

Task:

Use unsupervised, or supervised algorithms to classify crop types in Champaign, IL from RapidEye satellite images. As the main crop types here are corn and soybean, please just classify the image into three types: corn, soybean and others to simplify the problem.

First train your algorithm using the northern half of the RapidEye image and then predict using the southern half of the RapidEye image.

You are welcome to try various types of models and compare their performance, but not mandatory.

Submission Requirement:

1. Introduce your model structure, including necessary hyperparameters.
2. Demonstrate model performance regarding the training on the northern part. (Evaluation metric?)
3. Visualization of your prediction.
4. Best vectorize your code, i.e. avoid using for loop but using matrix operation of numpy.
5. Submit your code with proper comments.

Data:

We provided a RapidEye image (5m pixel size) obtained on Aug. 24, 2013 and divided it into two sub-images: northern and southern parts.

We also provided the Crop Data Layer (CDL) map from USDA in 2013 for this study area, which can be used as the referencing crop type classification result. The original resolution of the CDL map is about 30m and we already resampled it to 5m to match the pixel size of RapidEye images. We also converted the CDL map into the same projection of RapidEye images, i.e. the “WGS 84/UTM Zone 16” projection. In this way, the RapidEye images and CDL maps can be easily overlaid. The color table of the CDL data is provided in the dbf file. You can find that “1” represents corn and “5” represents soybean in the CDL maps.

All the images are in Geotiff format.

Hints:

RapidEye image has 5 bands (Blue, Green, Red, Red Edge and Near Infrared bands).