Chapter 7 - Generate additional morphometric elements

November 10, 2020

Input data: - building footprints with height attribute - street network

This notebook generates morphometric elements required for further analysis. It requires `momepy` 0.3 or newer.

[ ]:
```
import geopandas as gpd
import momepy as mm
```

[ ]:
```
path = "files/geometry.gpkg"
layer = "buildings"
```

Open buildings and assing unique ID to each.

[ ]:
```
buildings = gpd.read_file(path, layer=layer)
buildings["uID"] = range(len(buildings))
```

0.1 Morphological tessellation

Check input for ressellation.

[ ]:
```
check = mm.CheckTessellationInput(buildings)
```

Generate tessellation limited to 100 m buffer. Beware, it eats a ton of memory.

[ ]:
```
limit = mm.buffered_limit(buildings, 100)

tess = mm.Tessellation(buildings, "uID", limit)
tessellation = tess.queen_corners(sensitivity=2) # this is a dirty fix I am not␣
↪using anymore, but I did in thesis
```

[ ]:
```
tessellation.to_file("files/geometry.gpkg", layer="tessellation", driver="GPKG")
```

0.2 Tessellation based blocks

We need streets for that.

[ ]:
```
streets = gpd.read_file('files/geometry.gpkg', layer='streets')
```

[ ]:
```
snapped = mm.snap_street_network_edge(streets, buildings, 20, tessellation,␣
↪120, limit) # snap to close unwanted gaps
blocks = mm.Blocks(tessellation, snapped, buildings, 'bID', 'uID')
blocks_df = blocks.blocks  # get blocks df
buildings['bID'] = blocks.buildings_id  # get block ID
tessellation['bID'] = blocks.tessellation_id  # get block ID
```

0.3 Link streets

[ ]:
```
streets["nID"] = range(len(streets))
buildings['nID'] = mm.get_network_id(buildings, streets, 'nID', min_size=300) ␣
↪#
tessellation = tessellation.merge(buildings[['uID', 'nID']], on='uID',␣
↪how='left')
```

[ ]:
```
path = 'files/geometry.gpkg'
tessellation.to_file(path, layer='tessellation', driver='GPKG')
buildings.to_file(path, layer='buildings', driver='GPKG')
blocks_df.to_file(path, layer='blocks', driver='GPKG')
```