

# Othello User Guide

Gabriel Couture

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# 1 Installation

## 1.1 Install from release (preferred)

1. Find the most recent release here: <https://github.com/ulaval-rs/othello/releases>
2. In the assets, download the othello zip file
3. Unzip the zip file at the path where you want the application
4. Run `app.exe` to start the application

## 1.2 Install from source

Clone the repo:

```
git clone https://github.com/ulaval-rs/othello.git
cd othello
```

Make a virtual environment:

```
virtualenv venv
venv\Scripts\pip install -r requirements.txt
```

Re-install the GDAL, Shapely, pyproj, Rtree and Fiona from <https://www.lfd.uci.edu/~gohlke/pythonlibs> with the following command (tested with python 3.8).

```
venv\Scripts\pip install --force-reinstall GDAL-3.2.2-cp38-cp38-win_amd64.whl
venv\Scripts\pip install --force-reinstall Shapely-1.7.1-cp38-cp38-win_amd64.whl
venv\Scripts\pip install --force-reinstall pyproj-3.0.1-cp38-cp38-win_amd64.whl
venv\Scripts\pip install --force-reinstall Rtree-0.9.7-cp38-cp38-win_amd64.whl
venv\Scripts\pip install --force-reinstall Fiona-1.8.18-cp38-cp38-win_amd64.whl
```

### 1.2.1 Setup the ESRI geodatabase (.gdb) driver support

You need 2 files for this: `ogr_FileGDB.dll` and `FileGDBAPI.dll`. gohlke's GDAL library comes with the `ogr_FileGDB` driver as a plugin. `ogr_FileGDB.dll` is found at `venv-packages\FileGDB.dll`. Simply copy and paste the file outside the disabale directory: `venv-packages\FileGDB.dll`.

The `FileGDBAPI.dll` is the proprietary SDK from ESRI . It can be found on the following repository: [https://github.com/Esri/file-geodatabase-api/blob/master/FileGDB\\_API\\_1.5.1/FileGDB\\_API\\_1\\_5\\_1-VS2017.zip](https://github.com/Esri/file-geodatabase-api/blob/master/FileGDB_API_1.5.1/FileGDB_API_1_5_1-VS2017.zip). Unpack the zip file and copy-paste the `bin64.dll` to `venv-packages.dll`. The ESRI geodatabase driver support should then be enabled.

### 1.2.2 Build Othello

Build the application to the `build` directory with the following command.

```
venv\Scripts\python3.8 setup.py build
```

## 2 Usage

Othello is a tool that allows you to link optimization data from Macbeth software and geographic data in GDB format (ArcGIS proprietary format). It consists of two tools: the first being *Criteria*, and the second *Aggregate*.

### 2.1 *Criteria*

The *Criteria* tool allows to transform the values of a criterion thanks to a scale present in a macbeth file. The data flow is schematized in the figure 1. The tool combine a column from an ArcGIS GDB file with the interpolation extracted from a MacBeth file to produce a new column in the GDB file. The interpolation is made from two columns corresponding to a criterion in the MacBeth file. Note that since *Othello v0.1.5*, it is possible to link the GIS data with indexes corresponding to the MacBeth data. This means that the columnX in figure 1 may be indexes of the MacBeth rows rather than the raw values of the columnY1.

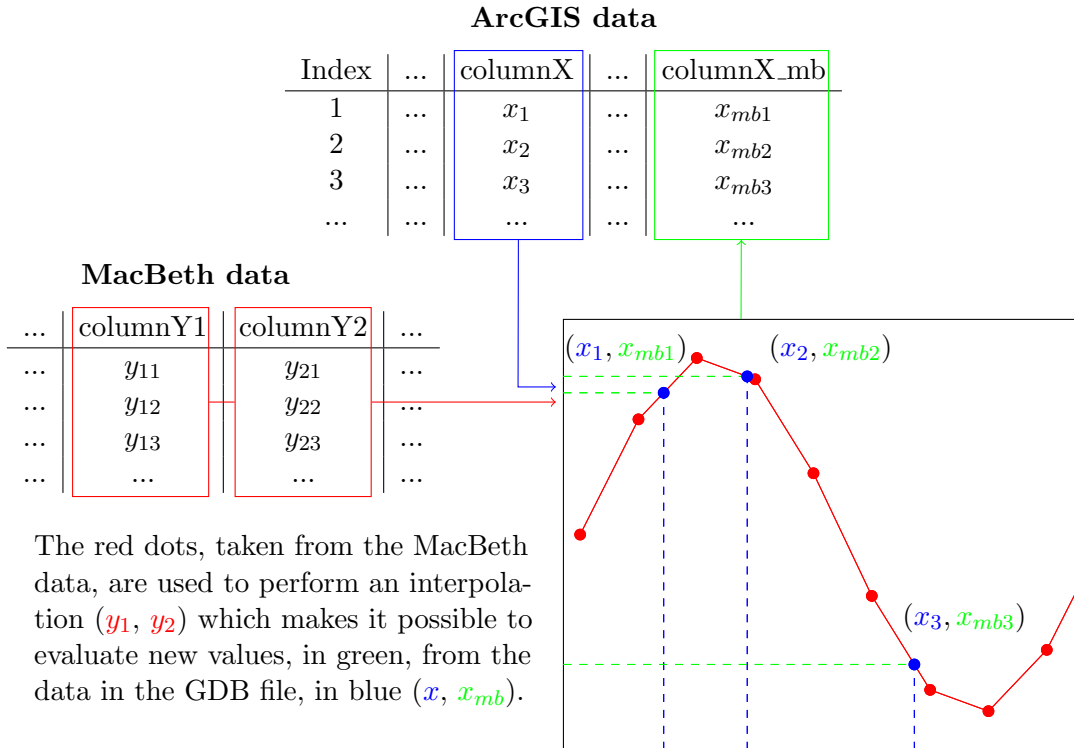


Figure 1: Criteria tool data flow diagram

Figure 2 shows the user interface where you can use this tool. From this tool, it is possible to load an GDB file, to choose the right layer and finally the column which will be the source one (columnX in blue in the figure 1).

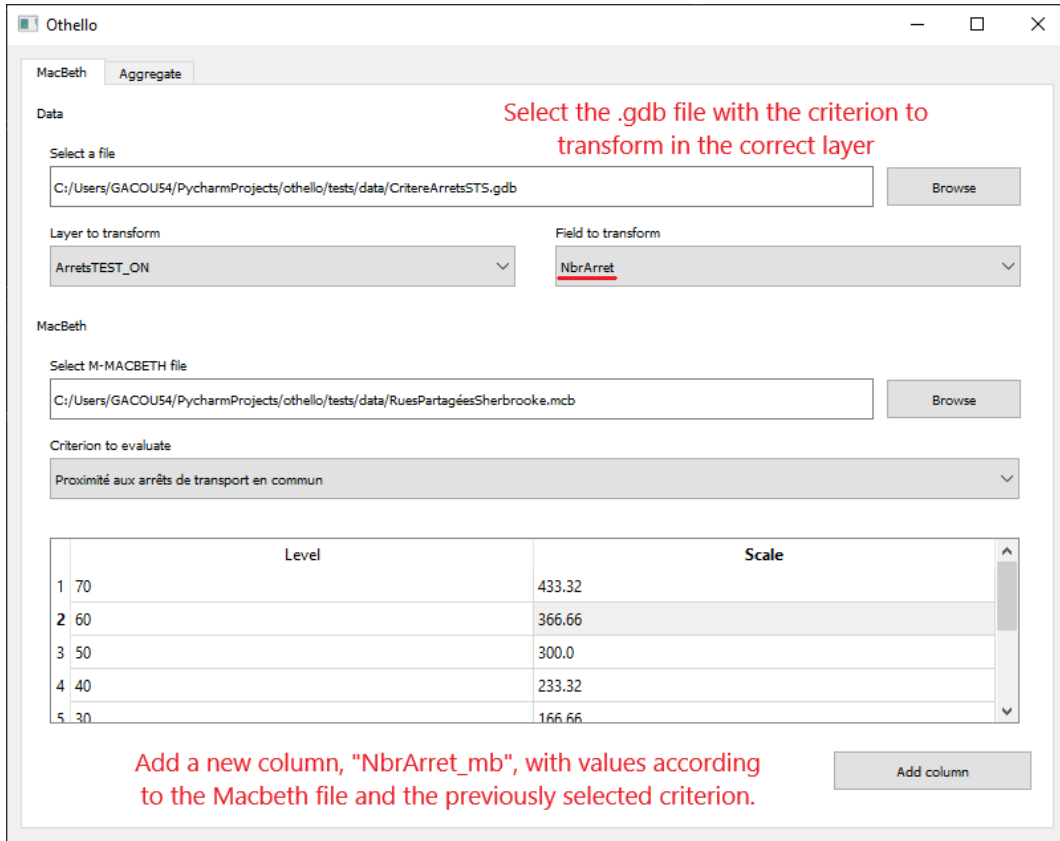


Figure 2: *Criteria* tool's user interface

## 2.2 Aggregate

The figure 3 presents the *Aggregate*'s data flow. The *Aggregate* tool allows you to use all the criteria already processed via the *Criteria* tool and to make a weighted sum in a column named *FinalScore* in an GDB file. A non-ponderated and a ponderated column for each criterion will also be wrote in the FinalLayer. Note that is possible to use the criterion columns from other GDB files and to write the *FinalScore* in a new/empty GDB file. Also note that the sum of the weights should be equal to 1 ( $\sum_n^N w_n = 1$  where  $N$  is the number of criteria), but not necessary. In the event where the sum is not equal to 1, a warning will be shown.

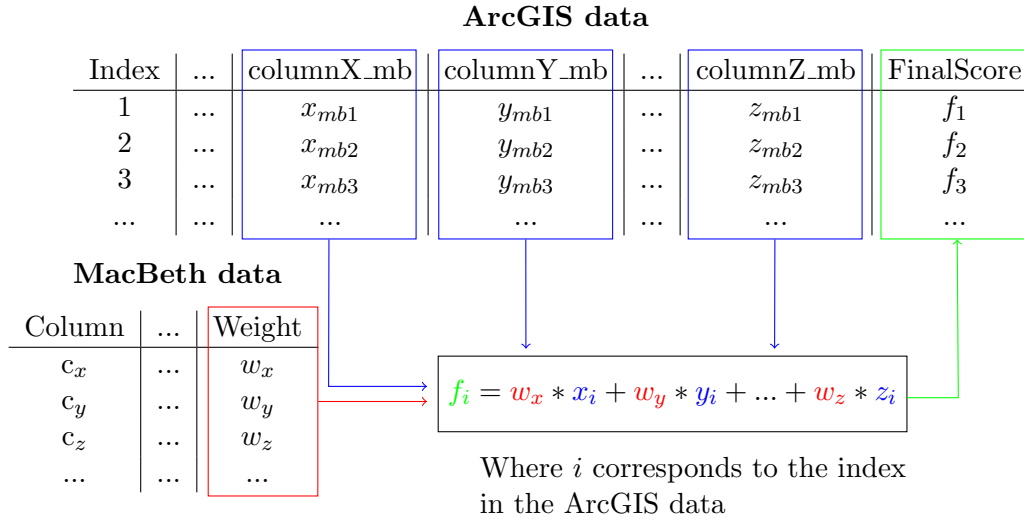


Figure 3: *Aggregate* tool data flow diagram

Figure 4 shows the user interface of this tool. It is possible to load GDB files to retrieve the columns one by one along the MacBeth weight corresponding to them. Note that since *Othello v0.1.4*, it is possible to rename the final criterion names via the user interface.

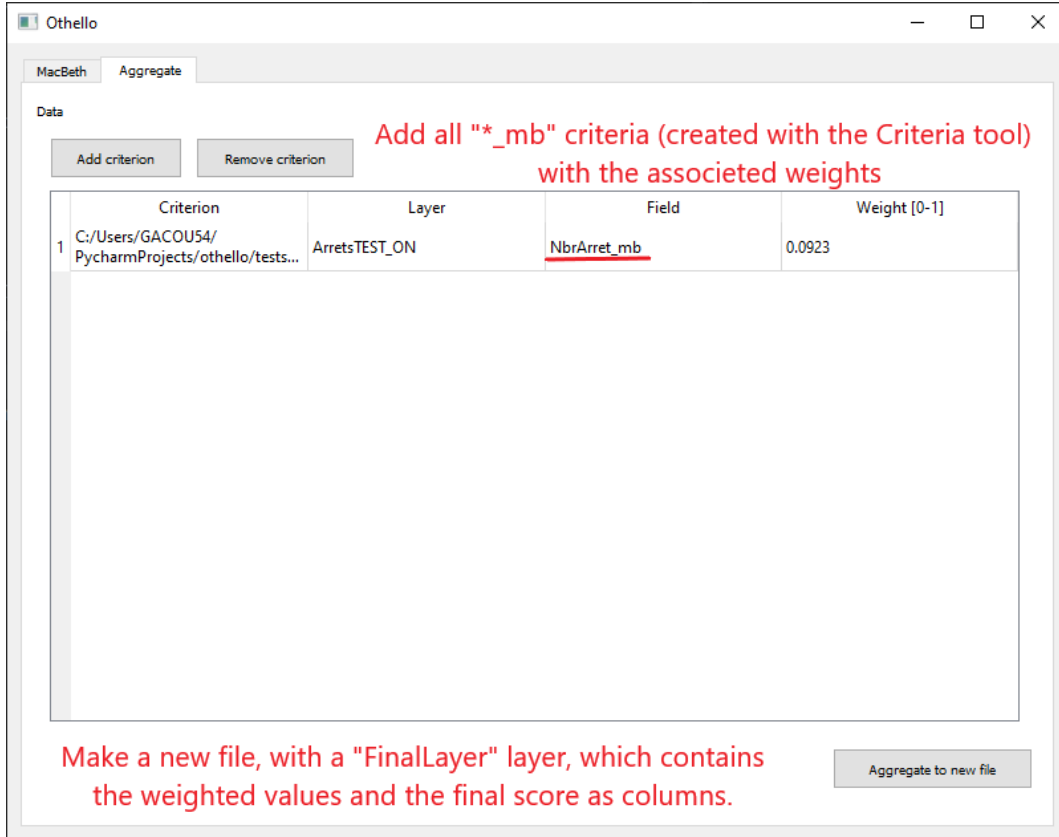


Figure 4: *Aggregate* tool's user interface