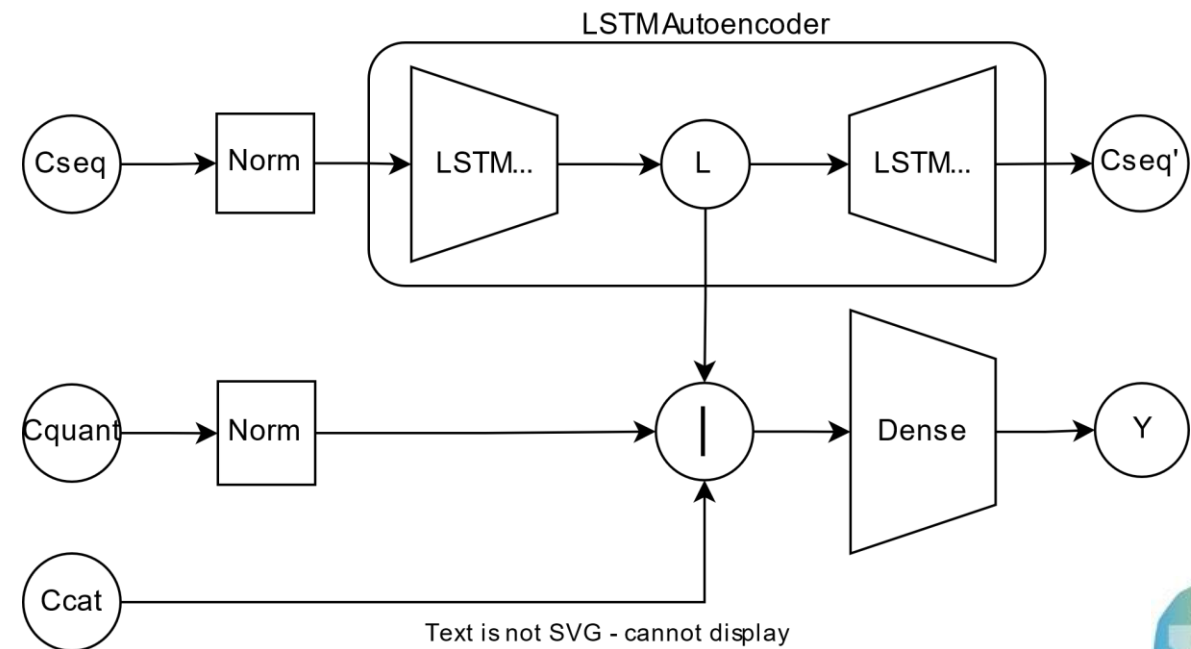
- ▶ Weather variables for each region and year
- ▶ Per-region aggregated yearly data of crop yield

▶ **Proposed Technique:**

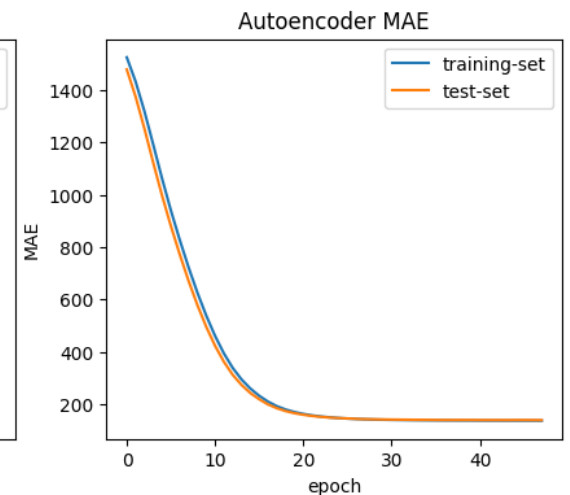
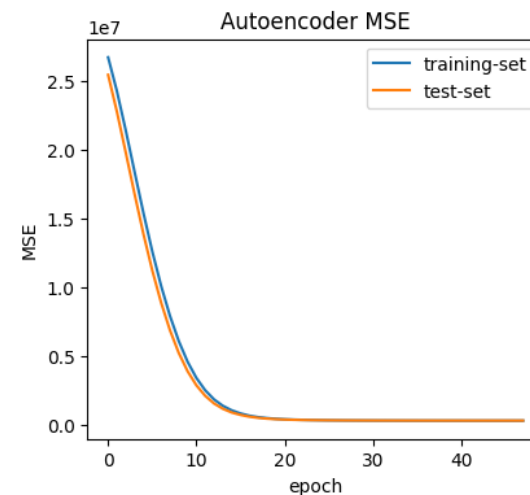
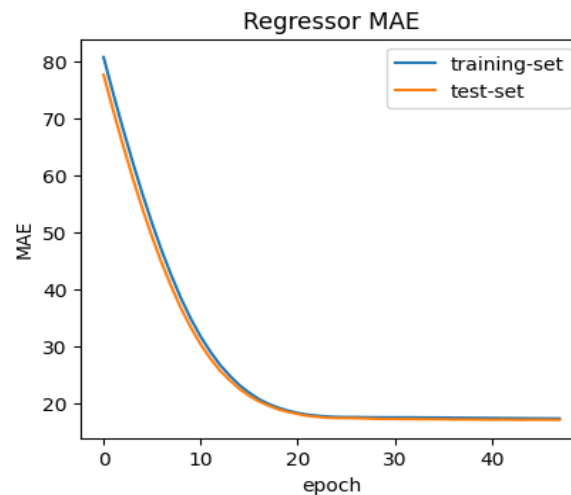
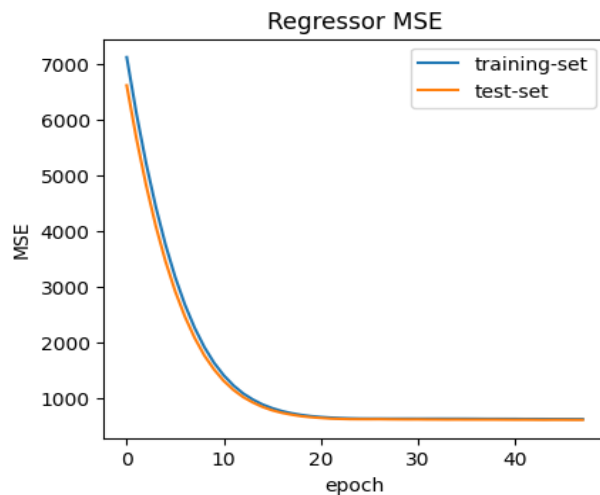
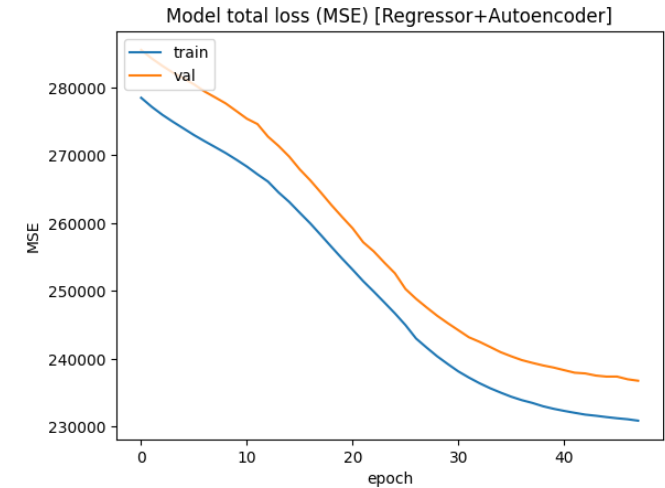
- ▶ Define an AI model for regressing yield, based on modelling meteorologic multivariate

▶ **Activity steps:**

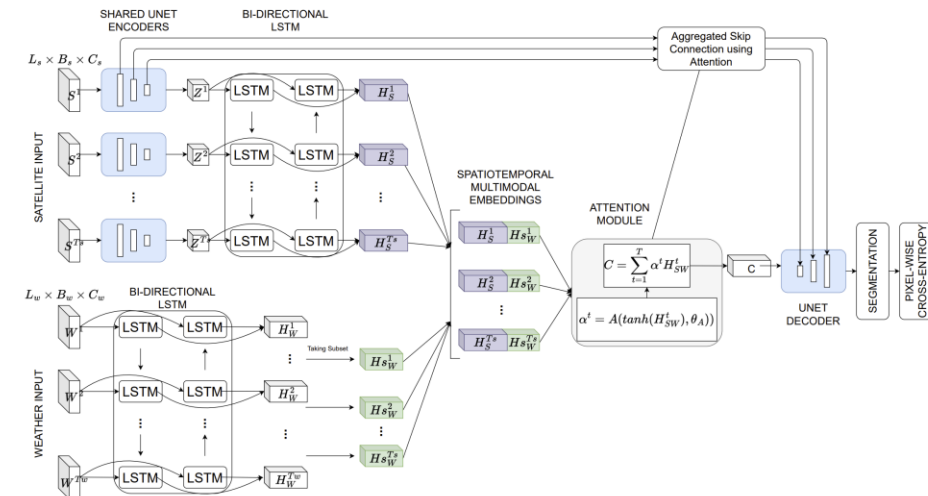
- ▶ **Preprocessing:** building of 3-years daily weather time series, data cleaning
- ▶ **Training** of regressor and autoencoder
- ▶ **Residuals** study and visualization



- ▶ MSE loss for both outputs (Autoencoder and Regressor)
- ▶ **Future Work:**
 - ▶ Train the model on actual factory data (non-aggregated)
 - ▶ Test new and more complex architectures



- ▶ **Land Cover Mapping:**
 - ▶ classify lands at some time based on current cover types (e.g., Crop types, biomes, buildings)
- ▶ **Crop Type Mapping:**
 - ▶ classify lands at some time based on covering crop types (e.g., Wheat, Maize, Cotton)
- ▶ **Computer vision applied on satellite images**
- ▶ **Problem:**
 - ▶ Need to distinguish between growing and harvested crops, that could result in similar satellite images
- ▶ **Solution:**
 - ▶ Define an algorithm for classifying temporal series of satellite images, accounting growing and harvesting of crops, and weather time series



▶ **C_seq:**

- ▶ Sequences Weather meteo variables and yields

▶ **C_quant**

- ▶ **SUPERFICIE_UTIL_sum**: sum of the surface used in the Agricultural Region in the year
- ▶ **SUPERFICIE_UTIL_mean**: average of the surface used in the Agricultural Region in the year
- ▶ **SUPERFICIE_UTIL_mean_mean**: average of the surface used in the Agricultural Region in the observation period
- ▶ **Q_IRRI_R_mean**: percentage mean of irrigated surface area in the Agricultural Region in the year

▶ **C_cat**

- ▶ **ID_SPECIE_VEG**: internal identifier of the cultivated plant species class
- ▶ **CL_IRRI**: irrigation class

