



Carrying on: georeferencing

Summer School on Digital Humanities

Course material available at
https://github.com/AugustoCiuffoletti/dhss_2021

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Carrying on: georeferencing

- Georeferencing consists of transforming an image into a map
 - giving each pixel in the image a geographic coordinate
- To this end we need the geographic coordinates of a (small) number of points of the map image
- Using this input a georeferencing tool infers the coordinates for all the pixels in the image
 - in principle only two points are needed, in practice accuracy improves with the number of points
 - possibly the image needs to be morphed (non-linear transform)
 - good reference points are distant and non-aligned
- To simplify the task of finding the reference points coordinates
 - associate points on the image with corresponding points of an accurate reference raster (e.g., the OSM one)
- QGIS can do that

Georeferencing: preparation

- Create a new project with the reference raster (OSM)
- Scale it to match the area in the map
- Notice the code shown in the bottom right corner:
EPSG3857 (WGS84/Pseudo-Mercator)
 - the standard projection to display maps on a plane
- Select **Raster** -> **Georeferencer...**: a new window appears
- In the *Georeferencer* window select **File** -> **Open Raster**
 - browse your directories to find the image file you want to georeference and double-click on it
- In the *Georeferencer* window select **Settings** -> **Transformation Settings**
 - Transformation type is the kind of morphing: TPS is OK
 - Check the SRS is EPSG:3857 - WGS84/Pseudo-Mercator
 - Define a target file for the result
 - Tick "Load in QGIS when done"
 - Click OK and return to the Georeferencer window

Matching points

- Repeat the following steps for at least three (distant and non-aligned) points on your image map
 - Find a detail on the map image that you can later locate also on the raster
 - e.g., in an ancient map of France *Lutetia* corresponds to Paris
 - to precisely hit the point you can move the map using keyboard arrows, zoom with mouse wheel, but you **can't click!**
 - Click when the crosshair is on the detail (*Lutetia*)
 - A new window shows up for the coordinates of the point
 - Here, hit the **From Map Canvas** button
 - The map and the dialog disappear and you are brought back to the OSM raster with a crosshair pointer
 - Find the corresponding point (*Paris*) on the raster and click
 - QGIS acquires the geographical coordinates from the raster
 - ... and your map re-appears with such coordinates in the boxes
 - Hit OK and repeat for three or more points

Run the georeferencer

- Once you have finished matching points from the image to the raster, you are ready to apply the geo-referencing algorithm
- Hit the green triangle in the toolbar of the *Georeferencer* window
- A pop-up informs you when the process terminates
- Do not close the georeferencing dialog yet, but go to the main window to inspect the result

Inspecting the result

- The image is pasted as a new raster in the main window
- To evaluate the work of the georeferencer we need to render the new layer as semi-transparent
- Right-click on the new layer (in the **Layers** frame) and select **Properties** -> **Transparency**
- Regulate **Global Opacity** around 50% and hit OK
- The next slide shows the OSM raster of France with a georeferenced map of ancient french tribes
- The three reference points are in Paris, Marseille and Bretagne
- Notice the North coastline, which differs in the two maps
- If you are not satisfied with the result,
 - remove the layer,
 - go back the *Georeferencer* window to add new points and
 - repeat the georeferencing

Georeferencing result



More resources

- Find accurate tutorials about QGIS at <https://www.qgistutorials.com/en/>
- Relevant geographic data (of the kind of OpenStreetMap) are found on regional and global basis. E.g:
 - e.g., the <https://earthexplorer.usgs.gov/> (give a look at the datasets available)
 - <http://wms.pcn.minambiente.it/mattm/servizi-di-scaricamento/> to download 'WFS' resources that you can import in QGIS
- An interesting exercise is https://www.qgistutorials.com/en/docs/3/working_with_terrain.html that teaches how to add contours to QGmaps