GeoPandas

Info Sheet

Python Geospatial Data Frame : http://geopandas.org/

Overview

GeoPandas is a project to add support for geographic data to pandas objects. It currently implements `GeoSeries` and `GeoDataFrame` types which are subclasses of `pandas.Series` and `pandas.DataFrame` respectively. GeoPandas objects can act on shapely geometry objects and perform geometric operations.

As you are aware, a pandas DataFrame is a collection of columns, additionally the rows are indexed. GeoPandas extend the core elements of pandas to include geospatial attributes and support geospatial data types for columns. One such, very important attribute, is the coordinate reference system (CRS). CRS each of a particular *projections* (http://geopandas.org/projections.html), which is a mathematical definition of how the coordinates map to a spheroid or planar system.
The geometry (Shapely) types supported by GeoPandas includes:

- Points / Multi-Points
- Lines / Multi-Lines
- Polygons / Multi-Polygons

Related libraries

Pandas : https://pandas.pydata.org/
Shapely : https://github.com/Toblerity/Shapely
Fiona : https://github.com/Toblerity/Fiona

Code Samples

Loading a Geospatial Data File

In:

```
import geopandas as gpd
oceans =
  gpd.read_file("oceans.shp")
oceans.head()
```

Out:

	my_polygon	ID	Oceans	geometry
0	S.Atlantic	1	South Atlantic Ocean	POLYGON ((-67.26025728926088 -59.9309210526315...
1	N.Pacific	0	North Pacific Ocean	(POLYGON ((180 66.27034771241199, 180 0, 101.1...
2	Southern	3	Southern Ocean	POLYGON ((180 -60, 180 -90, -180 -90, -180 -60...
3	Arctic	2	Arctic Ocean	POLYGON ((-100.1196521436255 52.89103112710165...
4	Indian	5	Indian Ocean	POLYGON ((19.69705552221351 -59.94160091330382...

Recipes:

Convert regular file data to GeoPandas

In:

```
import pandas as pd
import geopandas as gpd
from shapely.geometry import Point

df=pd.read_csv('datafile_with_LatLon.csv')

# Generate a List of shapely.geometry.Point
#   from the (lon, lat) pair for each row
geom_list = [Point(xy) for xy in
             zip(df['lon'], df['lat'])]

# Create a GeoPanda DF with original data
gdf =
   gpd.GeoDataFrame(df,geometry=geom_list)
```

Other References and Links:

Spatial Joins

https://github.com/geopandas/geopandas/blob/master/examples/spatial_joins.ipynb

Basic Rendering

http://geopandas.org/mapping.html

Well-known Text

https://en.wikipedia.org/wiki/Well-known_text