Introduction to spatial analysis library

Python images and hydro-share images

Spatial library List

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| **Classes** | **Library (current version)** | **Description** |
| Utility Library | pandas (0.25.3) | utility library data structures, operations for manipulating numerical tables and time series |
| numpy(1.17.3) | collection of high-level mathematical functions, multi-dimensional arrays, matrices. |
| matplotlib (3.1.2) | Plotting library and object-oriented API for embedding plots into applications using general-purpose GUI toolkits. |
| scipy (1.3.1) | scientific computing for optimization, linear algebra, integration, interpolation. |
| scikit-learn(0.21.3) | machine learning library with various classification, regression and clustering algorithms including support vector machines, random forests, gradient boosting, k-means and DBSCAN. |
| scikit-imge(0.16.2) | a collection of algorithms for image processing under pyhton |
| pillow (6.2.1) | Python Imaging Library |
| dask(2.2.0) | Scalable analytics in Python |
| xarray(0.14.1) | bring the labeled data power of pandas to the physical sciences |
| IPython(7.10.1) | Interactive python |
| Data processing | gdal(2.4.1) | geospatial data abstraction library for reading and writing raster and vector geospatial data formats. (python 3 should point to the configuration path) |
| fiona(1.8.6) | Reading and writing spatial data (alternative for geopandas) |
| shaply(1.6.4.post2) | Python package for manipulation and analysis of planar geometric objects (based on widely deployed GEOS). |
| proj4(5.2.0) | library for cartographic projections and coordinate transformations |
| pyproj(1.9.6) | library for cartographic projections and coordinate transformations |
| rasterio(1.0.25) | Reading and writing raster data |
| geopy(1.20.0) | geocoding library |
| geojson(2.5.0) | Python bindings and utilities for GeoJSON |
| lidar (not yet) | Reading and writing point cloud library |
| sqlalchemy(1.3.1) | Database library for data management (SQlite) |
| shapefile(2.1.0) | Reading ESRI Shape file library |
| pykrige (1.4.1) | Kriging toolkit for python version |
| pykdtree(1.3.1) | KDtree index |
| tqdm(4.40.0) | A fast, extensible progress bar for python and cli |
| geotiff(1.4.3) | Reading, processing and writing geotiff files |
| rtree(0.11) | Spatial index for spatial data |
| Spatial Analysis | pysal(2.1.0) | Spatial analysis library |
| geopandas(0.6.2) | Spatial operations, spatial index |
| scipy.spatial(1.3.1) | Spatial algorithms and data structures |
| osmnx(0.11) | network analysis library (based on gdal, networkx) |
| statsmodels(0.10.2) | Python module that provides classes and functions for the estimation of conducting statistical tests, and statistical data exploration |
| networkx(2.4) | graph theory library and network analysis |
| owslib(0.19.0) | Accessing OGC services |
| graph-tool (not yet) | efficient graph analysis (parallel graph analysis) |
| osmnet(0.1.5) | Tools for the extraction of OpenStreetMap street network data |
| pandana(0.4.4) | Pandas network analysis for efficient data frames of network queries |
| Geovisual analysis | datashader(0.9.0) | large scale datasets visual library and mapping library |
| holoviews(1.12.7) | Plotting library |
| geoviews(1.6.6) | visualize geographical, meteorological, and oceanographic datasets, such as those used in weather, climate, and remote sensing research (based on holoviews). |
| cartopy(0.17.0) | Cartographics |
| mapclassify(2.1.1) | Convert Matplotlib plots into Leaflet web maps |
| descartes(1.1.0) | Mapping library |
| bokeh(1.3.4) | Open source library for scientific computing |
| seaborn(0.9.0) | statistical data visualization library |
| pyplot | Scientifical visual library |
| basemap(1.2.1) | Creating maps (install gdal first for python3) |
| Spatial Simulation | Mesa (not test) | agent-based modeling (or ABM) framework (pip install mesa) |
| urbanism(3.1.1) | Python platform for modeling urban land use |
| urbanaccess (0.2.0) | A tool for GTFS transit and OSM pedestrian network accessibility analysis |
| Geospatial Applications | (HAND) hydro-share (0.5) | Height Above Nearest Drainage (HAND) is an approach for estimating the vertical height of any point on the landscape from the nearest stream surface or bed. |
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logos for spatial libraries

Each class needs notebook