GUS4073

Olivia Given Castello

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Final Project: Static Map

Data: Temple Library chats received Jan - Jun 2021

1. Use python to create a static map
2. Provide the code (Jupyter Notebook) and your picture of it

In [2]:

```python
# Import geopandas to read the spatial data
import geopandas as gpd

# Read in chat data by US state
us_chats_shp = r'data/ContinentalUS_chats.shp'
us_chats_gdf = gpd.read_file(us_chats_shp)

state_bound = gpd.read_file('data/tl_2021_us_state/tl_2021_us_state.shp')

us_chats_gdf.head()
```

Out[2]:

	REGION	DIVISION	STATEFP	STATENS	GEOID	STUSPS	NAME	LSAD	MTFCC	FUNCS
0	3	5	54	01779805	54	WV	West Virginia	00	G4000	
1	3	5	12	00294478	12	FL	Florida	00	G4000	
2	2	3	17	01779784	17	IL	Illinois	00	G4000	
3	2	4	27	00662849	27	MN	Minnesota	00	G4000	
4	3	5	24	01714934	24	MD	Maryland	00	G4000	

In [3]:

```python
# Check the projection of the dataframes
print('The US chat data projection is:', us_chats_gdf.crs)
print('The projection of the state boundary is:', state_bound.crs)
```

```
The US chat data projection is: epsg:4326
The projection of the state boundary is: epsg:4269
```

In [28]:

```python
# Change the projection to Albers Area Equal Conic
# USGS recommends this projection
# "for maps showing the conterminous United States (48 states) or large areas
# Source: U.S. Geological Survey (1993). Map projections. [USGS Unnumbered Se

us_chats_gdf = us_chats_gdf.to_crs(epsg=5070)
state_bound_us = state_bound.to_crs(epsg=5070)

print('The US chat data projection is:', us_chats_gdf.crs)
print('The projection of the state boundary is:', state_bound_us.crs)
```

```
The US chat data projection is: epsg:5070
The projection of the state boundary is: epsg:5070
```

In [29]:

```python
import geopandas as gpd
import matplotlib as mpl
import matplotlib.pyplot as plt
from matplotlib.colors import Normalize
from matplotlib import cm
import mapclassify as mc
from matplotlib_scalebar.scalebar import ScaleBar


# Create a empty plot for the choropleth map
fig, ax = plt.subplots(1, figsize=(18, 8))

# Set the number of categories to map
n_class = 5

# Set the color scheme
color_scheme = 'YlGnBu'
cmap = plt.cm.get_cmap(color_scheme, n_class)

# Set the background
state_bound_us.plot(ax=ax, alpha=0.5, color='grey', edgecolor='k')

# Indicate the field we are plotting and custom breaks
field = 'NUMPOINTS'
bins = [10, 25, 100, 200, 1500]

# Plot the choropleth map
us_chats_gdf.plot(column=field,
                  cmap=color_scheme,
                  edgecolor='0.5',
                  ax = ax,
                  linewidth=0.5,
                  k=n_class,

# This data is highly skewed because most chat interactions come from within
# Using custom breaks gives the clearest visualization
#                  scheme='equal_interval')
#                  scheme='NaturalBreaks',
#                  scheme='fisher_jenks')
#                  scheme='quantiles')
#                  scheme='MaximumBreaks')
                  scheme='User_Defined',
                  classification_kwds={'bins': bins},

# Leave in this legend because the lowest 2 bin labels are crowded on the col
                  legend=True,
                  legend_kwds={'loc': 'center left'},
)

# Match the scheme of the geopandas plot
#nb = mc.EqualInterval(us_chats_gdf[field].dropna(), k=n_class)
#nb = mc.NaturalBreaks(us_chats_gdf[field].dropna(), k=n_class)
#nb = mc.FisherJenks(us_chats_gdf[field].dropna(), k=n_class)
#nb = mc.Quantiles(us_chats_gdf[field].dropna(), k=n_class)
#nb = mc.MaximumBreaks(us_chats_gdf[field].dropna(), k=n_class)
nb = mc.UserDefined(us_chats_gdf[field].dropna(), bins=bins)

vals = list(nb.bins)
```

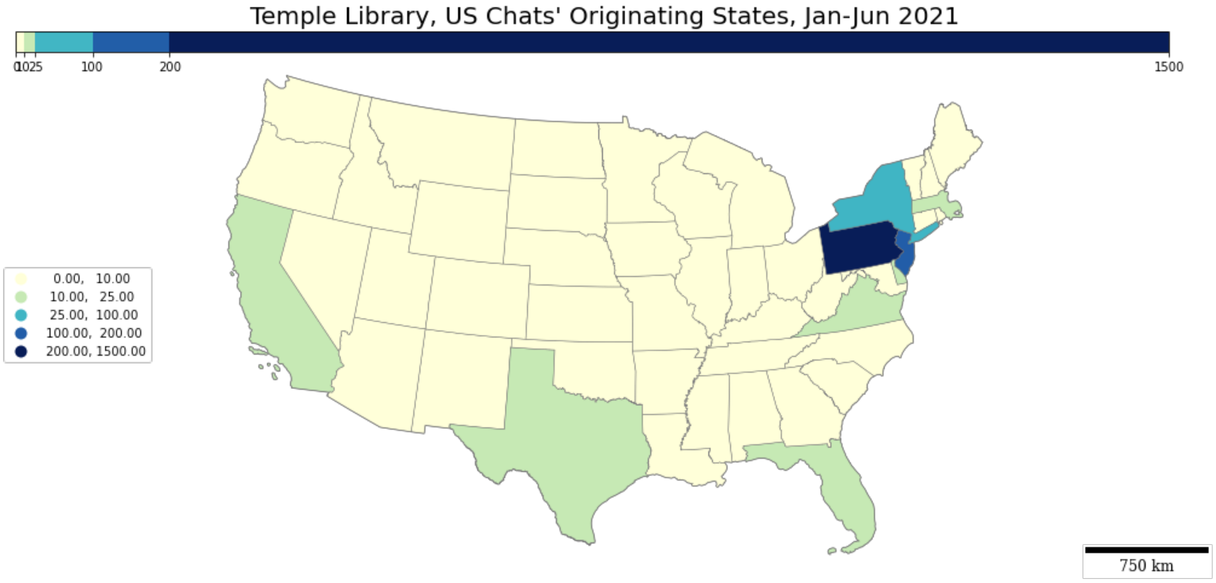
```
n_cmap = cm.ScalarMappable(norm=norm, cmap=cmap)
cbar = ax.get_figure().colorbar(n_cmap,
                                orientation='horizontal',
                                cax=axins,
                                spacing='proportional',
                                fraction=0.046,
                                pad=0.0,
                                ticks=vals,
                                shrink=0.4)

ax.set_title('Temple Library, US Chats\' Originating States, Jan-Jun 2021', f

# Add a scale bar
scale = ScaleBar(
    dx=1,
    length_fraction=.125,
    location='lower right',
    font_properties={'family':'serif', 'size': 'large'},
    box_alpha=1
)
ax.add_artist(scale)

ax.set_axis_off()
plt.axis('equal')

# Save to an image file
plt.savefig('GUS4073-Castello-FinalProjectStaticMap.png',dpi=200)
plt.show()
```


Temple Library, US Chats' Originating States, Jan-Jun 2021
0
10
25
100
200
1500
● 0.00, 10.00
● 10.00, 25.00
● 25.00, 100.00
● 100.00, 200.00
● 200.00, 1500.00
750 km