

GEO 542: Introduction to Remote Sensing – Fall 2025

Lab2: Image Classification

Due: written portion (worth 20% of your total course grade) Nov. 19, 2025 by the end of the lab period (by 9:00pm) via D2L

in-class presentation (worth 10% of your total course grade) **5 minutes per student - random order beginning** Nov. 26 (in the lecture and lab periods). **If you are not present when your name is called, you will receive a grade of zero (0) for the presentation portion of the lab. If your Powerpoint presentation is not submitted via D2L by 9:00pm on November 25** (further details below), you will receive a grade of zero (0) for the presentation portion of the lab.

Image classification for a variety of applications is one of the main reasons that remotely sensed data are collected. In this lab, you will perform “**supervised**” and “**unsupervised**” classification procedures on a 2000 x 2000 pixel subset image for an area within North America. For your classifications, you will use **one image** – from Sentinel 2A or 2B obtained from the Copernicus Data Space Ecosystem (<https://dataspace.copernicus.eu/>). The image file will be used for land cover classification. Details on Sentinel 2A and 2B images are also available from the Copernicus Data Space Ecosystem website.

In order to complete the classifications, you will need to follow these steps:

- 1) Download the imagery for the area of your choice (**within North America**). No duplication of areas is permitted so the choice of area will be on a “first come/first served” basis. Your instructor will maintain a list of the areas chosen and you must have your choice approved (via email) **by November 5 by the end of the lab period** or you will receive **a 10% total course grade reduction**. The image must be Level-1C (the standard format that is available). You require the **Sentinel-2 L1C Tile in JPEG2000 (.jp2)** format. You will be utilizing the 10m spatial resolution bands (2,3,4,8). You can extract these using Data Merge in Catalyst Professional. The metadata are located in the file manifest.safe.
- 2) Subset a 2000 x 2000 pixel portion of the image that you would like to work with. No clouds or “No Data” areas are permitted.
- 3) Add extra image channels for classification training areas (for the supervised classification) and results (for both classifications).
- 4) Display the image with the band combinations that you think allow for the best discrimination of different classes in the image (for the supervised classification).
- 5) Create training areas (make sure you are viewing the data at 1:1 resolution or better). You will be classifying each of the images into **five (5)** “logical” classes. This will require that you create training areas for each class (for the supervised classification).

- 6) After you have finished with your training areas, you will perform the supervised classification. You will use the **Maximum Likelihood** algorithm. The resulting classifications will be written to empty channels you added previously.
- 7) Run the unsupervised classification. Your instructor will provide details in the lab as to how this is accomplished. You will need to aggregate your initial set of classes to the **same** five classes that you use for the supervised classification.

Deliverables:

- 1) A map (created in Catalyst Professional) showing your analysis area subset in “natural colour” (one map). **The map must be submitted as a .pdf file.**
- 2) Maps (created in Catalyst Professional) of your supervised and unsupervised classification images including a legend showing what colour represents each class (two maps). **The maps must be submitted as a .pdf files.**
- 3) An explanation of why you chose the five (5) classes that you did (not longer than one page, double spaced, 12-point Times (New Roman) font, with 1” margins all around). Consult the [USGS Landcover Classification System](#) as necessary. **The document must be submitted as a .docx file.**
- 4) An explanation of whether your classifications are “accurate” (not longer than one page, double spaced, 12-point Times (New Roman) font, with 1” margins all around). **The document must be submitted as a .docx file.**
- 5) Your Powerpoint presentation will be **5 minutes in length** and will answer the questions above as well as provide an explanation of where your analysis area was located. You can also include other information you deem relevant. **All presentations must be submitted via D2L by 9:00pm on November 25.** The file will be your named yourlastname.pptx. Email your instructor if you have questions.

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