Tourism in India post Covid-19

03.05.2020

Introduction

- Covid-19 has wreaked havoc in the World
- Disrupted almost all the sectors and economy of all countries

Cumulative Confirmed Cases

Source: John Hopkins,Corona Virus Resource Centre

Project Deliverable

- Finding a tourist destination in India considering Covid-19 infection spread in the Country

Interested Parties

- International & Domestic Tourism Companies
- International Travellers
- Domestic Travellers

Data Acquisition & Cleaning

Data acquired from:

1. Covid-19 Data for India: https://www.mygov.in/covid-19
2. Popular Tourist Destinations in India: https://traveltriangle.com/blog/places-to-visit-in-india-before-you-turn-30/
3. Popular Destinations in Goa https://traveltriangle.com/blog/tourist-places-in-goa/

Data Wrangling

Data acquired from:

1. Covid-19 Data for India: https://www.mygov.in/covid-19.
2. Geo –coordinates fetched using geopy and appended to above data set.

	State/UTs	Confirmed	Active	Recovered	Deceased	latitude	longitude
0	Andaman and Nicobar	33	17	16	0	7.000017	93.811082
1	Andhra Pradesh	1525	1051	441	33	15.924091	80.186381
2	Arunachal Pradesh	1	0	1	0	27.689171	96.459723
3	Assam	43	10	32	1	26.407384	93.255130
4	Bihar	481	370	107	4	25.644085	85.906508

Data Wrangling

Data acquired from:

2.Popular Tourist Destinations in India: https://traveltriangle.com/blog/places-to-visit-in-india-before-you-turn-30/

Geo –coordinates fetched using geopy and appended to above data set

|	States	latitude	longitude
0	Goa	15.300454	74.085513
1	Srinagar	34.074744	74.820444
2	Andaman	10.000105	93.000019
3	Leh-Ladakh	34.164203	77.584813
4	Kerala	10.352874	76.512040

Data Wrangling

Data Sets Merged


```
df_combined=df_states.append(df_tourism, ignore_index = True)
df_combined
```

	States	Confirmed	Active	Recovered	Deceased	latitude	longitude
0	Andaman and Nicobar	33.0	17.0	16.0	0.0	7.000017	93.811082
1	Andhra Pradesh	1525.0	1051.0	441.0	33.0	15.924091	80.186381
2	Arunachal Pradesh	1.0	0.0	1.0	0.0	27.689171	96.459723
3	Assam	43.0	10.0	32.0	1.0	26.407384	93.255130
4	Bihar	481.0	370.0	107.0	4.0	25.644085	85.906508
5	Chandigarh	88.0	71.0	17.0	0.0	30.719402	76.764655
6	Chhattisgarh	43.0	7.0	36.0	0.0	21.663736	81.840635
7	Delhi	4122.0	2802.0	1256.0	64.0	28.651718	77.221939
8	Goa	7.0	0.0	7.0	0.0	15.300454	74.085513
9	Gujarat	5054.0	3896.0	896.0	262.0	22.415408	72.031497
10	Haryana	360.0	129.0	227.0	4.0	29.000000	76.000000

Exploratory Data Analysis
Visualizing the merged Data Set on the map of India
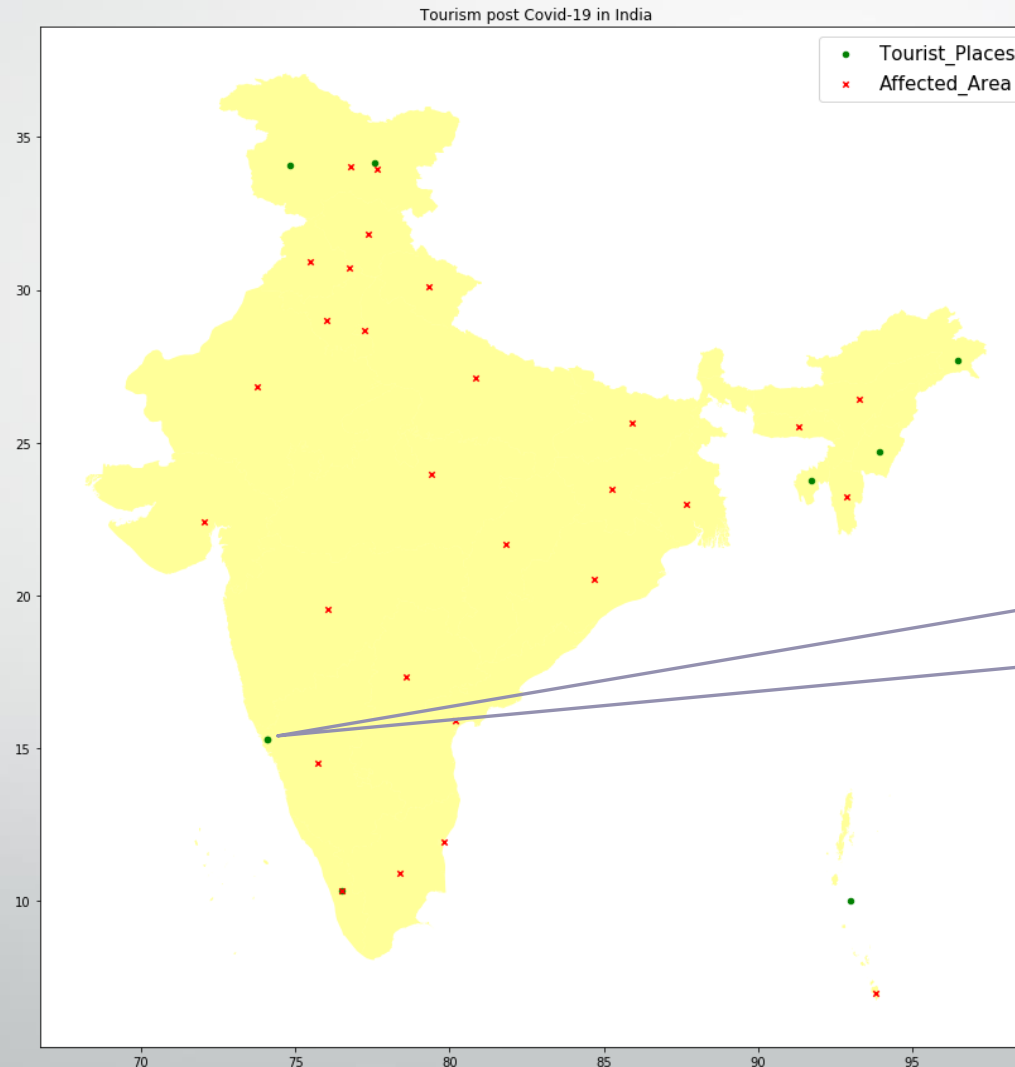
Goa is the only place with no active infections In its vicinity

Exploratory Data Analysis
Exploring Goa

```
filename ="Goa.csv"
df_goa= pd.read_csv(filename)
df_goa.head()
```

	Tourist_Attraction	USP
0	Aguada Fort	Beautiful Ambiance
1	Chapora Fort	For Selfie Lovers
2	Terekhol Fort	Serene Ambiance
3	Reis Mogos Fort	For History Lovers
4	Cabo De Rama Fort	Mythological Site

```
locator = Nominatim(user_agent="myGeocoder")
from geopy.extra.rate_limiter import RateLimiter
# 1 - conveneint function to delay between geocoding calls
geocode = RateLimiter(locator.geocode, min_delay_seconds=1)
# 2- - create location column
df_goa['location'] = df_goa['Tourist_Attraction'].apply(geocode)
# 3 - create longitude, laatitude and altitude from location column (returns tuple)
df_goa['point'] = df_goa['location'].apply(lambda loc: tuple(loc.point) if loc else None)
# 4 - split point column into latitude, longitude and altitude columns
df_goa[['latitude', 'longitude', 'altitude']] = pd.DataFrame(df_goa['point'].tolist(), index=df_goa.index)
df_goa = df_goa.drop(['location', 'point', 'altitude'], axis=1)
df_goa.head()
```

	Tourist_Attraction	USP	latitude	longitude
0	Aguada Fort	Beautiful Ambiance	15.492328	73.773204
1	Chapora Fort	For Selfie Lovers	15.603370	73.737162
2	Terekhol Fort	Serene Ambiance	15.721476	73.686472
3	Reis Mogos Fort	For History Lovers	NaN	NaN

Exploratory Data Analysis
Exploring Goa using Foursquare API

Now, let's get the top 100 venues that are near Fort Aguada within a radius of 500 meters.

```python
# type your answer here
LIMIT = 100 # limit of number of venues returned by Foursquare API
radius = 500 # define radius
# create URL
url = 'https://api.foursquare.com/v2/venues/explore?&client_id={}&client_secret={}&v={}&ll={},{}&radius={}&limit={}'.format(
    CLIENT_ID,
    CLIENT_SECRET,
    VERSION,
    place_latitude,
    place_longitude,
    radius,
    LIMIT)
url # display URL
```
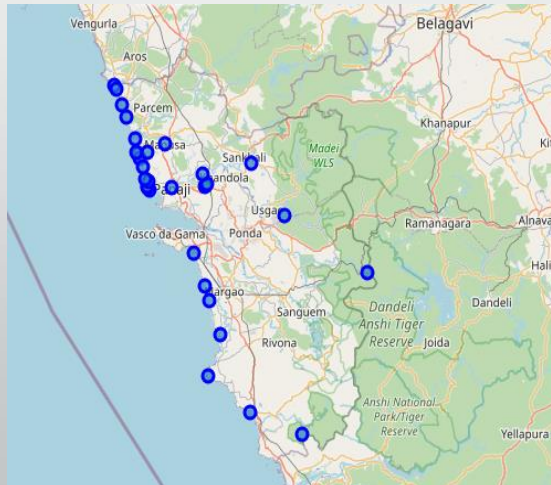
Exploratory Data Analysis
Exploring Goa using Foursquare API

Getting Nearby Venues near the tourist attractions in Goa

Explore Tourist Attractions in Goa

Let's create a function to repeat the same process to all the tourist attractions in Goa

```python
def getNearbyVenues(names, latitudes, longitudes, radius=500):

    venues_list=[]
    for name, lat, lng in zip(names, latitudes, longitudes):
        print(name)

        # create the API request URL
        url = 'https://api.foursquare.com/v2/venues/explore?&client_id={}&client_secret={}&v={}&
            CLIENT_ID,
            CLIENT_SECRET,
            VERSION,
            lat,
            lng,
            radius,
            LIMIT)
```

```python
goa_venues = getNearbyVenues(names=df_goa['Tourist_Attraction'],
                             latitudes=df_goa['latitude'],
                             longitudes=df_goa['longitude']
                            )
```

```
Aguada Fort
Chapora Fort
Terekhol Fort
Cabo De Rama Fort
Bom Jesus Basilica
Se Cathedral
Church Of St. Francis Of Assisi
Church Of St. Cajetan
Thalassa Restaurant
The Fisherman's Wharf
Tito's Club
Mambo's
Britto's
Cotigao Wildlife Sanctuary
Bondla Wildlife Sanctuary
Mapusa Market
Saturday Night Market
```

Exploratory Data Analysis
Analyzing venues

Let's print each neighborhood along with the top 5 most common venues

```python
num_top_venues = 5

for hood in goa_grouped['Neighborhood']:
    print("----"+hood+"----")
    temp = goa_grouped[goa_grouped['Neighborhood'] == hood].T.reset_index()
    temp.columns = ['venue','freq']
    temp = temp.iloc[1:]
    temp['freq'] = temp['freq'].astype(float)
    temp = temp.round({'freq': 2})
    print(temp.sort_values('freq', ascending=False).reset_index(drop=True).head(num_top_venues))
    print('\n')
```

```
----Aguada Beach----
                  venue  freq
0            Restaurant  0.15
1     Italian Restaurant  0.10
2                 Hotel  0.10
3      Indian Restaurant  0.05
4   Caribbean Restaurant  0.05
```

Exploratory Data Analysis
Analyzing venues

`neighborhoods_venues_sorted.head()`

	Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
0	Aguada Beach	Restaurant	Hotel	Italian Restaurant	Yoga Studio	Spa	Bar	Beach	Caribbean Restaurant	Historic Site	Hotel Pool
1	Aguada Fort	Lighthouse	Hotel	Motel	Yoga Studio	Dumpling Restaurant	Fish & Chips Shop	Filipino Restaurant	Fast Food Restaurant	Falafel Restaurant	Electronics Store
2	Anjuna Beach	Café	Indian Restaurant	Beach	Rest Area	Flea Market	Seafood Restaurant	Snack Place	Restaurant	Fast Food Restaurant	Discount Store
3	Anjuna Flea Market	Café	Nightclub	Restaurant	Indian Restaurant	Juice Bar	Fast Food Restaurant	Seafood Restaurant	Modern European Restaurant	Flea Market	Bed & Breakfast
4	Arambol Beach	Indian Restaurant	Resort	Restaurant	Asian Restaurant	Goan Restaurant	Breakfast Spot	Hostel	Vegetarian / Vegan Restaurant	Café	Theater

Exploratory Data Analysis
Clustering tourist locations using K-Cluster
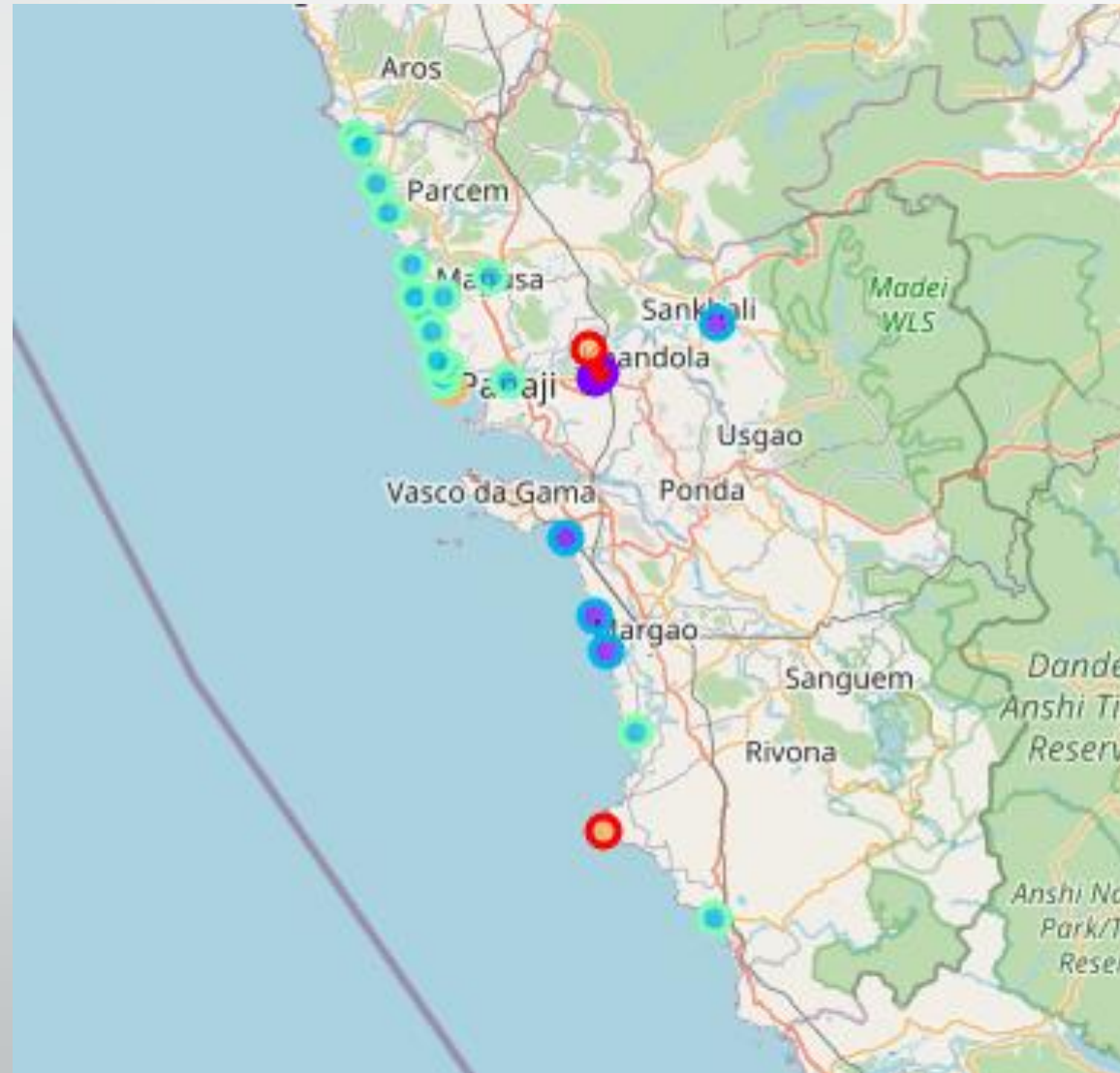
Results and Discussion

- Our Analysis shows that India is not an exception as far as Covid-19 spread is concerned.
- The virus has spread far and wide in the Country just like the Rest of the world.
- In India, despite its geographical area, "Goa" remains the only State/Tourist location which is safe to visit as of 02.05.2020.
- Goa despite being a small state has a lot to offer to Domestic as well as International tourists. There are multiple forts. Also there are several popular beaches as the state is located along the Arabian Sea.
- It justifies its USP viz "Official Party Hub"

Conclusion

The purpose of this project was to identify tourist destinations in India which would be safe to visit post normalization of Covid-19 pandemic in order to aid stakeholders (Domestic & International Tour operators) in offering customized targeted packages to prospective customers. By calculating and clustering the top venues for each Tourist Destination in Goa we were able to provide ample options to the prospective customer for planning his trip. Clustering of those locations was then performed in order to create major zones of interesting places to vis