

# Accuracy Assessments

Practical Exercise



**IDEAMAP**  
SUDAN

## General Information

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### Goal:

- Assess the accuracy of a supervised classification

### Content:

- Accuracy assessment
- Improving classification results.

### Software Requirements:

- QGIS
- The "dzetsaka" QGIS plugin (see instructions in the practical exercise Part 1)
- The data for this practical which can be downloaded from Canvas.

New for Part 2:

- The "AcATaMa" QGIS plugin (see instructions below).

### Data to be used:

- **ESACCI-LC10-Map-20m-2016-MLPractical.tif** – Land cover dataset raster
- **ESACII-LC-colormap.clr** – QGIS style for the Land Cover dataset
- **S2\_20170101\_Year\_20m-MLPractical.tif** – Satellite imagery
- **MLPractical\_Training\_Points.geojson** – Training points
- **CCI\_L10\_Training\_Points\_Style** – QGIS style for the training points

New for Part 2:

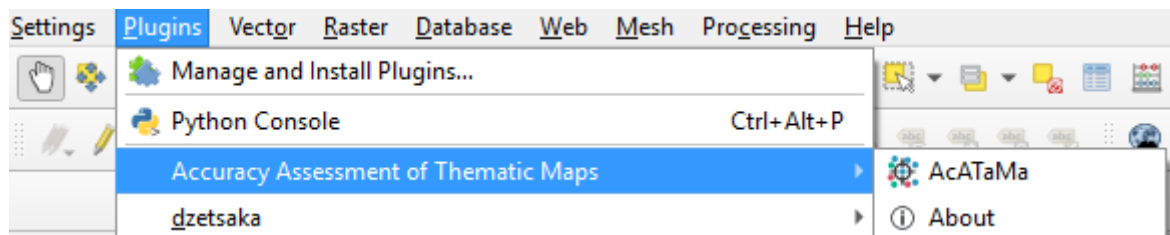
- Your classification layer from Part 1 (you can use **MLPractical\_ExampleClassification.tif** if you didn't save yours )
  - **MLPractical\_Reference\_Points.geojson** – Testing data points
  - **MLPractical\_Reference\_Points\_atacama.yml** – Description of testing points for the Atacama plugin.
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## Software Installation

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We will be using QGIS as you installed in Topic 2. You will also need to install the dzetsaka plug-in in QGIS (instructions in the Machine Learning Part 1 practical exercise).

We also need the “Accuracy Assessment of Thematic Maps” plugin. In the top menu of QGIS, select “Plugins” → “Manage and Install Plugins”. Then type **AcATaMa** in the search bar. Select it and then install (or upgrade) the plugin. After it is correctly installed you should see it under the list of installed plug-ins and in the Plugins menu like in the screenshot below.



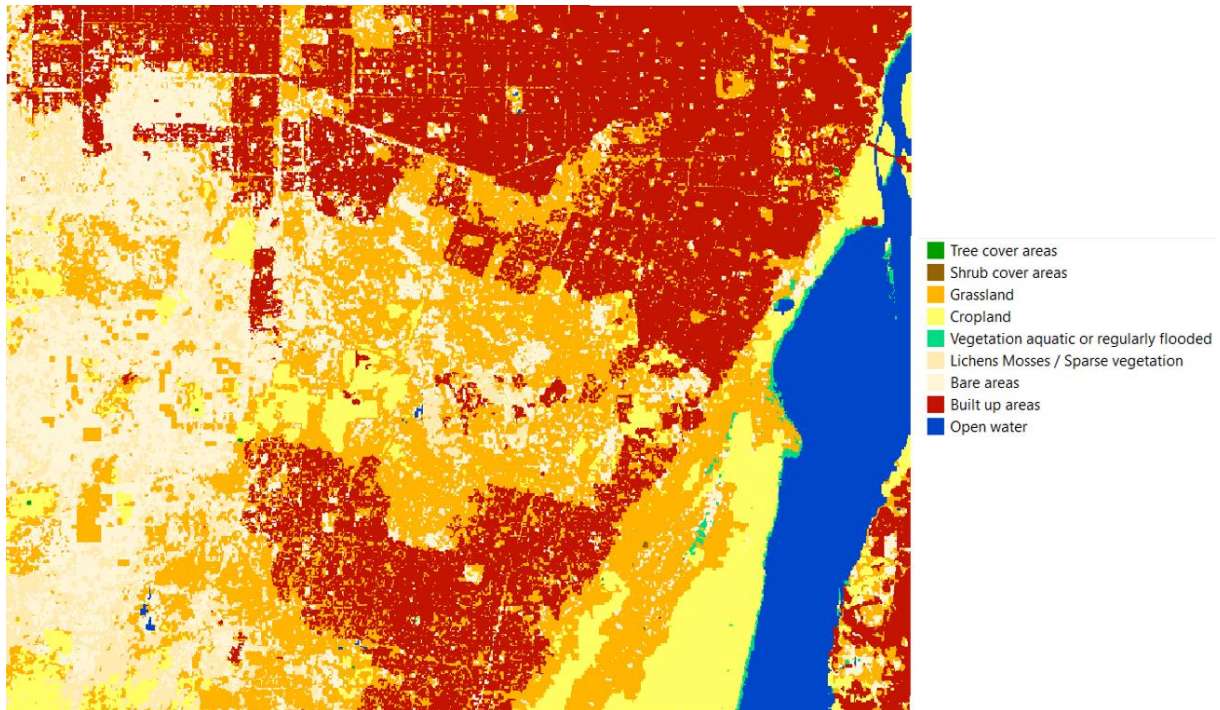
A detailed description of it can be found here: <https://smbyc.github.io/AcATaMa> (last accessed 07.06.2021).

## Datasets

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### Reference data

We will be using Land Cover data from the **CCI Land Cover dataset**. It has a spatial resolution of 20m and was generated from one year of Sentinel 2A observations from December 2015 to December 2016. More information can be found here: <http://2016africanlandcover20m.esrin.esa.int/> . A part of Khartoum was subsetted for this practical exercise.



### Input data

The classification will use a **Sentinel 2a image** mosaic of 2017. The input bands 2 – 8A are available.

### Training samples:

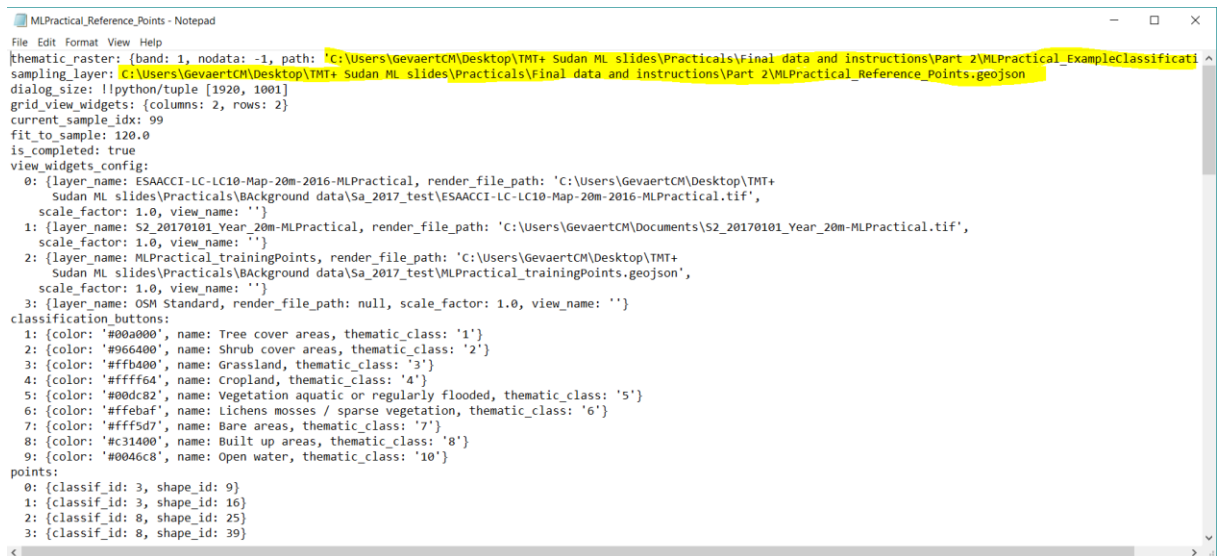
To train the classifier, 150 points were randomly selected and labeled according to the CCI land cover layer.

### Testing samples:

To test the classification results, 100 points were randomly selected and labeled according to the CCI land cover layer.

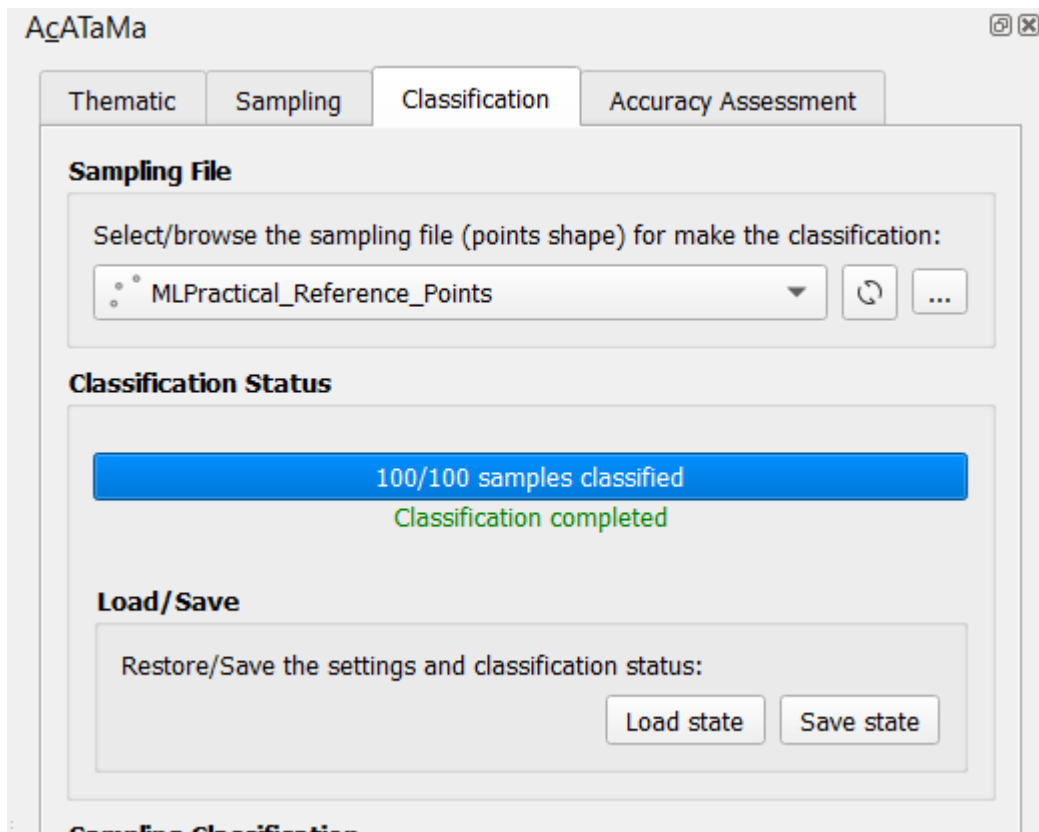
## Instructions

1. Load your QGIS project from Part 1 (or start a new project and load all of the layers listed under “Data to be Used” above).
2. The AcATaMa plug-in has a native .yml file. You will need to change the file to fit your filenames. Open **MLPractical\_Reference\_Points.yml** in Notepad. Change the filenames highlighted in the image below to match the names and paths to the classification raster (“thematic\_raster”) and the reference points (“sampling\_layer”).



```
MLPractical_Reference_Points - Notepad
File Edit Format View Help
[thematic_raster: {band: 1, nodata: -1, path: 'C:\Users\GevaertCM\Desktop\TMT+ Sudan ML slides\Practicals\Final data and instructions\Part 2\MLPractical_ExampleClassification.tif'}
sampling_layer: 'C:\Users\GevaertCM\Desktop\TMT+ Sudan ML slides\Practicals\Final data and instructions\Part 2\MLPractical_Reference_Points.geojson'
dialog_size: !python/tuple [1920, 1001]
grid_view_widgets: {columns: 2, rows: 2}
current_sample_idx: 99
fit_to_sample: 120.0
is_completed: true
view_widgets_config:
  0: {layer_name: ESAACCI-LC-LC10-Map-20m-2016-MLPractical, render_file_path: 'C:\Users\GevaertCM\Desktop\TMT+ Sudan ML slides\Practicals\Background data\Sa_2017_test\ESAACCI-LC-LC10-Map-20m-2016-MLPractical.tif', scale_factor: 1.0, view_name: ''}
  1: {layer_name: S2_20170101_Year_20m-MLPractical, render_file_path: 'C:\Users\GevaertCM\Documents\S2_20170101_Year_20m-MLPractical.tif', scale_factor: 1.0, view_name: ''}
  2: {layer_name: MLPractical_trainingPoints, render_file_path: 'C:\Users\GevaertCM\Desktop\TMT+ Sudan ML slides\Practicals\Background data\Sa_2017_test\MLPractical_trainingPoints.geojson', scale_factor: 1.0, view_name: ''}
  3: {layer_name: OSM Standard, render_file_path: null, scale_factor: 1.0, view_name: ''}
classification_buttons:
  1: {color: '#00a000', name: Tree cover areas, thematic_class: '1'}
  2: {color: '#966400', name: Shrub cover areas, thematic_class: '2'}
  3: {color: '#ffb400', name: Grassland, thematic_class: '3'}
  4: {color: '#ffff64', name: Cropland, thematic_class: '4'}
  5: {color: '#00dc82', name: Vegetation aquatic or regularly flooded, thematic_class: '5'}
  6: {color: '#ffebaf', name: Lichens mosses / sparse vegetation, thematic_class: '6'}
  7: {color: '#ffffd7', name: Bare areas, thematic_class: '7'}
  8: {color: '#c31400', name: Built up areas, thematic_class: '8'}
  9: {color: '#0046c8', name: Open water, thematic_class: '10'}
points:
  0: {classif_id: 3, shape_id: 9}
  1: {classif_id: 3, shape_id: 16}
  2: {classif_id: 8, shape_id: 25}
  3: {classif_id: 8, shape_id: 39}
```

3. Open the AcATaMa plug-in (at the top ‘Plugins → Accuracy Assessment of Thematic Maps → AcATaMa’). Select your classification result under the “Thematic” tab. Go to “Classification” tab and select **MLPractical\_Reference\_Points** as the Sampling File and click on “Load State” and open **MLPractical\_Reference\_Points.yml**.



4. Finally – look at the confusion matrix. Go to “Accuracy Assessment → Open the accuracy assessment results”. Answer the questions below.

**ADVANCED:** The dzetsaka plug-in also lets you do different types of classifications. Try a different classification and compare the results by performing an accuracy assessment with AcATaMa.

**ADVANCED:** Try making your own reference data. Use the “Sampling” tab and the “Classification” tab to randomly generate samples and assign them the correct label.

## Analysis questions

- What is the overall accuracy of your result?
- Which class has the highest producer's accuracy? And which has the highest user accuracy?
- Which classes are well classified and which are more confused?
- Compare the reference CCI Land cover map to what you see in the Sentinel-2 image. Do you think it is good?
- How do you think you can improve the classification? → try it!