Introduction to Geospatial Analysis (GSA)

By: Tiffany Le

What is Geospatial Data?

- **Definition:** Data that holds information with a geographic or spatial component
- **Examples:**
  - Location of... cities, counties, roads (coordinates [longitude and latitude])
  - Environmental data of... earthquake or temperature patterns
  - Satellite imagery and maps

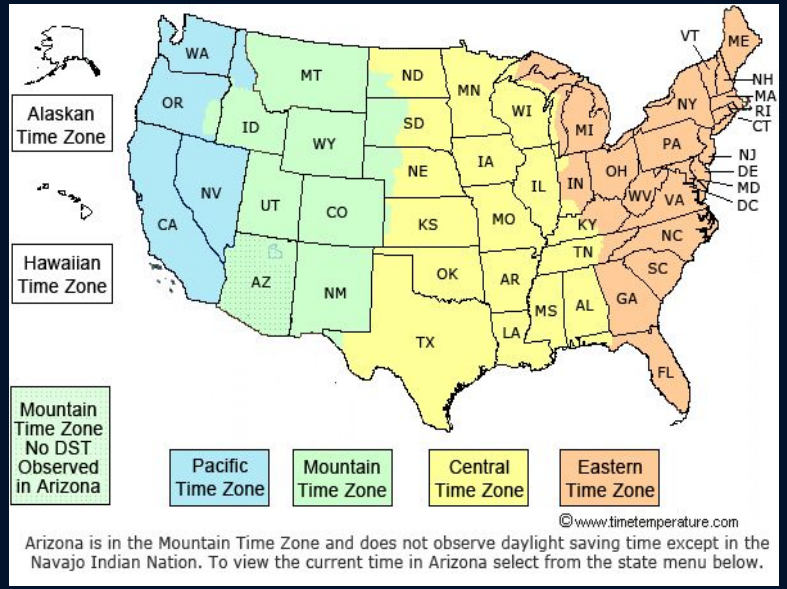
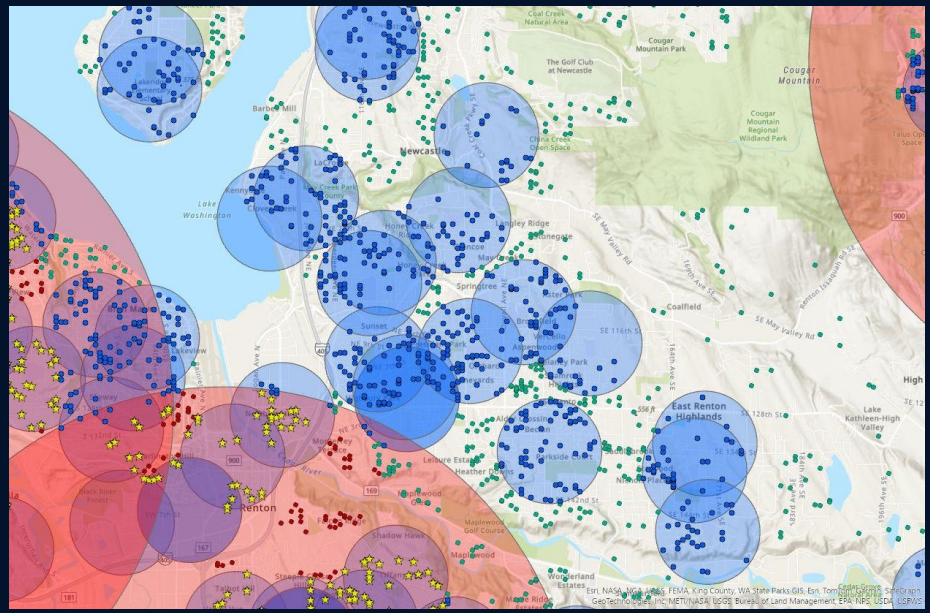
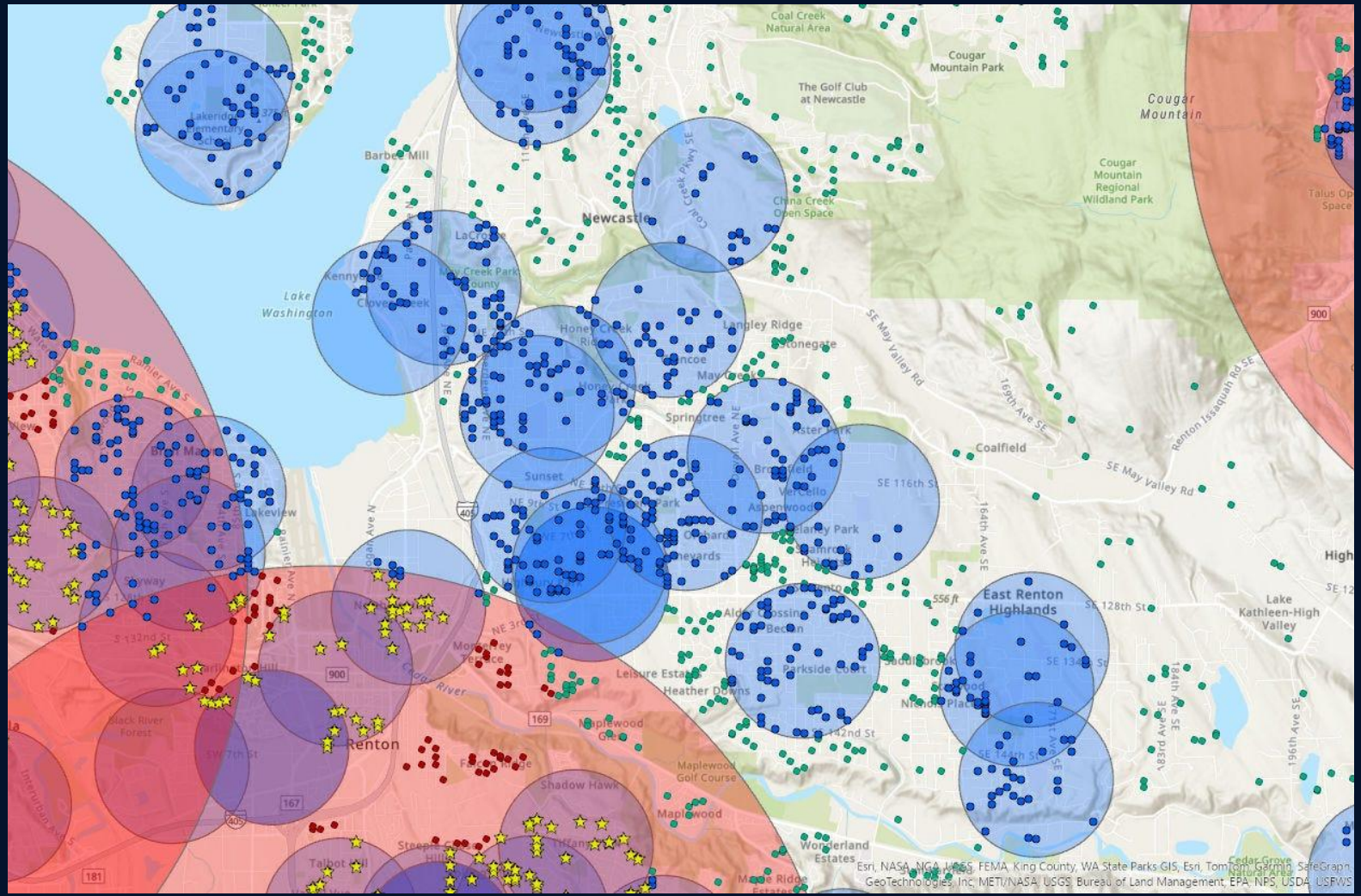


Image from https://www.timetemperature.com/tzus/time_zone.shtml

What is Geospatial Analysis?

- **Definition:** Process of gathering, analyzing, and visualizing geospatial data
- Geographic Information Systems (GIS)
- Using data to identify and/or predict understand spatial trends, relationships, and trends
- **Common Tasks:**
  - Feature Mapping
  - Distance Calculation
  - Distribution of Features
  - Spatial Queries

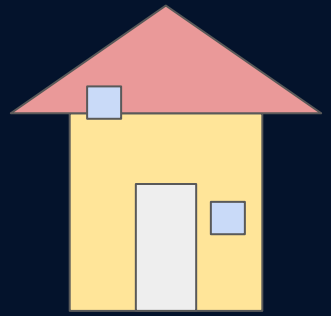



Coal Creek Natural Area
Cougar Mountain Park
The Golf Club at Newcastle
Cougar Mountain
Cougar Mountain Regional Wildland Park
Barbee Mill
Newcastle
China Creek Open Space
Lake Washington
Langley Ridge
Stonegate
Springtree
Coalfield
SE May Valley Rd
Renton Issaquah Rd SE
Sunset
Lakeview
Renton
East Renton Highlands
Lake Kathleen-High Valley
Leisure Estates
Heather Downs
Parkside Court
Maplewood Golf Course
Shadow Hawk
Wonderland Estates
Cedar River
Black River Forest
Talbot Hill
Esri, NASA, NGA, USGS, FEMA, King County, WA State Parks GIS, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USDA, USFWS

Investment Risks & Potentials

Residential Quality of Life

Predictive Analysis



Role in Real Estate

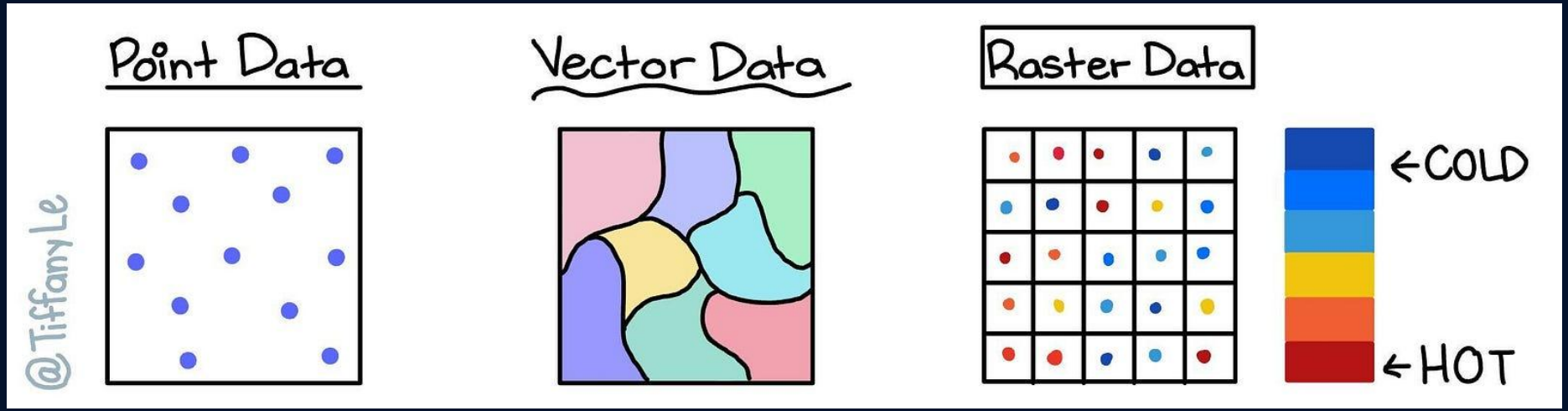
Risk Assessment

Urban Planning

Key Components of GSA

- Data Collection
- Data Processing
- Data Visualization
- Spatial Modeling

Types of Geospatial Data

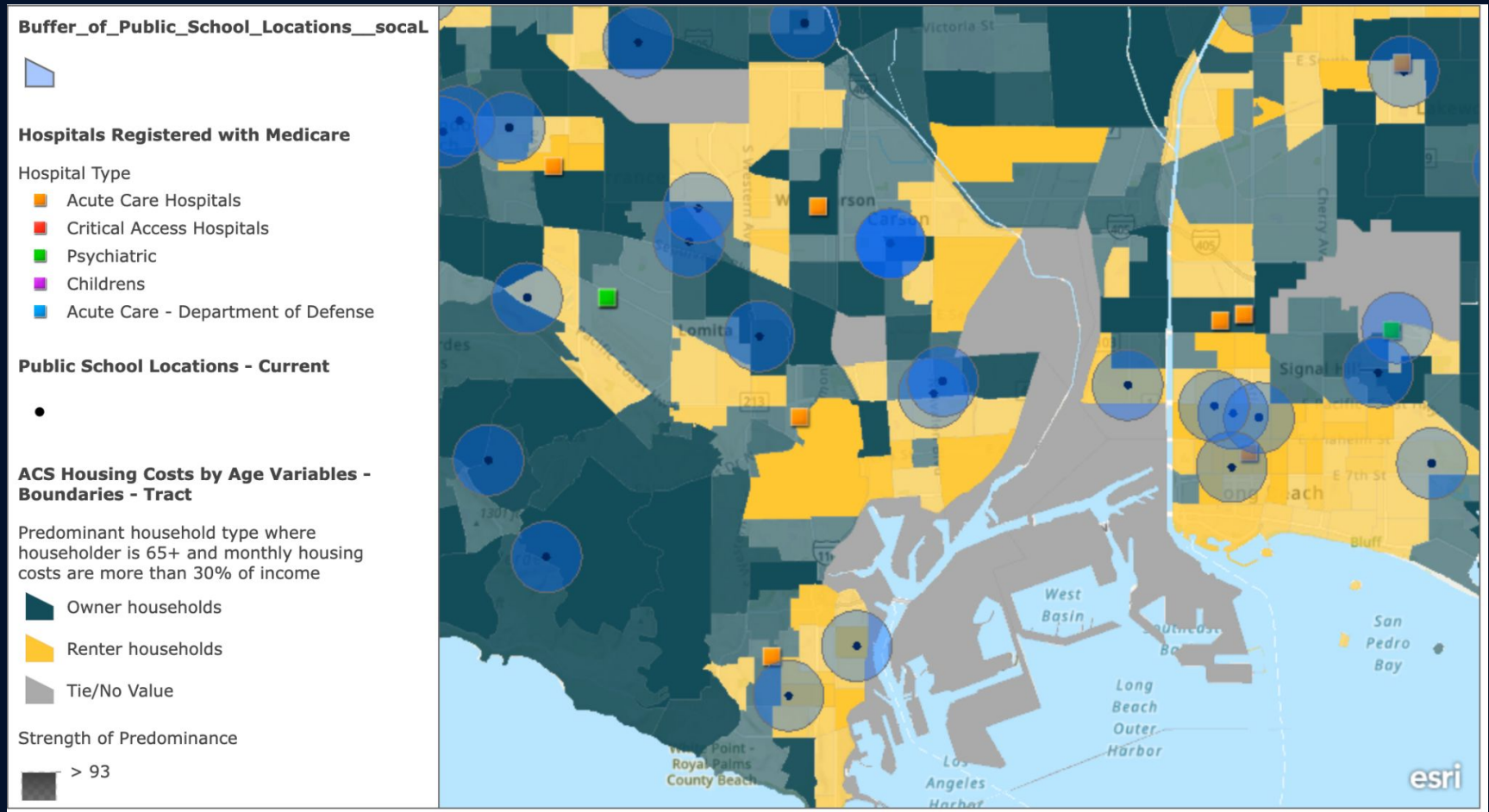


Data Sources

Public Data	Private Data
U.S. Geological Survey (USGS)	Google Maps (via API)
OpenStreetMap (OSM)	Zillow
Census Bureau	Esri
City and County GIS Departments	MapBox
National Oceanic and Atmospheric Administration (NOAA)	CoreLogic

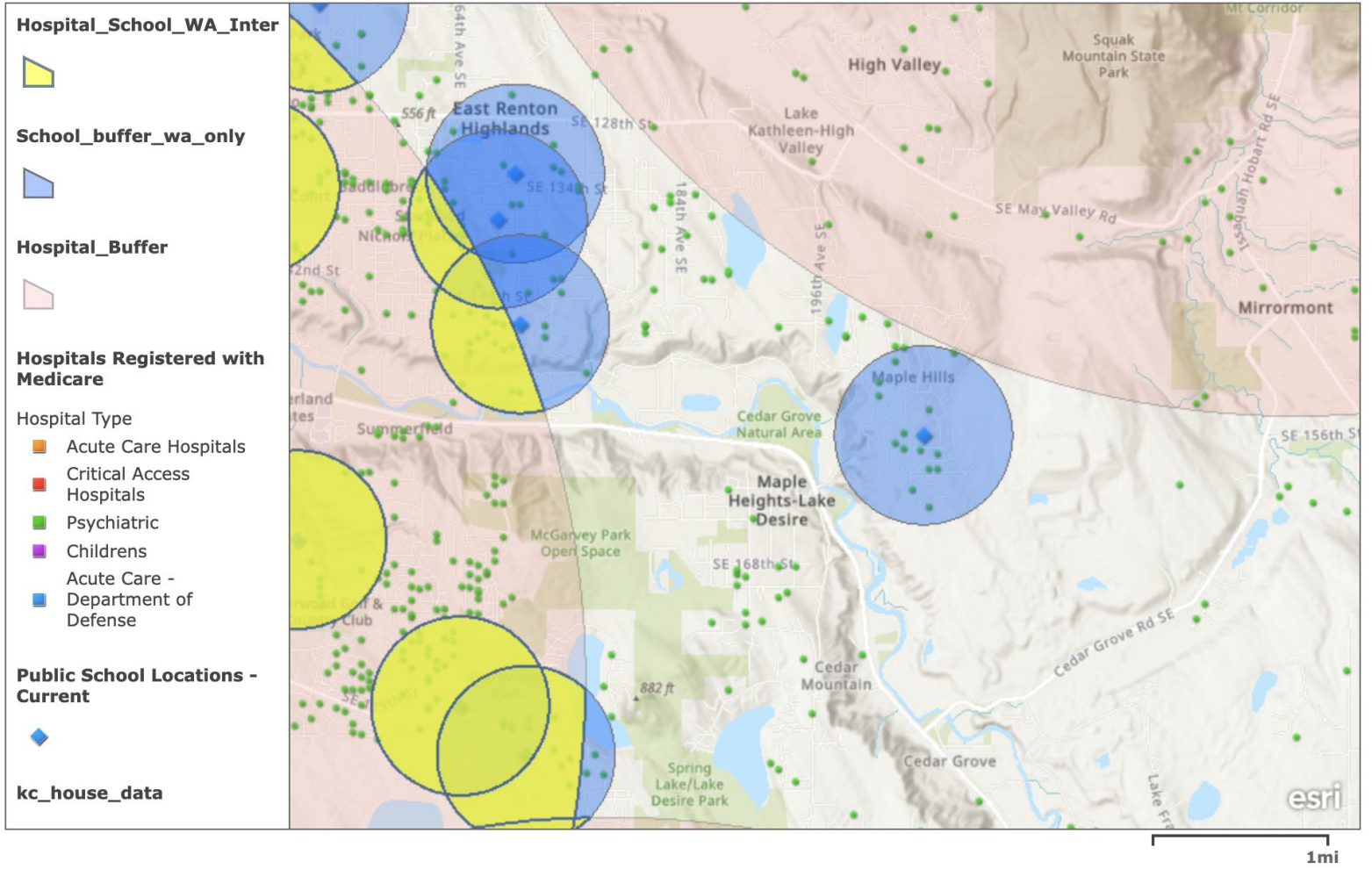
File Formats & Projections

- **Spatial data comes in different formats:** shapefiles (.shp), GeoSON, KML, TIFF (raster)
- **Project Standardization**
  - Convert to the same CRS
- **Tools:** QGIS, GDAL
- **Example:** KML (Google Earth) → shapefile (.shp) for analysis



Esri, NASA, NGA, USGS | Port of Los Angeles, County of Los Angeles, California State Parks, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USDA, USFWS | NCES EDGE

MGSC410-Demo_School Map & Cost



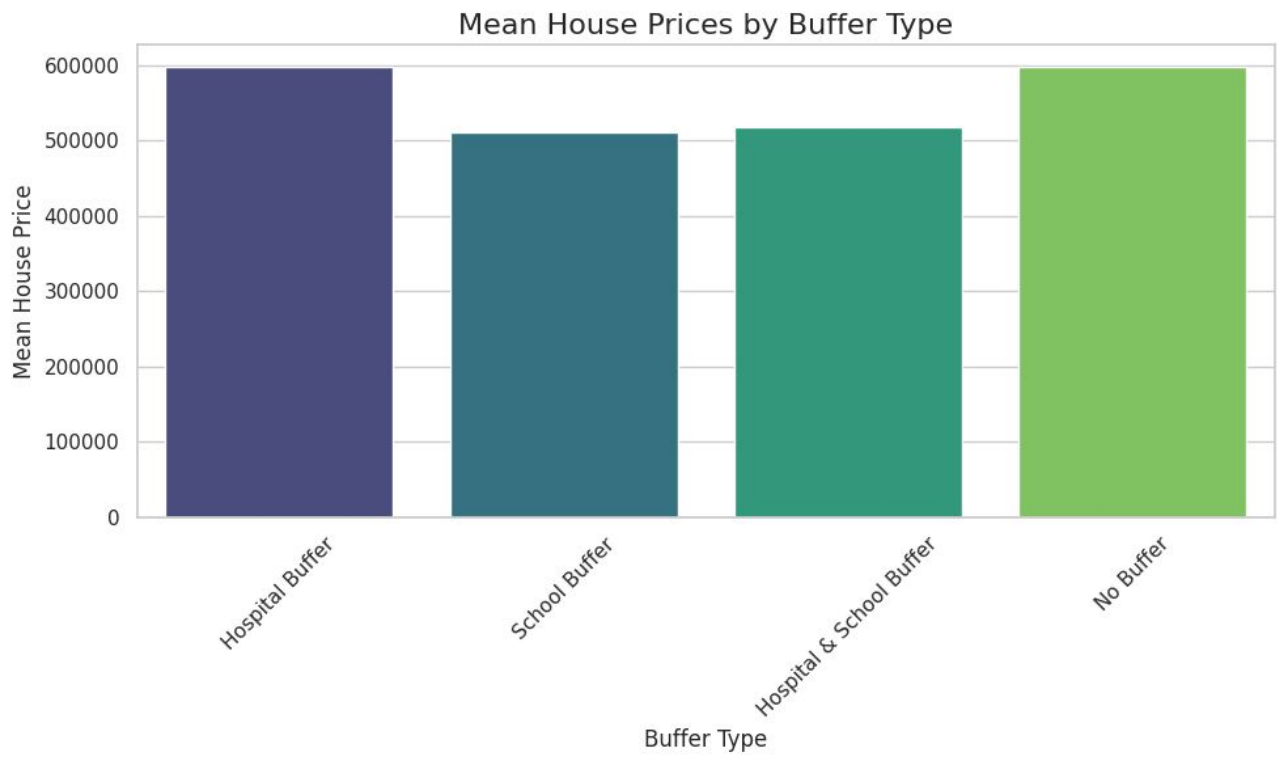
GSA in Machine Learning - Spatial Modeling

MAP

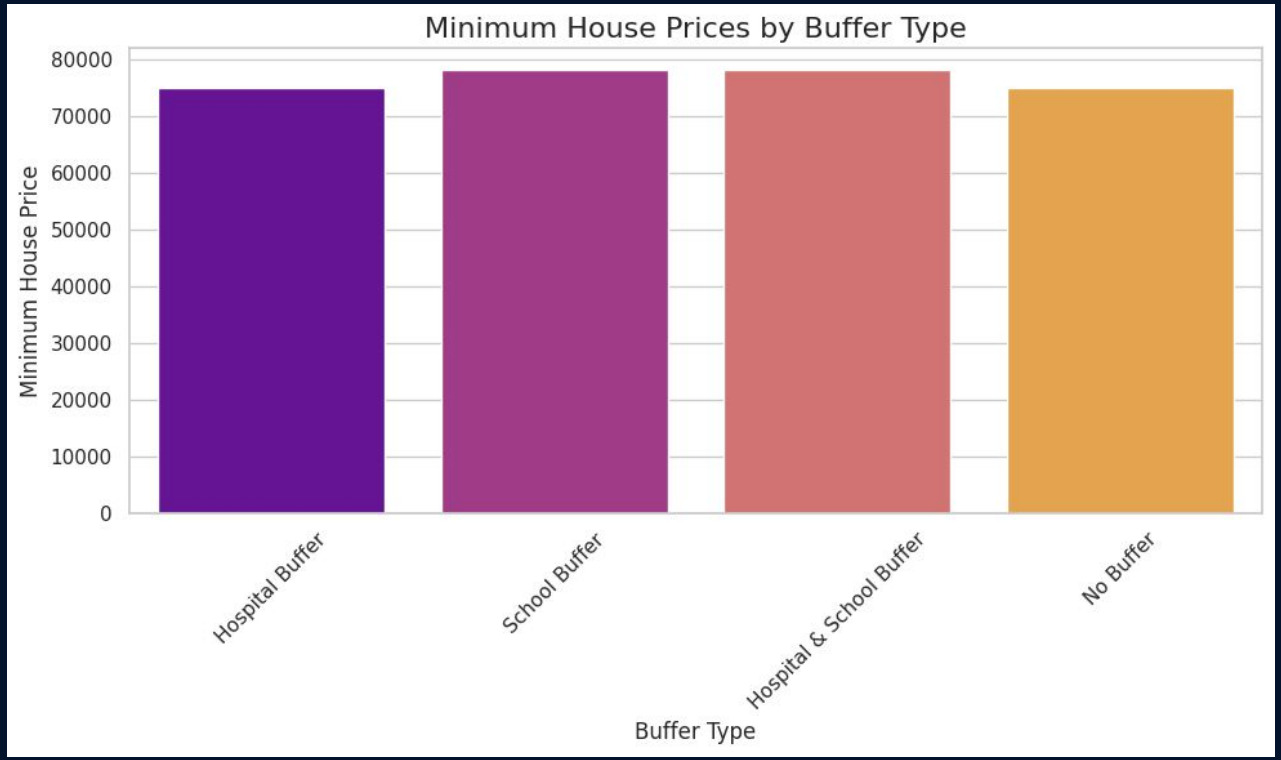
GSA in Machine Learning - Spatial Modeling

CASE STUDY

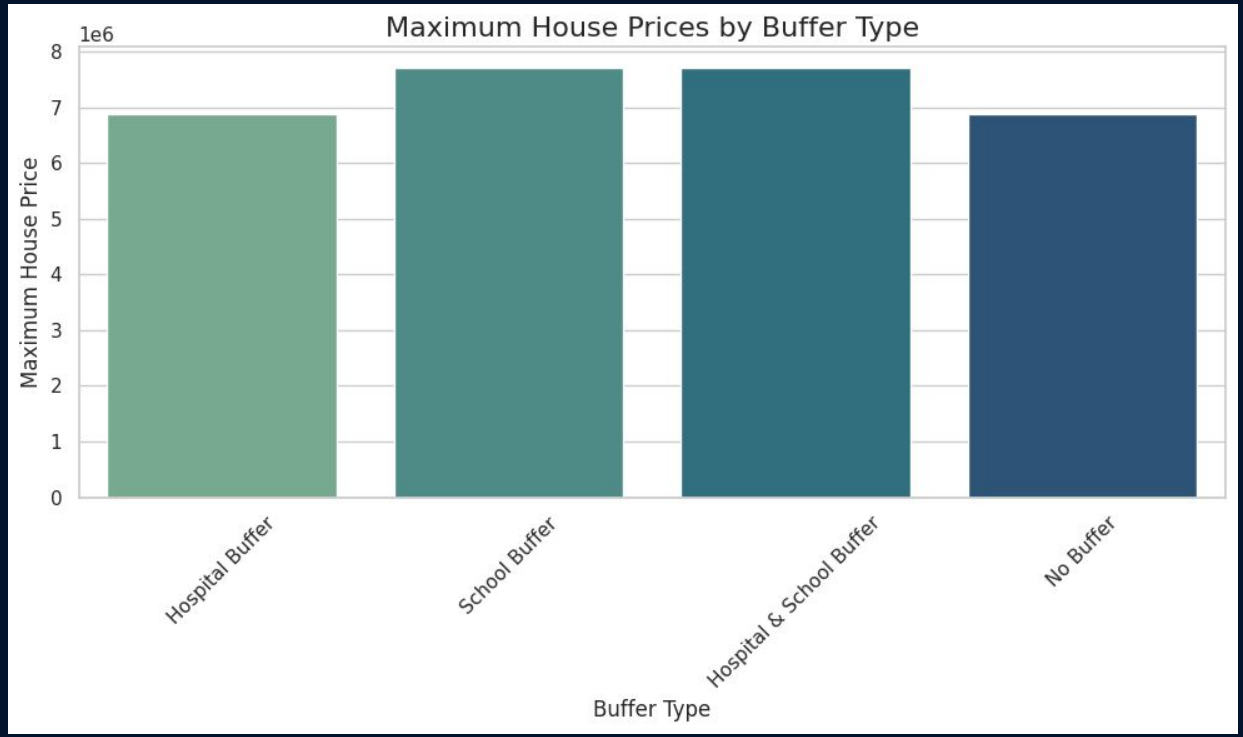
Summary Statistics
Average Price in Each “Buffer”



Summary Statistics
Min Price in Each “Buffer”



Summary Statistics
Max Price in Each “Buffer”



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THANK YOU!