Appraising_by_neighborhood

September 26, 2020

[109]:
```
import esda
import pandas as pd
import geopandas as gpd
from geopandas import GeoDataFrame
import libpysal as lps
import numpy as np
import matplotlib.pyplot as plt
from shapely.geometry import Point
import folium
import branca
%matplotlib inline
```

[5]:
```
Barrios = gpd.read_file('/mnt/d/Documentos/DS4A/process_Data/SectorCatastral/
 ↪SectorCatastral.shp')
Barrios.head(10)
```

[5]:

	gid	scacodigo	scatipo	scanombre	geometry
0	1	002598	0	EL MOCHUELO II URBANO	POLYGON ((-74.12983 4.53681, -74.12938 4.53647…
1	2	004524	0	SAN PABLO BOSA	POLYGON ((-74.19447 4.60992, -74.19288 4.60954…
2	3	001344	0	LOS SOCHES	POLYGON ((-74.08600 4.50096, -74.08693 4.50062…
3	4	002630	0	EL PORTAL DEL DIVINO	POLYGON ((-74.09576 4.48804, -74.09586 4.48799…
4	7	005103	0	SAN MIGUEL	POLYGON ((-74.07701 4.65949, -74.07734 4.65867…
5	8	005615	0	LA SOLEDAD NORTE	POLYGON ((-74.10289 4.69350, -74.10293 4.69353…
6	513	101301	1	HOYA SAN CRISTOBAL	POLYGON ((-74.07163 4.57686, -74.07163 4.57662…
7	514	101502	1	SIBERIA	POLYGON ((-74.05646 4.64102, -74.05643 4.64097…
8	5	002517	0	LUCERO DEL SUR	
9	6	002605	0	BOLONIA	

```
8  POLYGON ((-74.13736 4.55389, -74.13731 4.55353…
9  POLYGON ((-74.09983 4.51031, -74.09982 4.51031…
```

[6]:
```
avaluoMan = gpd.read_file('/mnt/d/Documentos/DS4A/initialData/Avaluo Catastral␣
↪Manzana/AvaluoCatastralManzana/Avaluo_Manzana.shp')
avaluoMan.head(10)
```

[6]:
```
   OBJECTID MANZANA_ID CP_TERR_AR   GRUPOP_TER  AVALUO_COM  AVALUO_CAT  \
0         1  009259086          N  RESIDENCIAL    951874.0    733096.0
1         2  001355027          N  RESIDENCIAL    973208.0    666239.0
2         3  001355010          N  RESIDENCIAL   1100000.0    818602.0
3         4  001355012          N  RESIDENCIAL    687104.0    469428.0
4         5  001355021          N  RESIDENCIAL    697258.0    474940.0
5         6  002538096          N  RESIDENCIAL    450000.0    317344.0
6         7  002521015          N  RESIDENCIAL    450000.0    292500.0
7         8  002521006          N  RESIDENCIAL    450000.0    292500.0
8         9  002521014          N  RESIDENCIAL    450000.0    292500.0
9        10  002521016          N  RESIDENCIAL    450000.0    292500.0

                                          OBSERVACIO  \
0  Este valor corresponde a la mediana y puede di…
1  Este valor corresponde a la mediana y puede di…
2  Este valor corresponde a la mediana y puede di…
3  Este valor corresponde a la mediana y puede di…
4  Este valor corresponde a la mediana y puede di…
5  Este valor corresponde a la mediana y puede di…
6  Este valor corresponde a la mediana y puede di…
7  Este valor corresponde a la mediana y puede di…
8  Este valor corresponde a la mediana y puede di…
9  Este valor corresponde a la mediana y puede di…

                                 GLOBALID  SHAPE_Leng    SHAPE_Area  \
0  {70BABE94-C17D-48FC-ADD0-BEF0283A45B4}    0.002464  1.213815e-07
1  {73AA8E80-CC4E-4DF5-887F-E1620A2356E4}    0.000684  2.818937e-08
2  {ED6BDEF8-72FB-40F3-B4B5-A979800F5B47}    0.000875  2.915943e-08
3  {2EBCB819-9A4E-4F41-9A8B-0578AE28045A}    0.001018  3.175301e-08
4  {F25CC9EA-C4FA-49D6-9878-5EF2EBEE73FA}    0.002131  9.812038e-08
5  {40A26BD4-2520-40D2-AC8F-528BE7F1220C}    0.002872  2.336448e-07
6  {747050A4-9C20-4B6C-B8AB-92830EA084CC}    0.001492  8.719960e-08
7  {28A87DB1-1C0F-4B05-B94B-FDE8605FD53E}    0.001722  1.043170e-07
8  {B23223D5-E500-4FE1-ADFF-A1C1C2A25211}    0.001092  5.799999e-08
9  {11D40468-A2BE-4711-A5AA-71FF96C2E35A}    0.001007  5.171805e-08

                                          geometry
0  POLYGON ((-74.12100 4.74751, -74.12101 4.74747…
1  POLYGON ((-74.09776 4.55222, -74.09776 4.55221…
2  POLYGON ((-74.09745 4.55194, -74.09747 4.55190…
```

```
3  POLYGON ((-74.09723 4.55258, -74.09718 4.55258…
4  POLYGON ((-74.09668 4.55296, -74.09673 4.55288…
5  POLYGON ((-74.11765 4.49118, -74.11764 4.49118…
6  POLYGON ((-74.14006 4.55912, -74.14006 4.55905…
7  POLYGON ((-74.13961 4.55970, -74.13962 4.55962…
8  POLYGON ((-74.14034 4.55890, -74.14036 4.55889…
9  POLYGON ((-74.13985 4.55922, -74.13985 4.55922…
```

[7]:
```
avaluoMan.isna().any()
```

[7]:
```
OBJECTID      False
MANZANA_ID     True
CP_TERR_AR     True
GRUPOP_TER     True
AVALUO_COM    False
AVALUO_CAT    False
OBSERVACIO    False
GLOBALID      False
SHAPE_Leng    False
SHAPE_Area    False
geometry      False
dtype: bool
```

[8]:
```
#VACIOS ID
len(avaluoMan) - avaluoMan['MANZANA_ID'].count()
```

[8]:
```
1204
```

[9]:
```
avaluoMan.dropna(subset = ['MANZANA_ID'],inplace = True)
```

[10]:
```
avaluoMan['SECTOR_ID'] = avaluoMan['MANZANA_ID'].apply(lambda x: str(x)[:6])
avaluoMan.head()
```

[10]:
```
   OBJECTID MANZANA_ID CP_TERR_AR   GRUPOP_TER  AVALUO_COM  AVALUO_CAT  \
0         1  009259086          N  RESIDENCIAL    951874.0    733096.0
1         2  001355027          N  RESIDENCIAL    973208.0    666239.0
2         3  001355010          N  RESIDENCIAL   1100000.0    818602.0
3         4  001355012          N  RESIDENCIAL    687104.0    469428.0
4         5  001355021          N  RESIDENCIAL    697258.0    474940.0

                                          OBSERVACIO  \
0  Este valor corresponde a la mediana y puede di…
1  Este valor corresponde a la mediana y puede di…
2  Este valor corresponde a la mediana y puede di…
3  Este valor corresponde a la mediana y puede di…
4  Este valor corresponde a la mediana y puede di…
```

```
                                    GLOBALID  SHAPE_Leng    SHAPE_Area  \
0  {70BABE94-C17D-48FC-ADD0-BEF0283A45B4}    0.002464  1.213815e-07
1  {73AA8E80-CC4E-4DF5-887F-E1620A2356E4}    0.000684  2.818937e-08
2  {ED6BDEF8-72FB-40F3-B4B5-A979800F5B47}    0.000875  2.915943e-08
3  {2EBCB819-9A4E-4F41-9A8B-0578AE28045A}    0.001018  3.175301e-08
4  {F25CC9EA-C4FA-49D6-9878-5EF2EBEE73FA}    0.002131  9.812038e-08

                                            geometry SECTOR_ID
0  POLYGON ((-74.12100 4.74751, -74.12101 4.74747…    009259
1  POLYGON ((-74.09776 4.55222, -74.09776 4.55221…    001355
2  POLYGON ((-74.09745 4.55194, -74.09747 4.55190…    001355
3  POLYGON ((-74.09723 4.55258, -74.09718 4.55258…    001355
4  POLYGON ((-74.09668 4.55296, -74.09673 4.55288…    001355
```

[12]:
```
avaluoSec = avaluoMan.groupby(['SECTOR_ID']).mean().reset_index()
```

[13]:
```
avaluoSec.drop(columns=['OBJECTID','SHAPE_Leng','SHAPE_Area'],inplace=True)
```

[14]:
```
avaluoSec
```

[14]:
```
    SECTOR_ID    AVALUO_COM    AVALUO_CAT
0      001101  1.110261e+06  7.629671e+05
1      001102  1.061025e+06  7.115269e+05
2      001103  1.141658e+06  7.870451e+05
3      001104  2.547066e+05  1.728447e+05
4      001106  7.770134e+05  5.363061e+05
..        …           …           …
983    009263  8.300920e+05  5.993414e+05
984    009265  7.111822e+05  5.593569e+05
985    009266  1.418897e+06  9.996877e+05
986    009267  1.757494e+06  1.265812e+06
987    009268  1.394482e+05  1.221605e+05

[988 rows x 3 columns]
```

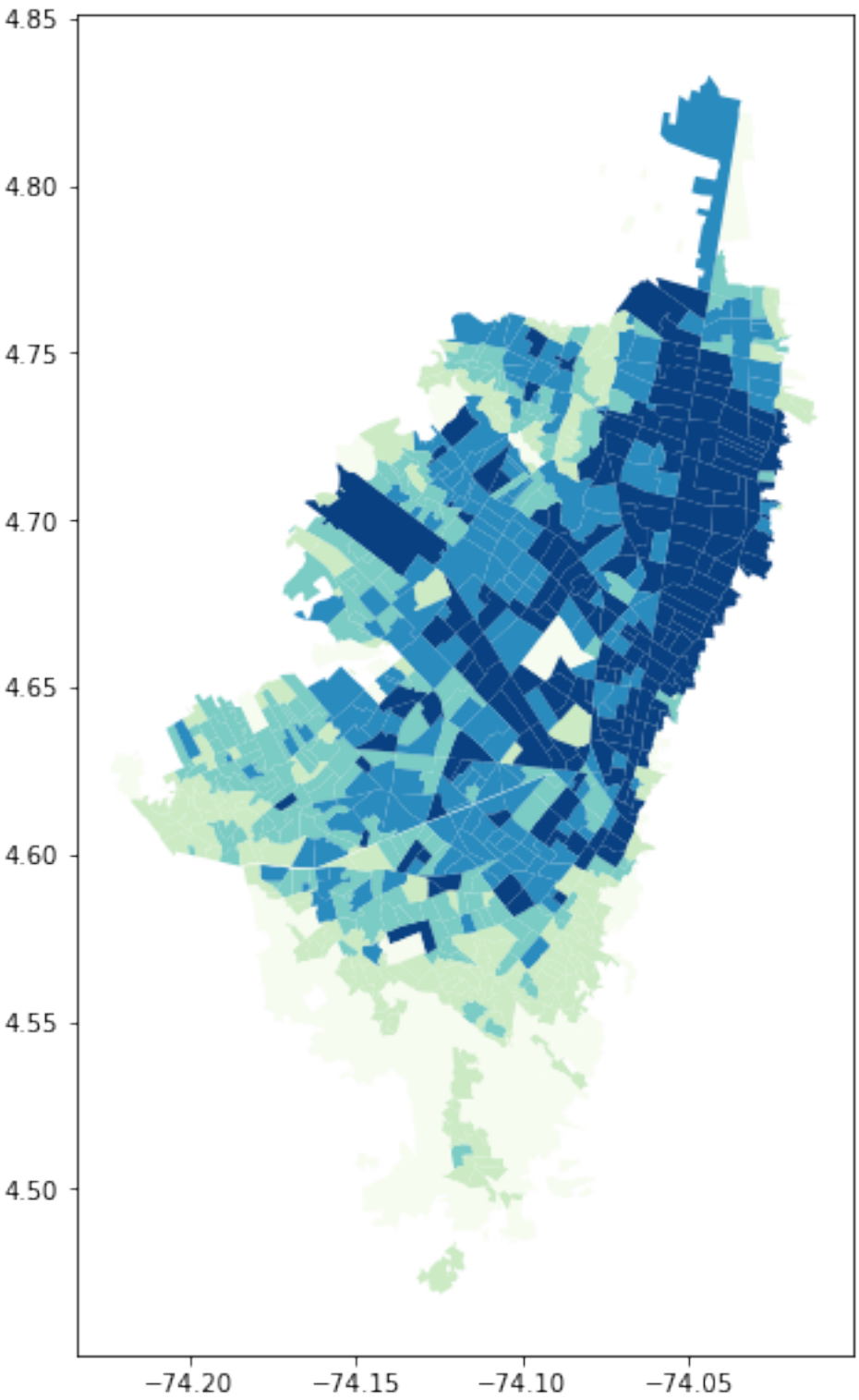
[15]:
```
avaluoBar = pd.merge(Barrios, avaluoSec, left_on='scacodigo',␣
↪right_on='SECTOR_ID', how='right')
avaluoBar
```

[15]:
```
      gid scacodigo  scatipo                scanombre  \
0    1002    001101        0              LAS BRISAS
1    1133    001102        0            BUENOS AIRES
2     276    001103        0                 VITELMA
3     278    001104        0      MOLINOS DE ORIENTE
4    1012    001106        0                SAN BLAS
..    …       …       …                      …
983   895    009263        0           VILLA ALCAZAR
```

```
984   478    009265        0    VEREDA SUBA CERROS II
985   740    009266        0           RINCON ALTAMAR
986   227    009267        0            VILLA MARIA I
987   739    009268        0  SANTA CECILIA DE SUBA I

                                                geometry SECTOR_ID  \
0    POLYGON ((-74.08107 4.58102, -74.08151 4.58119…    001101
1    POLYGON ((-74.07818 4.58105, -74.07799 4.58088…    001102
2    POLYGON ((-74.07576 4.57882, -74.07559 4.57873…    001103
3    POLYGON ((-74.06980 4.56872, -74.06966 4.56863…    001104
4    POLYGON ((-74.08235 4.57043, -74.08271 4.56972…    001106
..                                                 …       …
983  POLYGON ((-74.08405 4.72016, -74.08385 4.72068…    009263
984  POLYGON ((-74.06823 4.75848, -74.06796 4.75835…    009265
985  POLYGON ((-74.09104 4.71857, -74.09133 4.71817…    009266
986  POLYGON ((-74.10301 4.74327, -74.09891 4.74184…    009267
987  POLYGON ((-74.12493 4.74077, -74.12482 4.74052…    009268

       AVALUO_COM    AVALUO_CAT
0    1.110261e+06  7.629671e+05
1    1.061025e+06  7.115269e+05
2    1.141658e+06  7.870451e+05
3    2.547066e+05  1.728447e+05
4    7.770134e+05  5.363061e+05
..            …             …
983  8.300920e+05  5.993414e+05
984  7.111822e+05  5.593569e+05
985  1.418897e+06  9.996877e+05
986  1.757494e+06  1.265812e+06
987  1.394482e+05  1.221605e+05

[988 rows x 8 columns]
```

[23]:
```
fig, ax = plt.subplots(figsize=(12,10), subplot_kw={'aspect':'equal'})
avaluoBar.plot(column='AVALUO_COM', scheme='Quantiles', k=5, cmap='GnBu', ax=ax)
#ax.set_xlim(150000, 160000)
#ax.set_ylim(208000, 215000)
```

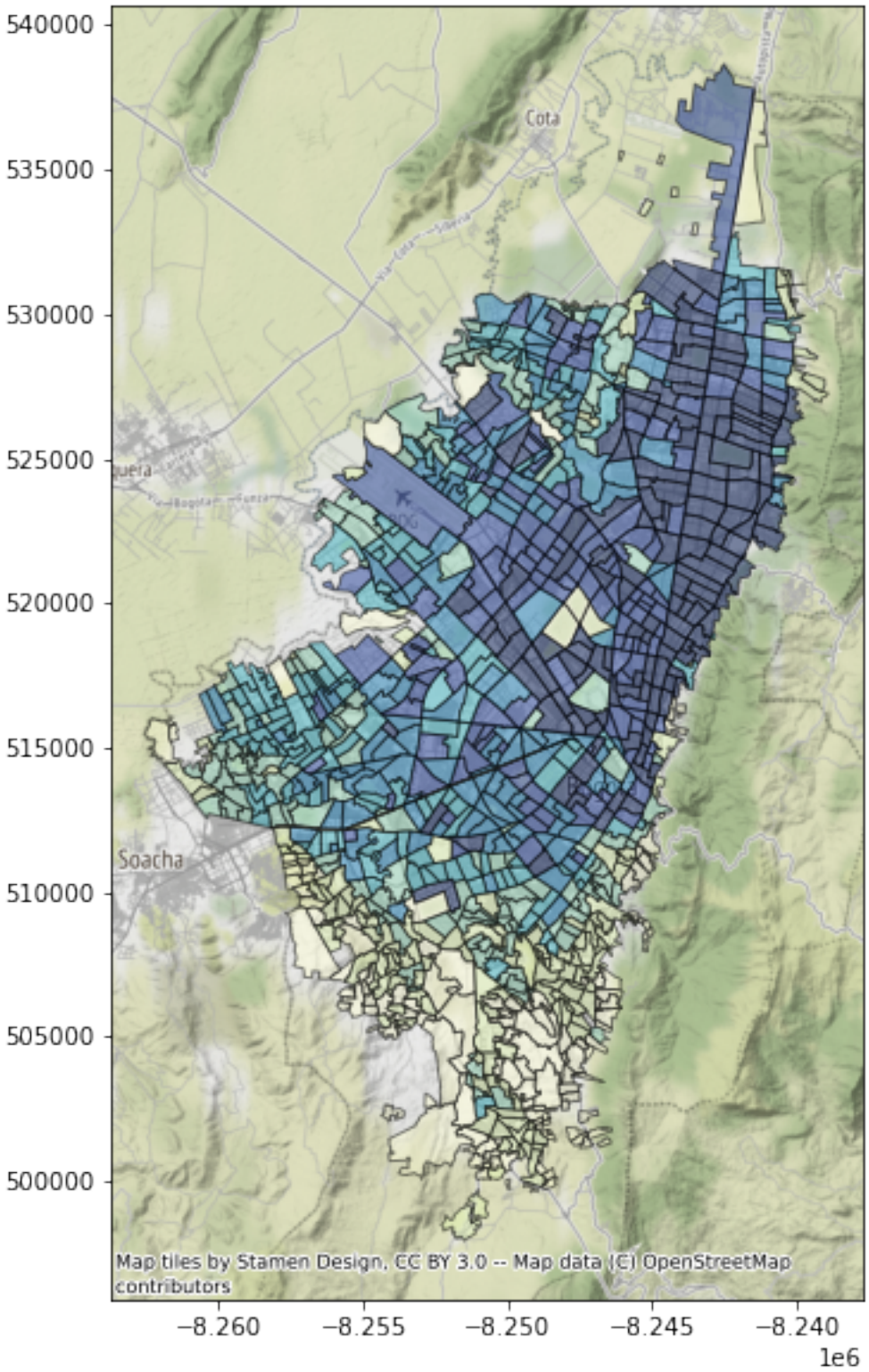
[23]:
```
<AxesSubplot:>
```



[34]:
```
df = avaluoBar.to_crs(epsg=3857)
```

[37]:
```
import contextily as ctx
```

[41]:
```
ax = df.plot(figsize=(10, 10), alpha=0.5, edgecolor='k',column='AVALUO_COM',␣
↪scheme='Quantiles', k=7, cmap='YlGnBu')
ctx.add_basemap(ax, zoom=12)
```


540000
535000
530000
525000
520000
515000
510000
505000
500000
Cota
Soacha
Map tiles by Stamen Design, CC BY 3.0 -- Map data (C) OpenStreetMap contributors
−8.260
−8.255
−8.250
−8.245
−8.240
1e6

[ ]:
```
#esto ta feo toca arreglardf = df.to_crs(epsg=3857)
f,ax = plt.subplots(1,2,figsize=(2.16*10,4))
avaluoBar.plot(column='AVALUO_COM', ax=ax[0], edgecolor='k',
        scheme="quantiles",  k=5, cmap='GnBu')
ax[0].axis(avaluoBar.total_bounds[np.asarray([0,2,1,3])])
ax[0].set_title("AVALUO_COM")
avaluoBar.plot(column='AVALUO_CAT', ax=ax[1], edgecolor='k',
        scheme='quantiles', cmap='GnBu', k=5)
ax[1].axis(avaluoBar.total_bounds[np.asarray([0,2,1,3])])
ax[1].set_title("AVALUO_CAT")
ax[0].axis('off')
ax[1].axis('off')
plt.show()
```

[73]:
```
df
```

[73]:

	gid	scacodigo	scatipo	scanombre	\
0	1002	001101	0	LAS BRISAS	
1	1133	001102	0	BUENOS AIRES	
2	276	001103	0	VITELMA	
3	278	001104	0	MOLINOS DE ORIENTE	
4	1012	001106	0	SAN BLAS	
..	…	…	…	…	
983	895	009263	0	VILLA ALCAZAR	
984	478	009265	0	VEREDA SUBA CERROS II	
985	740	009266	0	RINCON ALTAMAR	
986	227	009267	0	VILLA MARIA I	
987	739	009268	0	SANTA CECILIA DE SUBA I	

	geometry	SECTOR_ID	\
0	POLYGON ((-8246667.327 510501.231, -8246716.36…	001101	
1	POLYGON ((-8246345.508 510504.090, -8246324.00…	001102	
2	POLYGON ((-8246075.945 510255.034, -8246056.89…	001103	
3	POLYGON ((-8245412.666 509127.841, -8245396.99…	001104	
4	POLYGON ((-8246809.423 509318.417, -8246849.22…	001106	
..	…	…	
983	POLYGON ((-8246998.355 526041.164, -8246976.05…	009263	
984	POLYGON ((-8245237.990 530321.906, -8245207.59…	009265	
985	POLYGON ((-8247777.091 525863.310, -8247808.85…	009266	
986	POLYGON ((-8249109.251 528622.839, -8248652.79…	009267	
987	POLYGON ((-8251549.236 528343.786, -8251537.09…	009268	

	AVALUO_COM	AVALUO_CAT
0	1.110261e+06	7.629671e+05
1	1.061025e+06	7.115269e+05
2	1.141658e+06	7.870451e+05
3	2.547066e+05	1.728447e+05

```
4    7.770134e+05  5.363061e+05
..            …           …
983  8.300920e+05  5.993414e+05
984  7.111822e+05  5.593569e+05
985  1.418897e+06  9.996877e+05
986  1.757494e+06  1.265812e+06
987  1.394482e+05  1.221605e+05

[988 rows x 8 columns]
```

[108]:
```
m = folium.Map(location=[4.65, -74.1],
                        zoom_start=12,
                        tiles="OpenStreetMap")
min_cn, max_cn = df['AVALUO_COM'].quantile([0.01,0.99]).apply(round, 2)

colormap = branca.colormap.LinearColormap(
    colors=['white','yellow','green','blue'],
#     #index=beat_cn['count'].quantile([0.2,0.4,0.6,0.8]),b
    vmin=min_cn,
    vmax=max_cn
)

colormap.caption="Avaluo Comercial Promedio"
style_function = lambda x: {
    'fillColor': colormap(x['properties']['AVALUO_COM']),
    'color': 'white',
     'weight':0.6,
    'fillOpacity':0.7
}


stategeo = folium.GeoJson(
    df,
    name='AVALUO_CAT',
    style_function=style_function,
    tooltip=folium.GeoJsonTooltip(
        fields=['scanombre','AVALUO_COM','AVALUO_CAT'],
        aliases=['Barrio','Avaluo Comercial:','Avaluo Catastral'],
        localize=True
    )
).add_to(m)

# Save to html
colormap.add_to(m)
m.save('map_avaluo_barrio.html')
m
```

[108]: <folium.folium.Map at 0x7f7ec7a9e128>

[110]:
```
#avaluo catastral 70% del comercial?
avaluoMan['REL'] = avaluoMan['AVALUO_CAT']/avaluoMan['AVALUO_COM']
avaluoMan['REL'].mean()
```

[110]: 0.7426563618120284