

Python Library	Description
GeoPandas	<ul style="list-style-type: none"> • Geopandas is like Pandas meet GIS. • It extends the datatypes used by pandas to allow spatial operations on geometric types. • Geometric operations are performed by shapely. It further depends on fiona for file access and matplotlib for plotting. • Here is the Quick Start Guide.
"MNSP"	<ul style="list-style-type: none"> • Classical Matplotlib, NumPy, SciPy and Pandas are usually handy for spatial data structures and algorithms, data visualization, multidimensional image processing and regular mathematical transformation.
Shapely	<ul style="list-style-type: none"> • With Shapely, you can create shapely geometry objects (e.g. Point, Polygon, Multipolygon) and manipulate them, e.g. buffer, calculate the area or an intersection etc.
Fiona	<ul style="list-style-type: none"> • Fiona can read and write real-world data using multi-layered GIS formats and zipped virtual file systems and integrates readily with other Python GIS packages such as pyproj, Rtree, and Shapely.
ipyleaflet	<ul style="list-style-type: none"> • If you want to create interactive maps, ipyleaflet is a fusion of Jupyter notebook and Leaflet. • You can control an assortment of customizations like loading basemaps, geojson, and widgets. • It also gives a wide range of map types to pick from including choropleth, velocity data, and side-by-side views.
Folium	<ul style="list-style-type: none"> • Just like ipyleaflet, Folium allows you to leverage leaflet to build interactive web maps. • It gives you the power to manipulate your data in Python, then you can visualize it with the leading open-source JavaScript library
Imageio	<ul style="list-style-type: none"> • Imageio is a Python library that provides an easy interface to read and write a wide range of image data, including animated images, volumetric data, and scientific formats.
PyQGIS	<ul style="list-style-type: none"> • QGIS, the free and open source community-driven GIS software. • PyQGIS is the Python environment inside QGIS with a set of QGIS libraries plus the Python tools with the potential of running other powerful libraries such as Pandas, Numpy or Scikit-learn.
Earth Engine	<p>Earth Engine concepts illustrate important concepts about data types such as:</p> <ul style="list-style-type: none"> • Image, The fundamental raster data type in Earth Engine. • ImageCollection, a stack or time-series of images. • Geometry, the fundamental vector data type in Earth Engine. • Feature, or a Geometry with attributes. • FeatureCollection, or a set of features. • Reducer, an object used to compute statistics or perform aggregations.

	<ul style="list-style-type: none"> • Join, or how to combine datasets (Image or Feature collections) based on time, location, or an attribute property. • Array, for multi-dimensional analyses. <p>There are also sections for machine learning, specialized or sensor specific algorithms (e.g. Landsat algorithms), and Code Editor specific features such as Chart, Earth Engine apps, and data (asset) management.</p>
Geemap	<ul style="list-style-type: none"> • Geemap is intended more for science and data analysis using Google Earth Engine (GEE)
GeoPlot	<ul style="list-style-type: none"> • A high-level geospatial data visualization library. • It's an extension to cartopy and matplotlib which makes mapping easy: like seaborn for geospatial. • Here is the QuickStart Guide.
ArcPy	<ul style="list-style-type: none"> • ArcPy library is for Esri ArcGIS. • ArcPy is meant for geoprocessing operations. • But it's not only for spatial analysis, it's also for data conversion, management, and map production with Esri ArcGIS.
SciKit-Image	<ul style="list-style-type: none"> • Scikit-Image is for image manipulation, e.g. histogram adjustments, filter, segmentation/edge detection operations, texture feature extraction etc.
SciKit-Learn	<ul style="list-style-type: none"> • SKLearn is a machine learning library for Regression, classification, dimensionality reductions etc. • Heavily used for Feature Extraction and data-preprocessing.
Descartes	<ul style="list-style-type: none"> • Descartes enables plotting of shapely geometries as matplotlib paths or patches. • Also it is a dependency for the geometry plotting functions of geopandas.
RasterStats	<ul style="list-style-type: none"> • RasterStats is used for zonal statistics. • Extracts statistics from rasters files or numpy arrays based on geometries.
Rasterio	<ul style="list-style-type: none"> • Rasterio is the go-to library for raster data handling. • It lets you read/write raster files to/from numpy arrays, offers many convenient ways to manipulate these array (e.g. masking, vectorizing etc.) and can handle transformations of coordinate reference systems. • Just like any other numpy array, the data can also be easily plotted, e.g. using the matplotlib library.
PySAL	<ul style="list-style-type: none"> • The Python Spatial Analysis Library contains a multitude of functions for spatial analysis, statistical modeling and plotting. It is intended to support the development of high-level applications.
xarray	<ul style="list-style-type: none"> • xarray labels the dimensions of the multidimensional numpy array and combines this with many functions and the syntax of the pandas library (e.g. groupby, rolling window, plotting). • Great for handling extensive image time series stacks.
PyProj	<ul style="list-style-type: none"> • PyProj library works with spatial referencing systems. • It can project and transform coordinates with a range of geographic reference systems. • PyProj can also perform geodetic calculations and distances for any given datum.

GDAL/OGR	<ul style="list-style-type: none"> • The GDAL library is used for translating between GIS formats and extensions. • QGIS, ArcGIS, ERDAS, ENVI, and GRASS GIS and almost all GIS software use it for translation in some way.
RSGISLib	<ul style="list-style-type: none"> • The RSGISLib library is a set of remote sensing tools for raster processing and analysis. • To name a few, it classifies, filters, and performs statistics on imagery. • My personal favorite is the module for object-based segmentation and classification (GEOBIA).
ReportLab	<ul style="list-style-type: none"> • ReportLab library is one of the most satisfying libraries on this list. • I say this because GIS often lacks sufficient reporting capabilities. Especially, if you want to create a report template, this is a fabulous option.
MapClassify	<ul style="list-style-type: none"> • MapClassify implements a family of classification schemes for choropleth maps. • It is focused on the determination of the number of classes, and the assignment of observations to those classes.
RTree	<p>RTree provides a number of advanced spatial indexing features such as -</p> <ul style="list-style-type: none"> • Nearest neighbor search • Intersection search • Multi-dimensional indexes • Clustered indexes (store Python pickles directly with index entries)
WhiteBoxTools	<ul style="list-style-type: none"> • It is used for geospatial applications and workflow automation. • By combining the WhiteboxTools library with a high-level scripting language, such as Python, users are capable of creating powerful stand-alone geospatial applications and workflow automation scripts.
pydeck	<ul style="list-style-type: none"> • PyDeck is high-scale spatial rendering in Python. • Here is the QuickStart Guide.
GeoAlchemy 2	<ul style="list-style-type: none"> • GeoAlchemy 2 provides extensions to SQLAlchemy for working with spatial databases. • GeoAlchemy 2 focuses on PostGIS.
Spectral	<ul style="list-style-type: none"> • Spectral Python (SPy) is a pure Python module for processing hyperspectral image data. • It has functions for reading, displaying, manipulating, and classifying hyperspectral imagery. • It can be used interactively from the Python command prompt or via Python scripts.
Mapnik	<ul style="list-style-type: none"> • Mapnik is an open-source mapping toolkit for desktop and server based map rendering.