

Introducción manejo de Datos Geoespaciales con Python

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Abstract En este NoteBook encontrarás código para manejar Datos Geoespaciales con Python

```
import geopandas as gpd
import matplotlib.pyplot as plt
import contextily as ctx # Opcional: para mapas base
import pandas as pd

# Read the shapefile into a GeoDataFrame
gdf = gpd.read_file("../mg_2025_integrado/conjunto_de_datos/00mun.shp")

# View the first few rows and associated attributes
print(gdf.head())
```

```
CVEGEO CVE_ENT CVE_MUN           NOMGEO \
0 01001      01    001      Aguascalientes
1 01008      01    008      San José de Gracia
2 01011      01    011  San Francisco de los Romo
3 01009      01    009      Tepezalá
4 01007      01    007  Rincón de Romos

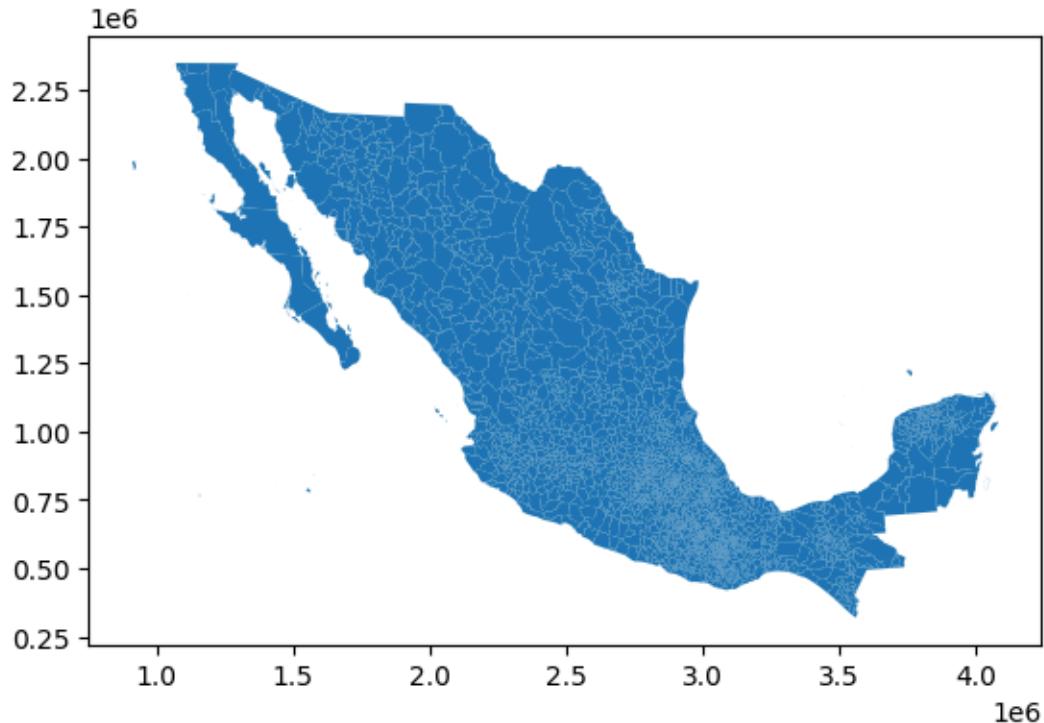
                           geometry
0  POLYGON ((2488980.227 1117358.447, 2489013.495...
1  POLYGON ((2453326.553 1143576.423, 2453363.325...
2  POLYGON ((2483638.349 1120034.022, 2483946.175...
3  POLYGON ((2481826.447 1149055.253, 2481589.222...
4  POLYGON ((2476760.231 1150329.046, 2476783.634...
```

```
excel_df = pd.read_excel("IMM_2020.xlsx", sheet_name= "IMM_2020")
```

```
type(gdf)
```

```
geopandas.geodataframe.GeoDataFrame
```

```
gdf.plot()
```



```
print(gdf.crs)
```

```
PROJCS["MEXICO_ITRF_2008_LCC",GEOGCS["ITRF2008",DATUM["International_Terrestrial_Reference_Frame_1980",6378137,298.257222101,AUTHORITY["EPSG","7019"]],AUTHORITY["EPSG","1061"]],PRIMEM["Greenwich",0,AUTHORITY["EPSG","8901"]],UNIT["metre",1,AUTHORITY["EPSG","9001"]],AXIS["vertical",UP,AUTHORITY["EPSG","9102"]],AXIS["horizontal",EAST,AUTHORITY["EPSG","9103"]]]
```

```
# Ajuste del tipo de dato para poder hacer Merge  
gdf["CVEGEO"] = gdf["CVEGEO"].astype(str)  
excel_df["CVE_MUN"] = excel_df["CVE_MUN"].astype(str)
```

```
merged_gdf = gdf.merge(excel_df, left_on="CVEGEO",  
right_on="CVE_MUN",how="inner")
```

```
merged_gdf.head()
```

CV	EV	MN	NOM	NAME	NUM	PONTO	OVSDE	SEESAGVPHAC5R02SM2M20202020
		GEO	GEO	e-		try		
0	100090	009	GuaPOLY0	Du- 1000Gua-9869...	4.293572813202842812590303260028279944160		829850	
		nacev	GON	rango	naceví			
1	100170	017	OcamPOLY0	Du- 1001Ocam-8003...	4.058290429497315426697137018200993539360.870007			
		GON	rango					
2	100360	036	TlahPOLY0	Du- 1003Tlahualli48.	2.5135367746763555394576495026740241729.893742		bajo	
		GON	rango					
3	100210	021	PeñPOLY0	Du- 1002Peñón1118.	3.083887466230845690846283296874824160.888229		bajo	
		Blan	GON	rango	Blanco			
4	100340	034	TamPOLY0	Du- 1003Tamašila.	17.543266507932816826256600209105091570.737373		alto	
		GON	rango					
		((2004791.908						
		1520210.009,						
		2007814.583...						

```
#variable_interes="IMN_2020"  
variable interes="POB TOT"
```

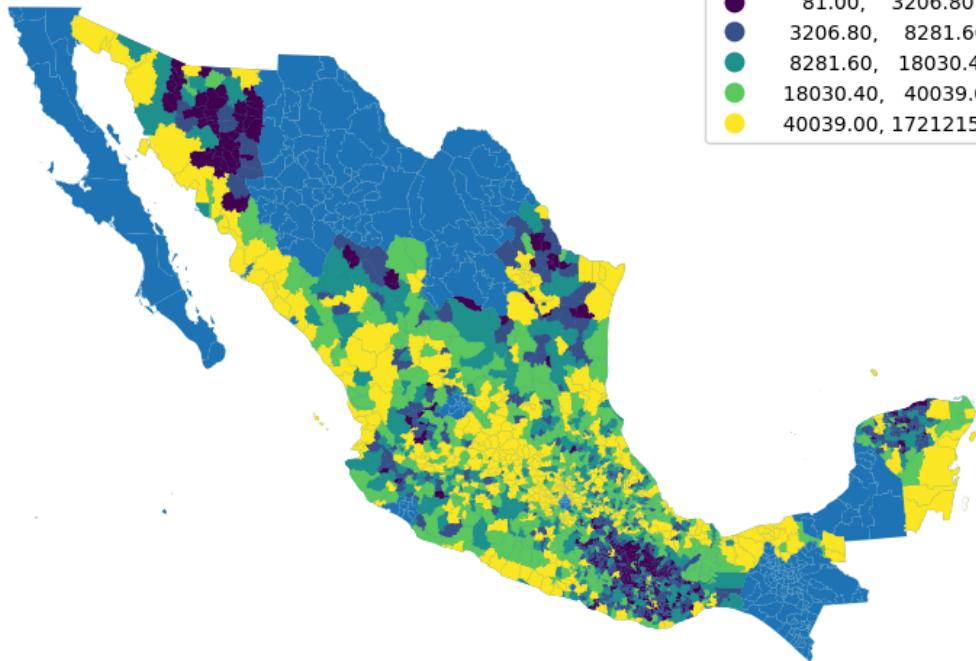
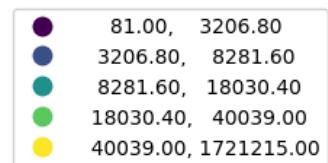
```
f, ax = plt.subplots(1, figsize=(10, 10))
gdf.plot(ax=ax)
merged_gdf.plot(column=variable_interes,
                 scheme='quantiles', # Clasificación por cuantiles
```

```

k=5,                      # 5 clases
cmap='viridis',          # Mapa de color
legend=True,
ax=ax)
ax.set_title(f"Distribución Espacial de: {variable_interes}")
ax.set_axis_off()
plt.show()

```

Distribución Espacial de: POB_TOT



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<https://www.inegi.org.mx/temas/mg/#descargas> <https://www.inegi.org.mx/app/biblioteca/ficha.html?upc=794551163061>

Índices de marginación 2020

<https://www.gob.mx/conapo/documentos/indices-de-marginacion-2020-284372>