Geospatial AI Training Curriculum

GEOSPATIAL ANALYSIS CURRICULUM FOR MOBILITY AND GEOSPATIAL DATA FOR HEALTH SOLUTIONS IN AFRICA

Outlines/Content

- **Basics Introduction to GIS and Spatial Analysis**
  - GIS concept and application in social goods.
  - Types spatial data (Vector and Raster)
  - Spatial tools (Python, QGIS and ArcGIS)
  - *Activities: Explore spatial data in Python, QGIS and ArcGIS interface*
- **Basic Introduction to GIS with Python**
  - Python variable.
  - numpy, geopandas, rasterio, shapely, fiona.
  - Spatial Join/ Relationship (Disjoint, touch, intersect, contains, within).
  - Handling different datatypes (Raster and Vector).
  - Spatial Analysis
    - Vector - buffer, clip, difference, dissolve, intersection and union.
    - Raster – Zonal Statistics, Raster Calculator.
    - Merging raster and vector data.
  - Saving and Exporting Data (shapefile, geojson , CSV excel)
  - *Activities: Explore earth observational data and interpolate with Meta data and other spatial data.*
- **Time series Analysis with Python.**
  - Descriptive analysis of time variable.
  - Feature engineering and data aggregation.
  - *Activities: Analysis of human movement using Meta's data.*
- **QGIS:** Spatial Analysis and Visualization.
  - Importing Vector and Raster Data.
  - Styling Vector Data and Raster (Choropleth, Heatmap, Bubble Map)
  - Map Design and Layout Output.
  - Map alone display and visualization.*Activities: Report on movement analysis effect on health site locations in Kenya.*

Duration

- **Total Duration:** 1 Month
- **Date**: Start Day: 15th November 2022 - 9th December 2022.
- 1 Hour Per Day || Tuesdays, Wednesdays, Fridays.

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Date	Modules	Content	Activities	Resources
Week 1 (15th Nov – 18th Nov)	**Basics Introduction to GIS and Spatial Analysis**	GIS concept and application in social goods.	Signup to Colab	QGIS Documentation
			Download Meta data connectivity data.	Meta's social good data.
		Types spatial data (Vector and Raster)	Explore the content and attributes of Metadata.	Spatial Analysis
		Spatial tools (Python, QGIS and ArcGIS)	Investigate the spatial tool (Python, QGIS, ArcGIS)	
		Source Data Source: Meta		
Week 2 (22nd Nov– 25th Nov)	**Introduction to GIS Analysis with Python.**	Python variable.	Install Numpy, Geopandas, rasterio, shapely, fiona.	GIS with Python
		NumPy, geopandas, rasterio, shapely, fiona.	Download Meta Data.	
			Download other spatial data (health location, schools, satellite imagery).	
		Spatial Join/ Relationship (Disjoint, touch, intersect, contains, within).	Explore earth observational data and interpolate with Meta data and other spatial data.	
		Handling different datatypes (Raster and Vector).		
		Spatial Analysis		
		Vector - buffer, clip, difference, dissolve, intersection and union.		
		Raster – Zonal Statistics, Raster Calculator.		

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		Merging raster and vector data.		
		Saving and Exporting Data (shapefile, geojson , CSV excel)		
Week 3 (29th Nov– 2nd Dec)	**Spatial Timeseries Analysis in Python.**	Descriptive analysis of time variable.	Download Meta's social good data.	Use case of Meta mobility data.
			Analysis of human movement using Meta's data	
		Feature engineering and data aggregation.		
		Understanding Meta's Movement data range.		
Week 4 (6th Nov – 9th Dec)	**QGIS: Spatial Analysis and Visualization**	Importing Vector and Raster Data.	Access customized cloud platform for analysis.	Spatial Thoughts Visualization.
			Download GIS.	
		Styling Vector Data and Raster (Choropleth, Heatmap, Bubble Map)	Report on movement analysis effect on health site locations.	Health Analysis
		Map Design and Layout Output.		
				Covid-19 Response report
		Map alone display and visualization.		