

Course Name: Species Distribution Modelling (SDM).

Software: Digitize IT.

Module: Software Tutorial.

Recommended File Structure:

D:/

Digitize_Distribution_Students_main /

- data /
 - input
 - output
 - templates/map
- src /
 - Input_information
 - Pixel_Classification.py
 - template_matching.py
 - template_matching_png.py
 - test_pixel_classification.R
 - test_template_matching.R
- www
- .RData
- .Rhistory
- README.md
- app.R
- config.txt
- install.R
- **start_dd_app.R**

** represents important directories.*

Figure 1: Recommended Structure of File Directory.

Task 1: Download the digitizer repository

Download the input repositories,

- as a zip file from https://github.com/environmentalinformatics-marburg/distribution_digitizer_students.git or
- directly from,
https://github.com/environmentalinformatics-marburg/distribution_digitizer_students/archive/refs/heads/main.zip
- One convenient method is to save files in the D:\ Drive (if you have, as recommended in the figure 1).
- In any case, make sure you know the path to this directory. You need to enter it in the DD application ("Working git directory").

Task 2: Start the local DD application

- Open the file "start_dd_app.R" in the downloaded and unzipped directory, and run the program in order to execute DD R Shiny Application.
- If you do not have the "reticulate" package installed, install it with `install.packages("reticulate")`.
- If asked, also install miniconda, which is a small version of Python.
- Set your working directory (= the path to your downloaded folder).
- For finding out the path to your opened "start_dd_app.R" file in RStudio:
click "session" -> "set working directory" -> "to source file location". The path then will appear in the console.

Task 3: Perquisites for object detection (DD application)

- Clear the input, output, and templates/map directories (= delete the files in there).
- Copy the input files to data/input and templates to the data/templates/maps.
- In case if the maps are not cropped, crop template maps and save them under the data/ templates /map directory.
- Ensure that the output directory is empty

Task 4: Executing Object Detection (DD application)

- Check the working directory of the DD-R Shiny application again.
- press "Start the template matching" for doing the object detection
- Check the data/output folder for the results. Also try different threshold values.
- The expected results in the output folder are (in this case) all cropped maps from the images in the input directory.
- Delete all the unwanted or noise images manually.

Task 5: Pixel classification (DD application)

- Try some values for the filters and "start the pixel classification", which will use the output from the previous object detection step.
- The Gaussian filter recommended value is 9 and the kernel filter recommended value is 5, feel free to try with the other values.
- The desired output is maps, which have the occurrence points marked in blue in your output folder. These files will then be used for geo-referencing.

Task 6: Geo-referencing (in QGIS)

- Get the open street map data and the geo-referencer plugin.
- The raster files are the output files of pixel classification stored under data/output/pixel_c folder.
- Your layer and your QGIS project should have the same CRS, namely EPSG (or ESRI): 102025.
- Know the structure of GCP data, e.g.: It mainly has four columns with coordinates, The first two columns contain the coordinates of the input image (=image space), the next two columns contain the coordinated in some CRS referring to the real world (=geographical space).

source_x	source_y	target_x	target_y
100	50	23.56	45.89
150	75	23.95	46.01

- Try to assign 75 GCP points (minimum) to geo-reference the image.

Assignment

- Geo-reference a map of your assigned book with 75 points distributed across the whole image.
- Scan five pages in a book of your choice with distribution maps and test the digitizer software.
- Upload everything (GCPs, pages, results) on GitHub in your personal course repository (create new folders for each task and organize you files so others can understand what you did)
- We will inform you about updates in the software by email, which can be obtained from GitHub at,
- https://github.com/environmentalinformatics-marburg/distribution_digitizer_students.git
- Please upload your assignment solutions to GitHub by next Wednesday