

Hierarchical Geography with PYTHON

A Very Brief Introduction

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March 10, 2022

Background

- We use GP boundaries as an example
 - areas covered are defined with different geographies
 - e.g. postcode districts and sectors
 - ultimately we are only interested in the overall boundary of a GP
- How do we merge geographies at different levels?
⇒ GeoPandas in PYTHON

GeoPandas

- An open source project for geospatial data analysis in PYTHON (Jordahl et al., [2020](#))
- Extends from **Pandas** (Reback et al., [2020](#)), a data analysis package
- Can be used to read and create shape files

NRS Data

We make use of postcode district and sector data from the National Records of Scotland ([NRS](#)).

- Shape files
- Contain geometries of districts and sectors
- Read in as `DataFrames` into PYTHON with `Pandas`
- Convert to `GeoDataFrames` with `GeoPandas`

NRS Data

	OBJECTID	District	Shape_Leng	Shape_Area	geometry
0	1	AB10	17466.667741	4.591592e+06	POLYGON (((394256.974 806666.497, 394264.000 80...
1	2	AB11	26086.506732	5.396370e+06	MULTIPOLYGON (((393211.114 805537.072, 393207....
2	3	AB12	73839.045489	7.299857e+07	MULTIPOLYGON (((396494.604 802552.201, 396491....
3	4	AB13	15847.217768	8.770372e+06	POLYGON (((386014.000 803318.000, 385991.953 80...
4	5	AB14	27250.316419	1.754676e+07	POLYGON (((383220.204 804258.703, 383230.799 80...

Figure 1: A segment of `DataFrame` containing district information. Similarly for sector data, with a column representing postcode sectors.

GP Data

- For this example we make use of a few GPs from Lanarkshire (with some modifications):
 - Nalagatla Medical Practice
 - The Craigallian Avenue Practice
 - The Stonelaw Practice
 - Ardoch Medical Practice
- For the purpose of testing, we also create two hypothetical practices, namely Hypothetical One and Hypothetical Two respectively
 - They cover areas defined by a combination of districts and sectors

Scotland Total

- Total admissions in Scotland
- A general decline could be observed

Summary and Conclusion

- From 2009/10 to 2018/19, a general upward trend could be observed for number of stays, patients and new patients
- Caused by factors such as population number in the 65 or above age group, change in life expectancy
- Using a standard population (EASR), there is a slight declining trend except for the number of new patients
- On the other hand, the overall trend including all age groups in Scotland also shows a general decline

References

Jordahl, K., den Bossche, J. V., Fleischmann, M., et al. [2020](#)

Reback, J., McKinney, W., jbrockmendel, et al. [2020](#)