01-map

July 27, 2024

1 Mapping Car Sales

```
[1]: # Imports
     import pandas as pd
     import datashader as ds
     import hvplot.pandas
     import holoviews as hv
     from holoviews.operation.datashader import datashade, dynspread
     from holoviews import opts
     from datashader.utils import lnglat_to_meters
     from bokeh.plotting import output_file, save

     purchase_data = pd.read_csv("../data/lf_tech_test_purchase_data.csv",␣
      ↪index_col="customer_id")
     vehicle_data = pd.read_csv("../data/lf_tech_test_vehicle_data.csv",␣
      ↪index_col="vehicle_id")
```

2 9. (Optional) Are there any other interesting observations in the data?

```
[9]: # Convert lat/lng to Web Mercator format (meters)
     purchase_data['easting'], purchase_data['northing'] =␣
      ↪lnglat_to_meters(purchase_data['lng'], purchase_data['lat'])

     # Ensure the data and tiles are in the same coordinate system
     # 'geo=False' as the data is in meters now, not lat/lon
     points = purchase_data.hvplot.points('easting', 'northing', geo=False, size=1,␣
      ↪alpha=0.5)

     # Apply datashading
     shaded = datashade(points, cmap=["lightblue", "darkblue"], how='log')

     # Spread dense points for better visualization
     spread = dynspread(shaded, threshold=0.5, max_px=4)

     # Add map tiles using holoviews
```

```python
tiles = hv.element.tiles.OSM()

# Combine map tiles with the data points
plot = tiles * spread

# Customize plot options
plot.opts(
    opts.Tiles(width=800, height=600),
    opts.RGB(width=800, height=600),
)

# Initialize Holoviews with the Bokeh backend
hv.extension('bokeh')

# Save the plot as an HTML file
output_file("car_sales_heatmap.html")
save(hv.render(plot))

# View
plot
```

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WARNING:param.datashade: Parameter(s) [how] not consumed by any element
rasterizer.
WARNING:param.datashade: Parameter(s) [how] not consumed by any element
rasterizer.
WARNING:bokeh.embed.util:
You are generating standalone HTML/JS output, but trying to use real Python
callbacks (i.e. with on_change or on_event). This combination cannot work.

Only JavaScript callbacks may be used with standalone output. For more
information on JavaScript callbacks with Bokeh, see:

    https://docs.bokeh.org/en/latest/docs/user_guide/interaction/js_callbacks.html

Alternatively, to use real Python callbacks, a Bokeh server application may
be used. For more information on building and running Bokeh applications, see:

    https://docs.bokeh.org/en/latest/docs/user_guide/server.html
```

[9]: BokehModel(combine_events=True, render_bundle={'docs_json':
{'225bb2cb-9083-4711-a09a-ffd3324711f0': {'version…

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