Here is a few tips that may help you use these tools.

# Brief Description

What is this:

This is a Python Script-based tool to analysis the spatial distribution of international aid projects by Voronoi Analysis, based on the level 1 data of AidData.

This tool contains three files:

* **AutoVoronoi\_AidData\_separate\_land.py**

The engine. This Python Script contains all the functions and code that do the analysis. For users without enough understanding of this scipt, none of codes should be changed by them. The output of this mode is a shapefile.

* **AutoVoronoi\_config.py**

File for input specification. This Python Scipt is for users to set up the input parameter and the full path of input files, like shapefile of administrative level 0 of the study region and csv file of level 1 data of study region. However, if users want to specify a customized setting file for reserved fields in the output shapefile, they can specify a new full path of attribute setting csv file which has the same format with the default attribute csv file, ‘default\_setting\_voronoi.csv’. In this scipt, there are detailed instruction in the start of this script to instruct users to set up input parameters. Just to emphasize, users should only edit parameters starting with “\_\_”, and they should not edit the rest parameter and functions to validate user’s input.

* **default\_setting\_voronoi.csv**

The setting file for reserved fields from level 1 data of AidData to output shapefile. This file has only one column and variable lines of rows, depending on users’ specification. The content of rows should be the field name (column name) of level 1 data, so those fields will be reserved in final output shapefiles as string fields.

This tool offer three kind of voronoi analysis:

* Standard mode
* Highlight mode
* Pair-wise comparision mode

Standard mode will just do voronoi analysis based on valid records. To call this mode, 0 is the code you should input to the input file to the parameter, voronoi\_mode. Valid records are chose by filter configuration, and we will explain details of filter in the later section.

Highlight mode is the second mode. This mode will highlight the valid records among all records by allowing that valid records has an integer value ‘1’ in a field, which named ‘requested’, of the output shapefile of this mode. Valid records are chose by filters. In the input python script, to call this mode, ‘\_\_voronoi\_mode’ should be 1, as an integer value . Remember again, only parameter starting with ’\_\_’ should be edited by user.

Pair-wise comparison mode is a very specific mode for the visualization of the comparison of one chose country to all other possible related countries. Only this mode will possibly output multiple shapefiles and designed maps corresponding to each shapefile. Each output shapefile is showing the comparison of the chose country and one of relate countries. If a country donate to a region where the chose country has also donated, this country is one of related countries with the chose country. This pair-wise mode will unleash the audience from complicated relationships among all countries by only looking at one chose country to all its possible related countries. Related countries can also be narrowed by filters. Only this mode has map output, since only this mode is specific enough to design meaningful maps, and the first two modes are too flexible for meanings.

What type of tool

This tool are only based on Python, so Python interpreter is needed.

Files needed

Two files are needed to run this tool. The first file is the level 1 data of a particular region, and the second one is the shapefile of administrative level 0 of the correspondent region. Their fullpath should be inputted in input configuration file of this tool.

How to use / run this

Since this tool is designed to have separate files for analysis, input and attribute setting. Users just need to edit input parameter and attribute setting file under instruction and then to run the analysis script by Python-enabled IDE or commend line window.

# Package installation

This tutorial uses Python 2.7.x, and the following non-stdlib packages are required:

* IPython
* Pandas
* Numpy
* Matplotlib
* Basemap (Eugene Wang note: this cannot be installed by pip, look at [here](https://github.com/matplotlib/basemap) and find install section in ReadMe. Therefore, its dependencies Pyproj and pyshp is not installed automatically.)
* Shapely
* Fiona
* Descartes
* PySAL
* Pyproj (Python interface to PROJ.4 Library. Needed by Basemap)

The installation of some of these packages can be onerous, and requires a great number of third-party dependencies (GDAL *&* OGR, C *&* FORTRAN77 (yes, really) compilers). If you’re experienced with Python package installation and building software from source, feel free to install these dependencies (if you’re using OSX, Homebrew and/or [Kyngchaos](http://www.kyngchaos.com/software/frameworks) are helpful, particularly for GDAL *&* OGR), before installing the required packages in a virtualenv, and skipping the rest of this section.

# Input specification

The way to specify input values has been demonstrated in the first couple lines of input python file.

# Expected workflow, examples

1. Collect administrative level 0 shapefile, a.k.a. the country boundary shapefile since a study region of level 1 data is usually the study region
2. Collect level 1 data.
3. Specify input parameters in input Python script, change configuration csv file if needed.
4. Run the ‘engine’ script.