The objective of this research is to develop and evaluate deep learning models for the classification of EuroSAT satellite images. The dataset utilized in this research comprises multi spectral (MS) photos obtained from the EuroSAT satellite, comprising a total of 13 distinct bands. The methodology encompasses a sequence of stages, comprising data preprocessing, model construction, and evaluation. The first step entails extracting and standardizing bands from the given EuroSAT dataset. Initially, extract the EuroSATallBands.zip file and retain only the files with the ".tif" extension. Next, we apply min-max scaling to each band, converting the pixel values to a range of [0, 1]. The normalized multi-spectral images are saved in a NumPy array for additional processing. To rectify any potential disparities in class distribution, we subject the dataset to class balancing. We create a balanced dataset by identifying the smallest class and randomly selecting a subset of observations from each class. We subsequently divide the equilibrated dataset into training and testing sets using a stratified methodology to guarantee inclusion of all categories in both sets. To streamline the process of training the model, we encode the labels using a one-hot encoding technique. For the purpose of classification, we chose a convolutional neural network (CNN) architecture. The basis models used in this study are VGG16 and ResNet50, which are both widely recognised CNN architectures. We instantiate these models without pre-existing weights and adjust them to fit the input dimensions of the EuroSAT multi-spectral images.

Dataset Link: EuroSAT satellite images