MapsUsingPlotly

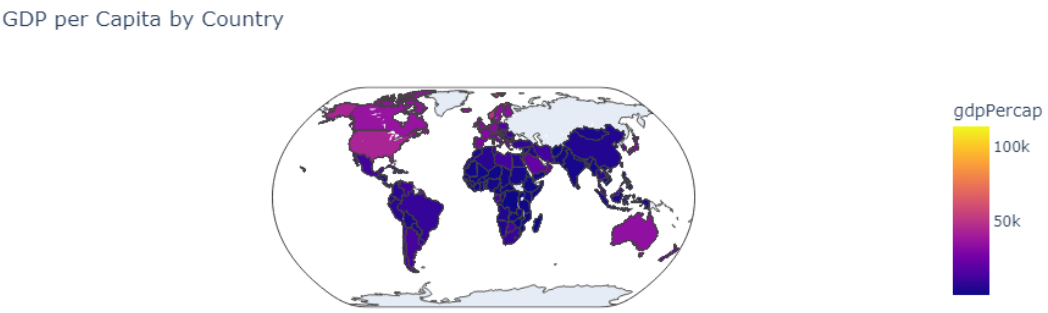
March 20, 2024

0.1 Maps using Plotly Series

[1]:
```
import plotly.express as px
import pandas as pd

data = pd.read_csv('https://raw.githubusercontent.com/plotly/datasets/master/
 ↪gapminder_with_codes.csv')
print(data)

# choropleth creates a choropleth map using plotly express,
# locations for identifying countries on the map using the ISO alpha-3 country␣
 ↪codes
# 'hover_name' specifies the column in the DataFrame that contains the country␣
 ↪names to be displayed when hovering over each country on the map
fig = px.choropleth(data, locations = 'iso_alpha', color = 'gdpPercap',␣
 ↪hover_name = 'country',
                    projection = 'natural earth', title = 'GDP per Capita by␣
 ↪Country')

fig.show()
```

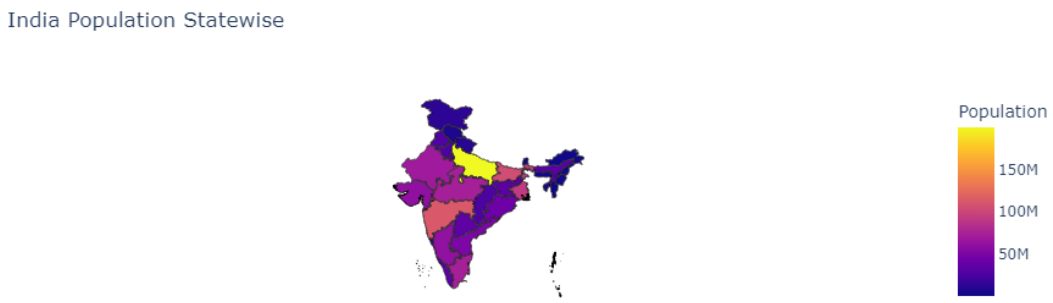
```
          country continent  year  lifeExp       pop   gdpPercap iso_alpha  \
0     Afghanistan      Asia  1952   28.801   8425333  779.445314       AFG
1     Afghanistan      Asia  1957   30.332   9240934  820.853030       AFG
2     Afghanistan      Asia  1962   31.997  10267083  853.100710       AFG
3     Afghanistan      Asia  1967   34.020  11537966  836.197138       AFG
4     Afghanistan      Asia  1972   36.088  13079460  739.981106       AFG
…             …       …    …      …          …          …          …
1699     Zimbabwe    Africa  1987   62.351   9216418  706.157306       ZWE
1700     Zimbabwe    Africa  1992   60.377  10704340  693.420786       ZWE
1701     Zimbabwe    Africa  1997   46.809  11404948  792.449960       ZWE
1702     Zimbabwe    Africa  2002   39.989  11926563  672.038623       ZWE
1703     Zimbabwe    Africa  2007   43.487  12311143  469.709298       ZWE

      iso_num
0           4
1           4
2           4
```

```
3            4
4            4
…          …
1699       716
1700       716
1701       716
1702       716
1703       716

[1704 rows x 8 columns]
```



[2]:
```
import json
import numpy as np
import pandas as pd
import plotly.express as px

india_states = json.load(open('states_india.geojson', 'r'))

df = pd.read_csv("india_census.csv")
# print(df)

# iterates over each feature (state) in the 'india_states' geojson data.
# Extracts the state code('state_code') and creates a mapping from state names␣
 ↪('st_nm') to state codes
state_id_map = {}
for feature in india_states["features"] :
    feature["id"] = feature["properties"]["state_code"]
    state_id_map[feature["properties"]["st_nm"]] = feature["id"]

# adds a new column 'Density' to the DataFrame by extracting and coonverting␣
 ↪the density values from the 'Density[a]' column
```

```
df["Density"] = df["Density[a]"].apply(lambda x : int(x.split("/")[0].
 ↪replace(",", "")))
df["id"] = df["State or union territory"].apply(lambda x : state_id_map[x])

fig = px.choropleth(df,
                    locations = "id",
                    geojson = india_states,
                    color = "Population",
                    hover_name = "State or union territory",
                    hover_data = ["Density", "Sex ratio", "Population"],
                    title = "India Population Statewise",
                   )

# Updates the geospatial layout of map to fit the bounds of the state locations␣
 ↪and makes the map invisible
fig.update_geos(fitbounds = 'locations', visible = False)
fig.show()
```



[3]:
```
print(df)
```

```
    Rank  State or union territory  Population  Population (%)  \
0    1.0              Uttar Pradesh   199812341             NaN
1    2.0                Maharashtra   112374333             NaN
2    3.0                      Bihar   104099452             NaN
3    4.0                West Bengal    91276115             NaN
4    5.0             Madhya Pradesh    72626809             NaN
5    6.0                 Tamil Nadu    72147030             NaN
6    7.0                  Rajasthan    68548437             NaN
7    8.0                  Karnataka    61095297             NaN
8    9.0                    Gujarat    60439692             NaN
9   10.0             Andhra Pradesh    49577103             NaN
10  11.0                     Odisha    41974219             NaN
```

11	12.0	Telangana	35003674	NaN
12	13.0	Kerala	33406061	NaN
13	14.0	Jharkhand	32988134	NaN
14	15.0	Assam	31205576	NaN
15	16.0	Punjab	27743338	NaN
16	17.0	Chhattisgarh	25545198	NaN
17	18.0	Haryana	25351462	NaN
18	19.0	Uttarakhand	10086292	NaN
19	20.0	Himachal Pradesh	6864602	NaN
20	21.0	Tripura	3673917	NaN
21	22.0	Meghalaya	2966889	NaN
22	23.0	Manipur	2570390	NaN
23	24.0	Nagaland	1978502	NaN
24	25.0	Goa	1458545	NaN
25	26.0	Arunanchal Pradesh	1383727	NaN
26	27.0	Mizoram	1097206	NaN
27	28.0	Sikkim	610577	NaN
28	NaN	NCT of Delhi	16787941	NaN
29	NaN	Jammu & Kashmir	12267032	NaN
30	NaN	Puducherry	1247953	NaN
31	NaN	Chandigarh	1055450	NaN
32	NaN	Dadara & Nagar Havelli	585764	NaN
33	NaN	Daman & Diu	585764	NaN
34	NaN	Andaman & Nicobar Island	380581	NaN
35	NaN	Lakshadweep	64473	NaN

	Decadal growth(2001-2011)	Rural population	Percent rural	\
0	20.20%	155317278	NaN	
1	20.00%	61556074	NaN	
2	25.40%	92341436	NaN	
3	13.80%	62183113	NaN	
4	16.30%	52557404	NaN	
5	15.60%	37229590	NaN	
6	21.30%	51500352	NaN	
7	15.60%	37469335	NaN	
8	19.30%	34694609	NaN	
9	11.00%	34966693	NaN	
10	14.00%	34970562	NaN	
11	13.58%	21395009	NaN	
12	4.90%	17471135	NaN	
13	22.40%	25055073	NaN	
14	17.10%	26807034	NaN	
15	13.90%	17344192	NaN	
16	22.60%	19607961	NaN	
17	19.90%	16509359	NaN	
18	18.80%	7036954	NaN	
19	12.90%	6176050	NaN	
20	14.80%	2712464	NaN	

21	27.90%	2371439	NaN	
22	18.60%	1793875	NaN	
23	-0.6%	1407536	NaN	
24	8.20%	551731	NaN	
25	26.00%	1066358	NaN	
26	23.50%	525435	NaN	
27	12.90%	456999	NaN	
28	21.20%	419042	NaN	
29	23.60%	9064220	NaN	
30	28.10%	395200	NaN	
31	17.20%	28991	NaN	
32	55.10%	243510	NaN	
33	55.10%	243510	NaN	
34	6.90%	237093	NaN	
35	6.30%	14141	NaN	

	Urban population	Percent urban	Area[16]	\
0	44495063	NaN	240,928 km2 (93,023 sq mi)	
1	50818259	NaN	307,713 km2 (118,809 sq mi)	
2	11758016	NaN	94,163 km2 (36,357 sq mi)	
3	29093002	NaN	88,752 km2 (34,267 sq mi)	
4	20069405	NaN	308,245 km2 (119,014 sq mi)	
5	34917440	NaN	130,058 km2 (50,216 sq mi)	
6	17048085	NaN	342,239 km2 (132,139 sq mi)	
7	23625962	NaN	191,791 km2 (74,051 sq mi)	
8	25745083	NaN	196,024 km2 (75,685 sq mi)	
9	14610410	NaN	162,968 km2 (62,922 sq mi)	
10	7003656	NaN	155,707 km2 (60,119 sq mi)	
11	13608665	NaN	112,077 km2 (43,273 sq mi)	
12	15934926	NaN	38,863 km2 (15,005 sq mi)	
13	7933061	NaN	79,714 km2 (30,778 sq mi)	
14	4398542	NaN	78,438 km2 (30,285 sq mi)	
15	10399146	NaN	50,362 km2 (19,445 sq mi)	
16	5937237	NaN	135,191 km2 (52,198 sq mi)	
17	8842103	NaN	44,212 km2 (17,070 sq mi)	
18	3049338	NaN	53,483 km2 (20,650 sq mi)	
19	688552	NaN	55,673 km2 (21,495 sq mi)	
20	961453	NaN	10,486 km2 (4,049 sq mi)	
21	595450	NaN	22,429 km2 (8,660 sq mi)	
22	776515	NaN	22,327 km2 (8,621 sq mi)	
23	570966	NaN	16,579 km2 (6,401 sq mi)	
24	906814	NaN	3,702 km2 (1,429 sq mi)	
25	317369	NaN	83,743 km2 (32,333 sq mi)	
26	571771	NaN	21,081 km2 (8,139 sq mi)	
27	153578	NaN	7,096 km2 (2,740 sq mi)	
28	16368899	NaN	1,484 km2 (573 sq mi)	
29	3202812	NaN	42,241 km2 (16,309 sq mi)[d]	
30	852753	NaN	479 km2 (185 sq mi)	

31	1026459	NaN	114 km2 (44 sq mi)
32	342254	NaN	603 km2 (233 sq mi)
33	342254	NaN	603 km2 (233 sq mi)
34	143488	NaN	8,249 km2 (3,185 sq mi)
35	50332	NaN	32 km2 (12 sq mi)

	Density[a]	Sex ratio	Density	id
0	828/km2 (2,140/sq mi)	912	828	9
1	365/km2 (950/sq mi)	929	365	27
2	1,102/km2 (2,850/sq mi)	918	1102	10
3	1,029/km2 (2,670/sq mi)	953	1029	19
4	236/km2 (610/sq mi)	931	236	23
5	555/km2 (1,440/sq mi)	996	555	33
6	201/km2 (520/sq mi)	928	201	8
7	319/km2 (830/sq mi)	973	319	29
8	308/km2 (800/sq mi)	919	308	24
9	303/km2 (780/sq mi)	993	303	28
10	269/km2 (700/sq mi)	979	269	21
11	312/km2 (810/sq mi)	988	312	0
12	859/km2 (2,220/sq mi)	1084	859	32
13	414/km2 (1,070/sq mi)	948	414	20
14	397/km2 (1,030/sq mi)	954	397	18
15	550/km2 (1,400/sq mi)	895	550	3
16	189/km2 (490/sq mi)	991	189	22
17	573/km2 (1,480/sq mi)	879	573	6
18	189/km2 (490/sq mi)	963	189	5
19	123/km2 (320/sq mi)	972	123	2
20	350/km2 (910/sq mi)	960	350	16
21	132/km2 (340/sq mi)	989	132	17
22	122/km2 (320/sq mi)	992	122	14
23	119/km2 (310/sq mi)	931	119	13
24	394/km2 (1,020/sq mi)	973	394	30
25	17/km2 (44/sq mi)	938	17	12
26	52/km2 (130/sq mi)	976	52	15
27	86/km2 (220/sq mi)	890	86	11
28	11,297/km2 (29,260/sq mi)	868	11297	7
29	297/km2 (770/sq mi)	890	297	1
30	2,598/km2 (6,730/sq mi)	1037	2598	34
31	9,252/km2 (23,960/sq mi)	818	9252	4
32	970/km2 (2,500/sq mi)	711	970	26
33	970/km2 (2,500/sq mi)	711	970	25
34	46/km2 (120/sq mi)	876	46	35
35	2,013/km2 (5,210/sq mi)	946	2013	31

[ ]: