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Xtern Task: Data Science.

Your Task

Utilize the open-source map API such as Google Map API, OpenStreetMap, AWS Map API to collect useful data on local stores, shops, and destinations. Clean and organize your data then present it as a table or data frame. Such table or data frame of local stores, shops, and destinations should contain basic information about those locations such as name, address, rating, website, and type. See Example_Data.csv for an example list.

Review the data and draw any conclusions you can find from the data set you gathered. Present a one-day (9:00 AM - 9:00 PM) activities plan with time, location name, address, activity type, and duration. See Example_Plan.csv for an example plan.

Demonstrate your findings using data visualization tools and well-written explanations. As an important member of the team, you get to come up with your own analysis and explain it! So try your best to dig out any useful information from this data set. Sky is the limit! 🤓

Answer:

We have created a function which gives us the dataset by giving the following:

Inputs: `keyword="tourist_attraction" => we have various keywords,`

`loc=("39.7738797","-86.1784417")=> loc = (lat,lon),`

`radius = "5000" =>(this is generally in meters)`

Function:

```
def get_data(keyword,loc=("39.7738797","-86.1784417"),  radius = "5000"):
    # API Key
    APIKEY = 'AIzaSyCPUAkr1Q_zfKt2uBEDStUYVaf5I2If9eo'
    lat, lng = loc
    pagetoken = None
    # URL: Link + Lat + Lng + Radius + Type means keyword(Restaurant, Mall etc) +
    url = "https://maps.googleapis.com/maps/api/place/nearbysearch/json?location={lat},{lng}&radius={radius}&type={type}&key={APIKEY}{pagetoken}".format(lat = lat, lng = lng, radius = radius,
                                                                                                                                                         type = keyword,APIKEY = APIKEY,
                                                                                                                                                         pagetoken = "&pagetoken="+pagetoken
                                                                                                                                                         if pagetoken else "")

    # print(url)
    response = requests.get(url)
    res = json.loads(response.text)
    # print(res)
    # print("here results ---->>> ", len(res["results"]))
    final_data = []
    for result in res["results"]:
      try:
        # Name of the place
        name = result['name']
        # Address of the place
        Add = result['vicinity']
        # Rating of the place
        rating = result['rating']
        # Types of the place associated with
        types = result['types']
        data = [name, Add, rating, types, keyword]
        final_data.append(data)
      except:
        continue
    #create dataframe
    df = pd.DataFrame(final_data, columns=['Name','Address','Rating','types','keyword'])

    return(df)
```

Outputs:

For keyword = "tourist_attraction"

```
[34] df_1.head()
```

	Name	Address	Rating	types	keyword
0	Indianapolis Zoo	1200 West Washington Street, Indianapolis	4.5	[zoo, aquarium, tourist_attraction, point_of_i...	tourist_attraction
1	Indiana Statehouse	200 West Washington Street, Indianapolis	4.6	[tourist_attraction, local_government_office, ...	tourist_attraction
2	Indiana Historical Society	450 West Ohio Street, Indianapolis	4.7	[tourist_attraction, museum, point_of_interest...	tourist_attraction
3	Eiteljorg Museum	500 West Washington Street, Indianapolis	4.6	[tourist_attraction, museum, point_of_interest...	tourist_attraction
4	The Children's Museum of Indianapolis	3000 North Meridian Street, Indianapolis	4.7	[tourist_attraction, museum, point_of_interest...	tourist_attraction

We have choices list keywords from the google maps API

accounting	lawyer
airport	library
amusement_park	light_rail_station
aquarium	liquor_store
art_gallery	local_government_office
atm	locksmith
bakery	lodging
bank	meal_delivery
bar	meal_takeaway
beauty_salon	mosque
bicycle_store	movie_rental
book_store	movie_theater
bowling_alley	moving_company
bus_station	museum

Link of gmaps API: https://developers.google.com/maps/documentation/places/web-service/supported_types

We have created various types of dataframes using the different keywords, according to this API we request nearby places using the keyword.

Here the situation, we find tourist_attraction near the location.

Pinpoint Location: `loc=("39.7738797","-86.1784417")`

`[Campus Center,IUPUI,Indianapolis]`

Here the samples datasets are as follows :

tourist_attraction near location campus center Indianapolis around radius of 5000 meters.

```
df_1.head()
```

	Name	Address	Rating	types	keyword
0	Indianapolis Zoo	1200 West Washington Street, Indianapolis	4.5	[zoo, aquarium, tourist_attraction, point_of_i...	tourist_attraction
1	Indiana Statehouse	200 West Washington Street, Indianapolis	4.6	[tourist_attraction, local_government_office, ...	tourist_attraction
2	Indiana Historical Society	450 West Ohio Street, Indianapolis	4.7	[tourist_attraction, museum, point_of_interest...	tourist_attraction
3	Eiteljorg Museum	500 West Washington Street, Indianapolis	4.6	[tourist_attraction, museum, point_of_interest...	tourist_attraction
4	The Children's Museum of Indianapolis	3000 North Meridian Street, Indianapolis	4.7	[tourist_attraction, museum, point_of_interest...	tourist_attraction

shopping_mall near location campus center Indianapolis around radius of 5000 meters.

```
df_2.head()
```

	Name	Address	Rating	types	keyword
0	Circle Centre Mall	49 West Maryland Street, Indianapolis	4.1	[shopping_mall, point_of_interest, establishment]	shopping_mall
1	West Side Shoppes	West 10th Street, Indianapolis	4.2	[shopping_mall, point_of_interest, establishment]	shopping_mall
2	SHE. EVENT INDY CO - SHEXperience Shoppes	CIRCLE CENTRE MALL SHEXPERIENCE SHOPPES, 49 We...	4.8	[shopping_mall, point_of_interest, establishment]	shopping_mall
3	Sun Garage	48 West Maryland Street, Indianapolis	4.0	[shopping_mall, point_of_interest, establishment]	shopping_mall
4	INDY	30 South Meridian Street # 650, Indianapolis	4.7	[shopping_mall, point_of_interest, establishment]	shopping_mall

art_gallery near location campus center Indianapolis around radius of 5000 meters.

```
df_3.head()
```

	Name	Address	Rating	types	keyword
0	City Gallery	1505 North Delaware Street, Indianapolis	3.7	[art_gallery, point_of_interest, establishment]	art_gallery
1	Cultural Arts Gallery	Room #146, 420 University Boulevard, Indianapolis	5.0	[art_gallery, point_of_interest, establishment]	art_gallery
2	Nancy Lee Designs	1125 East Brookside Avenue, Indianapolis	5.0	[art_gallery, jewelry_store, store, point_of_i...	art_gallery
3	Kurt Vonnegut Museum & Library	543 Indiana Avenue, Indianapolis	4.8	[art_gallery, tourist_attraction, museum, libr...	art_gallery
4	LO-FI Lounge	G. C. Murphy Building, 1043 Virginia Avenue #2...	4.5	[art_gallery, point_of_interest, establishment]	art_gallery

Restaurant near location campus center Indianapolis around radius of 5000 meters.

```
df_4.head()
```

	Name	Address	Rating	types	keyword
0	Shapiro's Delicatessen	808 South Meridian Street, Indianapolis	4.5	[bakery, meal_takeaway, restaurant, food, poin...	restaurant
1	St. Elmo Steak House	127 South Illinois Street, Indianapolis	4.7	[night_club, bar, restaurant, food, point_of_i...	restaurant
2	The Rathskeller	401 East Michigan Street, Indianapolis	4.5	[bar, restaurant, food, point_of_interest, est...	restaurant
3	Harry & Izzy's	153 South Illinois Street, Indianapolis	4.7	[restaurant, food, point_of_interest, establis...	restaurant
4	Buca di Beppo Italian Restaurant	35 North Illinois Street, Indianapolis	4.1	[restaurant, food, point_of_interest, establis...	restaurant

Suppose we have a person who wants to visit (From 9:00 AM to 9:00 PM),

Choose any 1 church for worship near Campus center, IUPUI, Indianapolis (Randomly)

Choose any 1 tourist attractions for touring near Campus center, IUPUI, Indianapolis (Randomly)

Choose any 1 shopping mall for shopping near Campus center, IUPUI, Indianapolis (Randomly)

Choose any 1 art gallery for viewing near Campus center, IUPUI, Indianapolis (Randomly)

Choose any 1 restaurant for dinner near Campus center, IUPUI, Indianapolis (Randomly)

- • We assume two situations that a person starts from the choosen toursit attraction for a start and end at a same place.
  We calculate the distance matrix and further using dynamic programming we find out the shortest path which the person can use for travelling.

```
--------------------------------------------
your travel routine is
1 The Salvation Army - Fountain Square
2 Shapiro's Delicatessen
3 Long-Sharp Gallery
4 West Side Shoppes
5 Easley Winery
The Salvation Army - Fountain Square, and the total distance of travel is:  24.799999999999997  km.
```

- • Another situation is that person starts and ends at the choosen points
  We calculate using the googles API
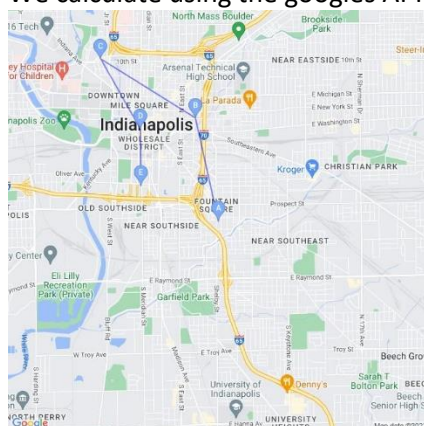

```
Stop:0 1337 Shelby St, Indianapolis, IN 46203, USA ==>  1337 Shelby St, Indianapolis, IN 46203, USA distance:  0 traveling Time:  0
Stop:1 1337 Shelby St, Indianapolis, IN 46203, USA ==>  205 N College Ave, Indianapolis, IN 46202, USA distance:  2723 traveling Time:  431
Stop:2 205 N College Ave, Indianapolis, IN 46202, USA ==>  1 N Illinois St a, Indianapolis, IN 46204, USA distance:  2508 traveling Time:  463
Stop:3 1 N Illinois St a, Indianapolis, IN 46204, USA ==>  W 10th St, Indianapolis, IN, USA distance:  8030 traveling Time:  876
Stop:4 W 10th St, Indianapolis, IN, USA ==>  808 S Meridian St, Indianapolis, IN 46225, USA distance:  10842 traveling Time:  772
Stop:5 808 S Meridian St, Indianapolis, IN 46225, USA ==>  808 S Meridian St, Indianapolis, IN 46225, USA distance:  0 traveling Time:  0
```

The jupyter notebook shows the calculation using these two methods and assumptions, hence we get the optimal itineary plan of the places near city.

Jupyter Notebook: https://colab.research.google.com/drive/1_FPM-tzKm8Gfpy3I6CSf2aHXLAwScUy2?usp=sharing