

PyCon Nigeria 2017

Using Python for GIS and Remote Sensing Operations

Slides and Notebook: <https://github.com/forum2k9/pycon-ng-2017>

About me:

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Contents

1) Overview of GIS and RS

- Working with maps and data (location and attribute)
- Areas of application
- Dataset - Vector and Raster
- Traditional tool - ArcGIS and QGIS

2) Python for GIS and RS

- If it exists, there is python module for it
- Geospatial python modules
 - For vector data: Shapely, Fiona, PyShp
 - For raster data: OpenCV, Rasterio, Scikit-image, GDAL
 - Others: Geopy, PySAL, PostGIS, SimpleKML (more on Pypi)

3) Jupyter Notebook - demo

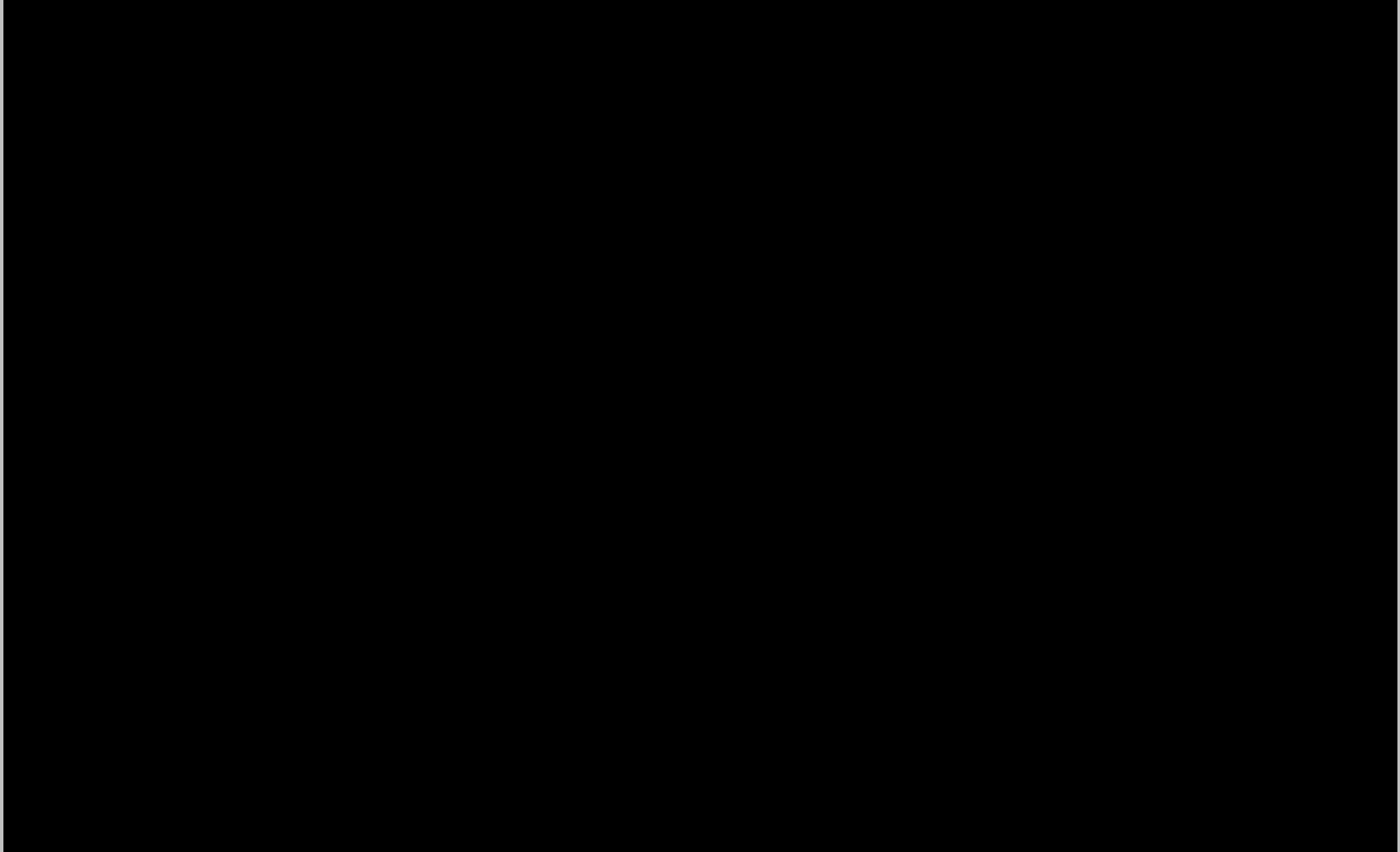
- Geocoding some addresses (GeoPy)
- Visualization on web map (Folium)
- Working with Points, Lines and Polygons
- Image Processing

Overview of GIS and RS

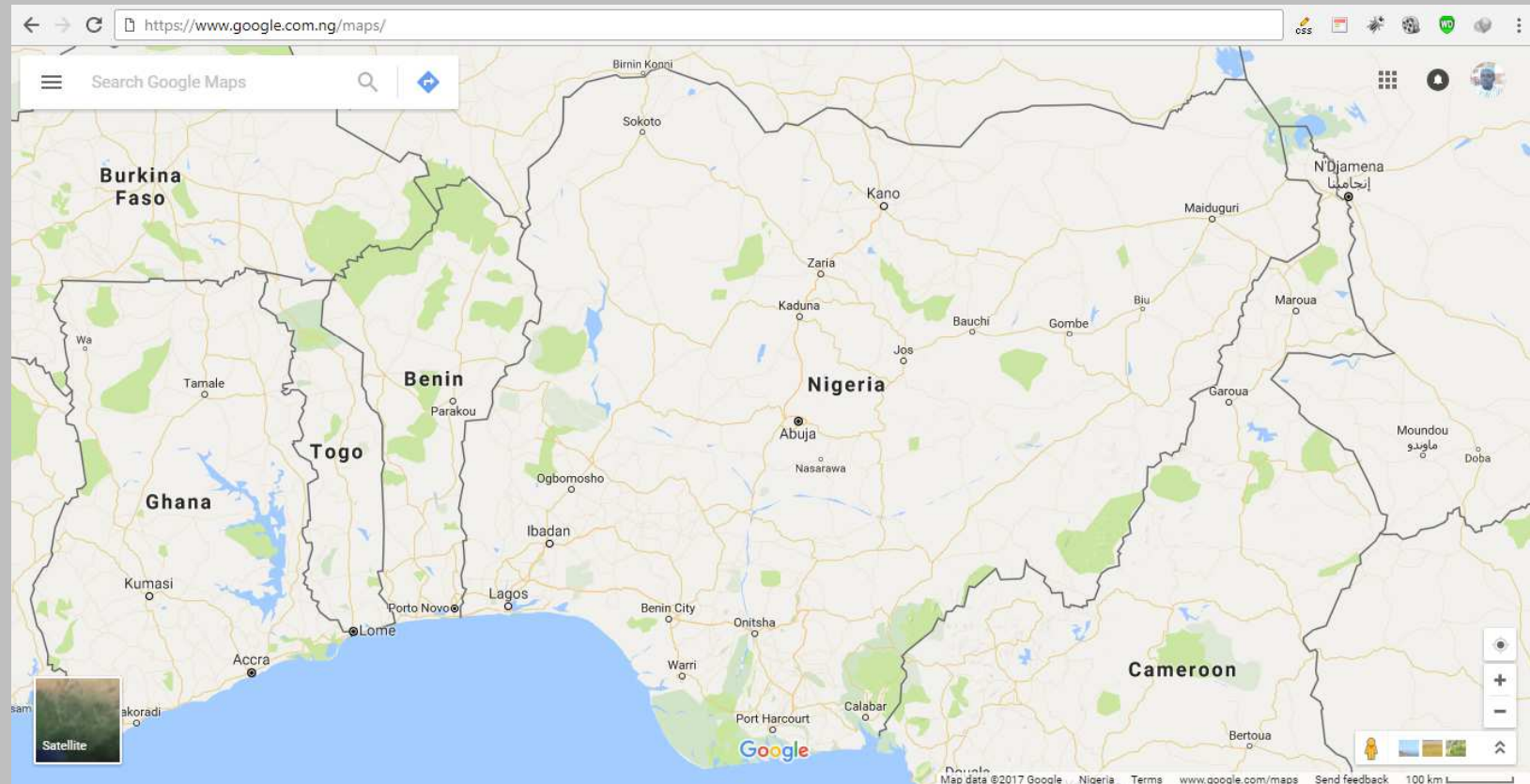
Anyone from one of these Geo related fields?

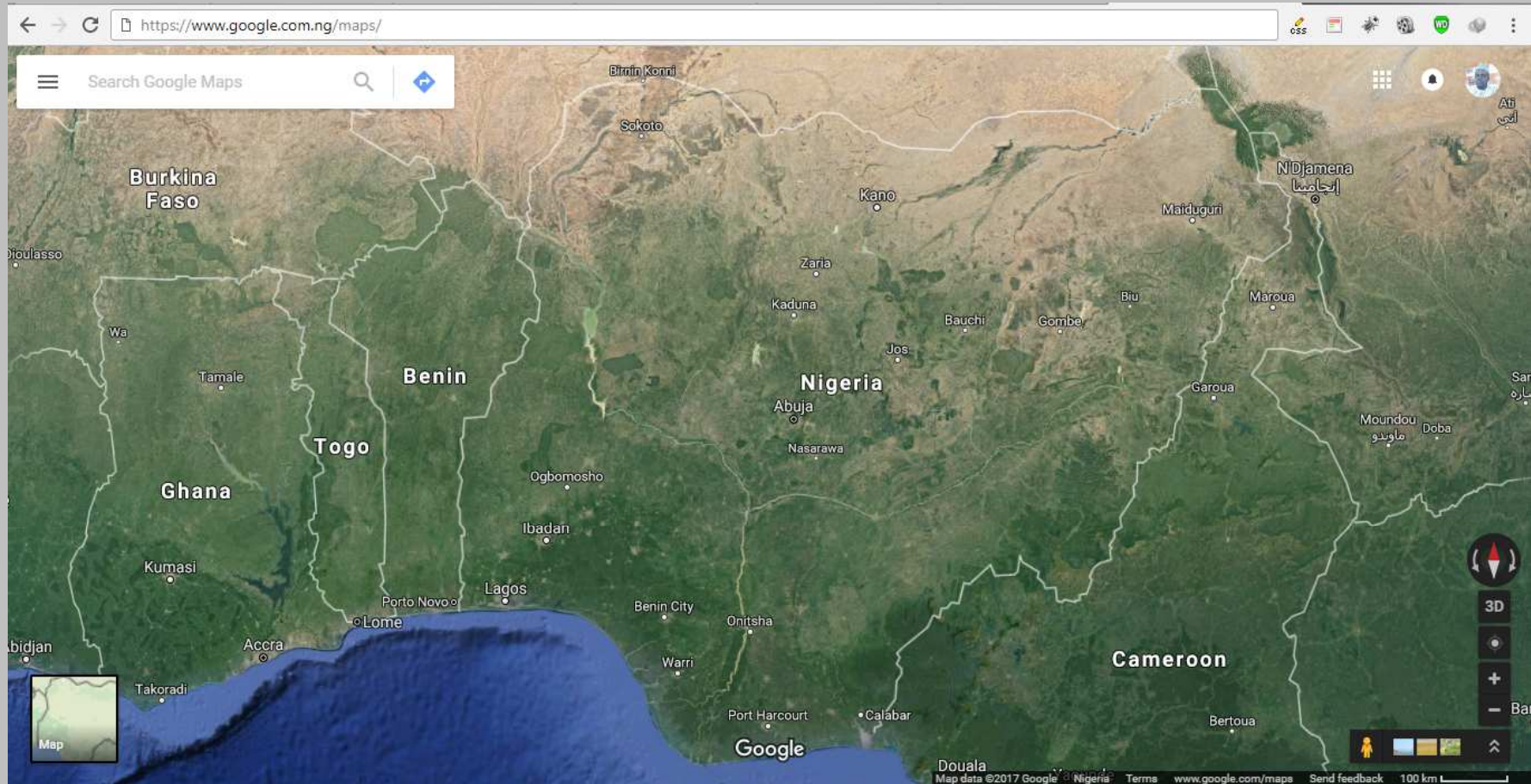
- ~ Geography
- ~ Geophysics
- ~ Geodesy/Geomatics
- ~ Land Surveying
- ~ Urban Planning
- ~ Geo-IT
- ~ Cartography
- ~ Photogrammetry
- ~ LiDAR
- ~ Remote Sensing
- ~ GIS/Mapping
- ~ Electronic Charting /GIS
- ~ Seismic & Hydrocarbon Exploration
- ~ Mining
- ~ Sensor Technology
- ~ XYZ Positioning & Specialist Navigation
- ~ Environmental Research

Most likely you have interacted with
GIS/RS tools



Working with maps and data (location and attribute)





Maps/satellite imagery + attribute data = GIS/RS

Areas of application

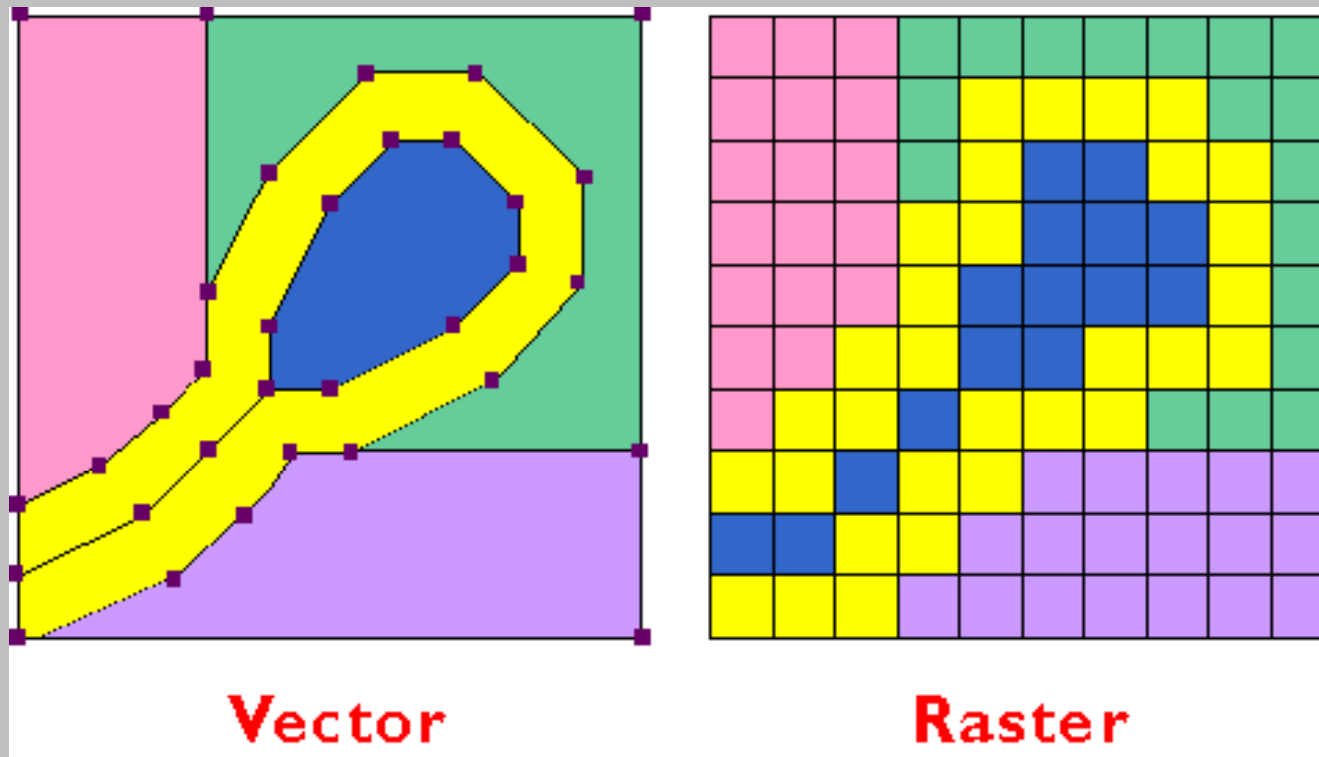


Transportation Management
Crime Management
Disaster Management

1000 GIS Applications & Uses

<http://gisgeography.com/gis-applications-uses>

Dataset - Vector and Raster



Vector data: consists of individual points, Lines and polygons

Raster data: is made up of pixels (or cells)

Traditional tool - ArcGIS and QGIS

Open source: QGIS, GRASS, SAGA, gVSIg etc

Commercial: ArcGIS, Manifold, Geomedia, GlobalMapper etc

* The top tool in each category supports **Python** as its scripting language

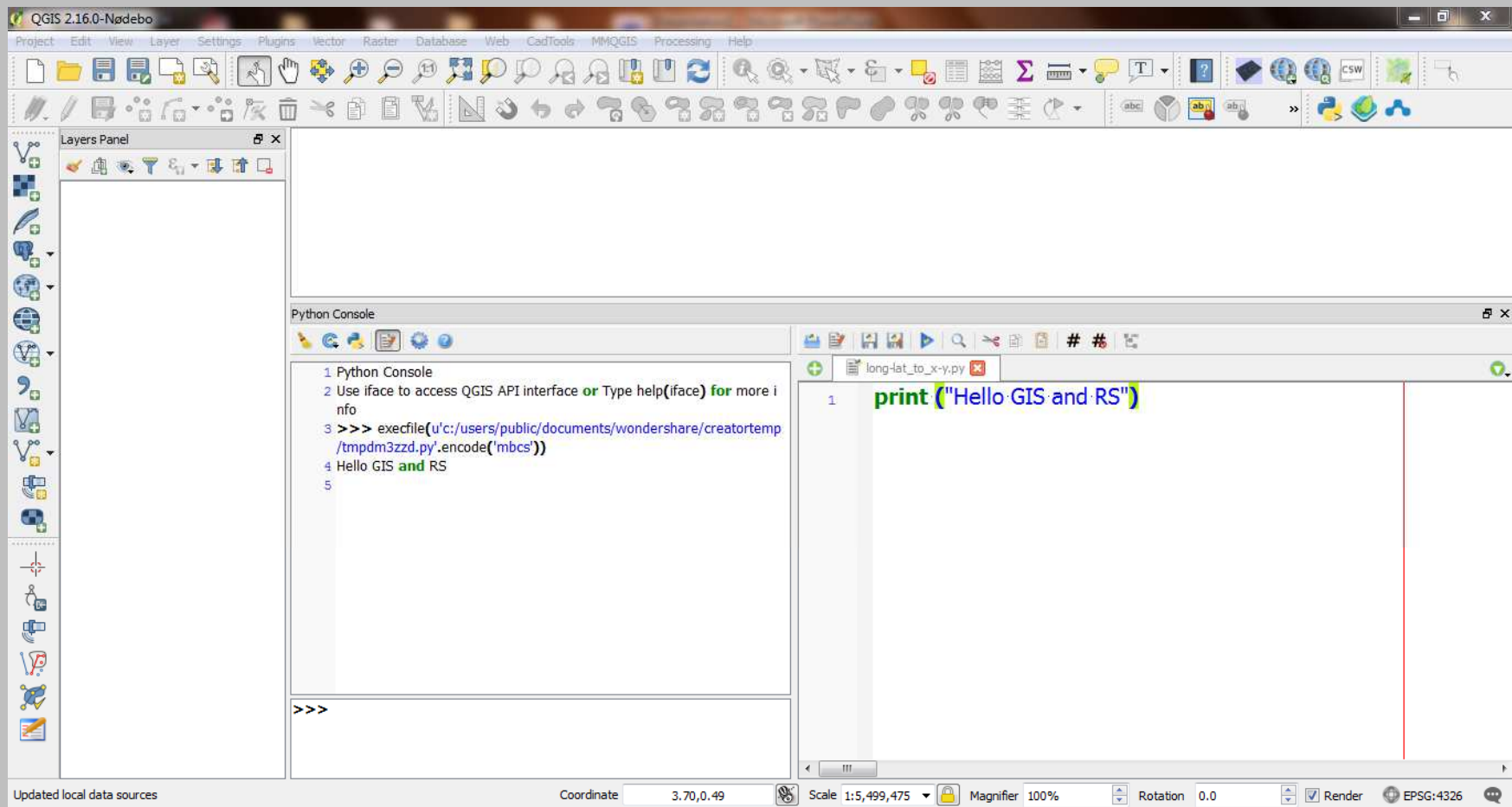
Python for GIS and RS

If it exists, there is python module for it

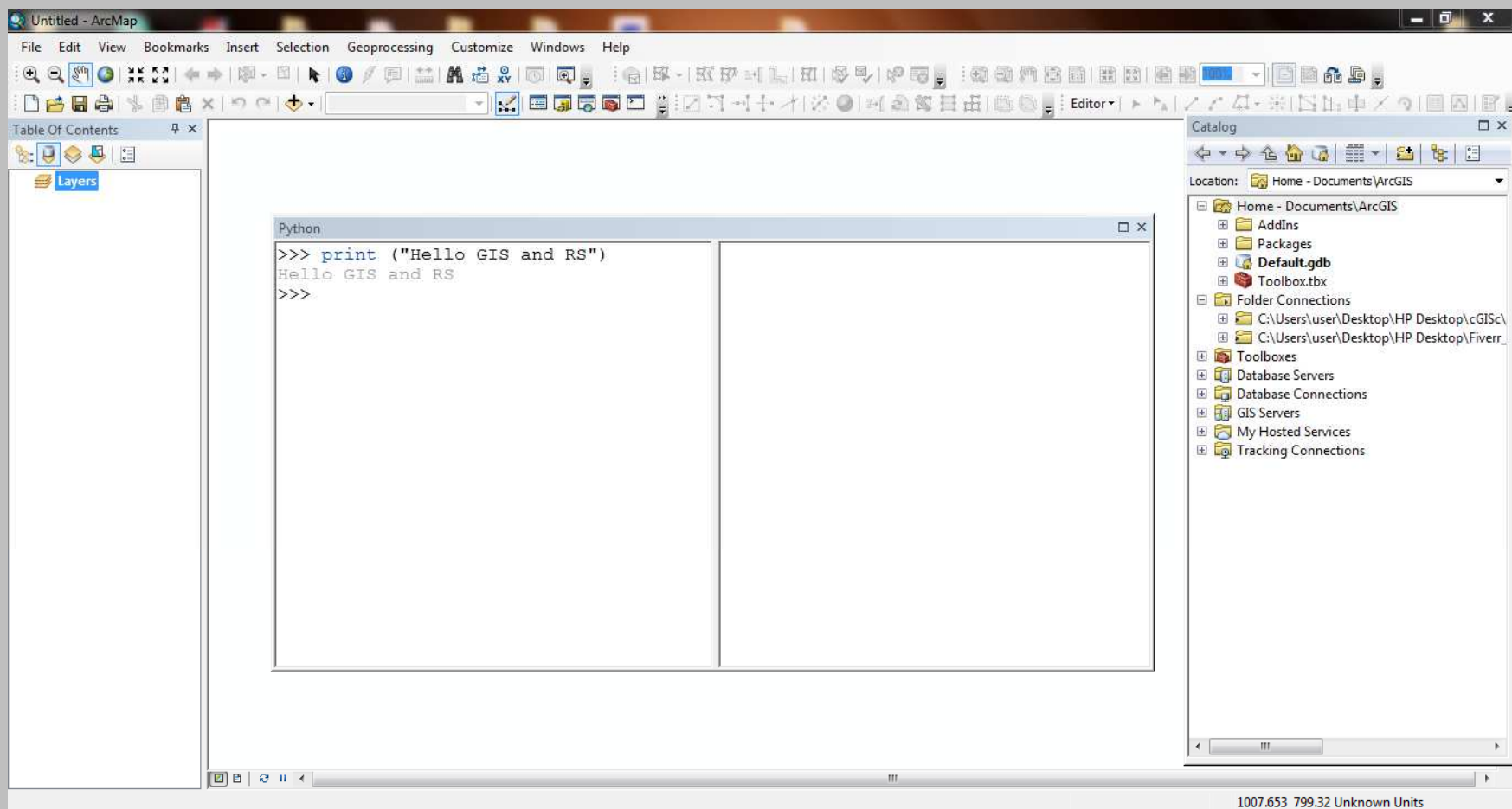
GIS/RS operations with Python can be conducted using:-

- 1) GIS Tools – ArcPy and PyQGIS

- 2) Native Python Tools



The QGIS Python Console (Uses PyQGIS module)



The ArcGIS Python Console (Uses ArcPy module)

Native Geospatial python modules

For vector data: Shapely, Fiona, PyShp

For raster data: OpenCV, Rasterio, Scikit-image, GDAL

Others: Geopy, PySAL, PostGIS, SimpleKML ([more on PyPI](#))

Jupyter Notebook - DEMO

The story: Places of Tourist Attractions in Lagos
+ The Geo in PyCon 2017

- Working with Coordinates – Geocoding
- Web-based Geo data visualization
- Working with vector and raster

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