

## Exploratory Spatial Data Analysis with PySAL

### Author

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### Description

A unique feature of this tutorial is the use of Python based software tools for spatial data analysis. Python is an object oriented scripting language that is gaining rapid adoption in the computational sciences. To facilitate this adoption within the GIScience community, Sergio Rey and Luc Anselin have collaborated on the creation of PySAL: Python Library for Spatial Analysis. Since its initial release in July 2010, PySAL has been downloaded over 16,000 times. This tutorial will introduce participants to version 1.4 of PySAL and provides hands-on experience with the exploratory spatial data analysis (ESDA) components of the library.

### Objectives

This tutorial will offer participants the following :

- installation of Python tools for scientific computing
- introduction to Python for spatial data processing
- introduction to PySAL for exploratory spatial data analysis

### Outline

1. PySAL Origins, Use and Overview
2. Package Installation
3. Tools: IPython and IPython Notebook

4. Spatial data processing with PySAL
  - a. Reading/Writing Shapefiles
  - b. Other file types
5. Visualization
  - a. matplotlib
  - b. choropleth mapping
6. Spatial Weights
  - a. Weights Construction
  - b. Weights Manipulation
  - c. Weights Conversion
  - d. Spatial Lag
7. Spatial Autocorrelation
  - a. Global Autocorrelation
  - b. Local Autocorrelation
8. Spatial Dynamics
  - a. Classic Markov Chains
  - b. Spatial Markov Chains
  - c. LISA Markov

## **Audience**

GIScientists, researchers and students interested in using PySAL for computational scripting in spatial analysis.

## **Prerequisites**

This tutorial is geared towards individuals who have a basic understanding of exploratory spatial data analysis. Previous experience with Python programming is recommended.