

# Travel to Ukraine with the help of Data Science

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## 1. Introduction

Who loves traveling? I believe that almost everyone is happy to see something new, something breathtaking, to try a new food and to explore the world around us. Also, it is really useful to change the environment at least for some days or weeks. But even when we're going on vacation to some new country, we usually don't have time to explore all beautiful cities and sights, because of time limit and also money. That's why we're trying to choose the best and the most suitable town for us with lots of interesting places. But it isn't an easy work, as it takes a lot of time to search all the necessary info and watch all travel guides. So, we're asking professionals (travel agencies) to help us. But travel agencies need all the information about countries where they're working as well. And it's easy to find it and to discover most popular countries and cities, thus nowadays people don't even need a help when they're going to some well-known country. But nowadays people like to travel to countries that weren't so popular decades ago. People want to discover something different, and travel businesses are interested in helping people to do that.

One of such countries is Ukraine. It has been extremely popular when there was held UEFA Euro 2020, and after HBO's TV series about Chornobl there is a new wave of tourists. There is a marketing brand Ukraine NOW, that means it's perfect time to visit this country now, while it isn't overcrowded with tourists and you can feel the true nature and culture.

Travel agencies spend a lot of money on countries investigation and exploration. And Ukraine isn't the most blogged about and described country. Due to that, this project aims to prepare informative and easy to use report about most famous and most suitable Ukrainian cities for different groups of people.

The most interested would be travel agencies, as far as this information could save them a lot of money and effort. It also would be extremely useful for people who are happy to plan their own vacation by themselves.

## 2. Data

I will use the Foursquare location data to solve this problem as this is the most trusted and independent location data used by thousands of developers and multiple big companies. Thanks to the Places API I can access information about three chosen cities: Kyiv, Lviv and Odesa. These are the most popular cities in Ukraine and there is a lot of relevant data about them. For each of them I'm going to prepare a report about most popular places, hotels, nearby archaeological sites, restaurants, cafes, transport system, museums, nightlife etc. This information will be collected into a data frames using Venues API. Main columns for me will be category, name and location of a venue. As far as nearby sights are concerned, I will get the information about all places out of town in radius of 50 kilometers, so that we don't miss some castles and other great places to visit.

I've chose such categories that might be interesting for travelers:

- Arts & Entertainment
- Event
- Food
- Nightlife
- Outdoors & Recreation
- Shop & Service
- Travel & Transport

I started with these cities:

Kyiv, Lviv, Odesa, Chernivtsi, Zaporizhia, Kharkiv.

I fetched data about venues for each of these cities in radius of 5km. Then I stored it into a dataframe and got such columns: 'id', 'name', 'categories', 'referralId', 'hasPerk', 'location.address', 'location.lat', 'location.lng', 'location.postalCode', 'location.cc', 'location.labeledLatLngs', 'location.distance', 'location.city', 'location.country', 'location.state', 'location.formattedAddress', 'location.crossStreet', 'venuePage.id'.

Then comes data cleaning.

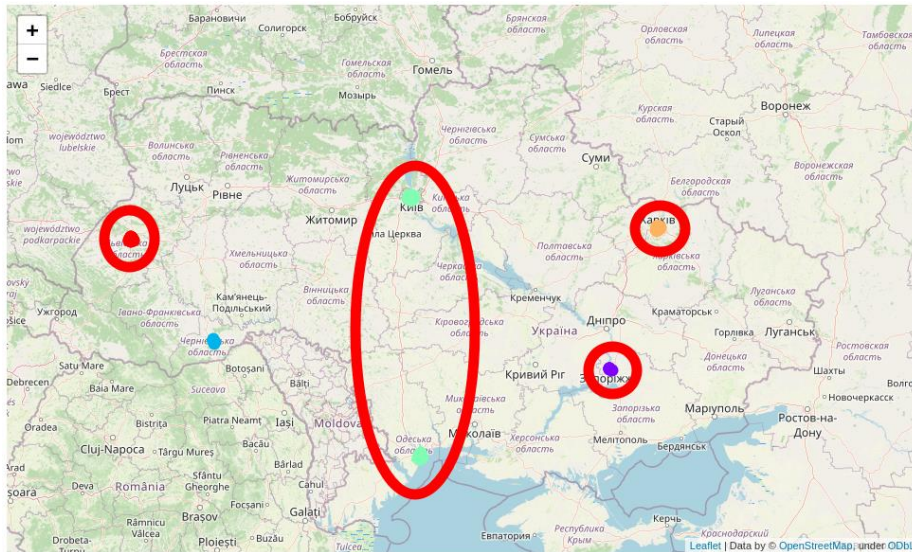
First of all, I've replaced all 'NuN' values in the column city with name of the city. I've dropped irrelevant for my project columns: "postalCode", "cc", "crossStreet", "state", "country", "labeledLatLngs", "distance", "address". Also, I've introduced a column with name of main category. Column categories was in JSON format, so I selected only name and filtered the category for each row. After that I kept columns that include venue name, and anything that is associated with location and cleaned column names by keeping only last term.

As a result, I've got data frame with 751 row and 9 columns, and that is info about 6 cities.

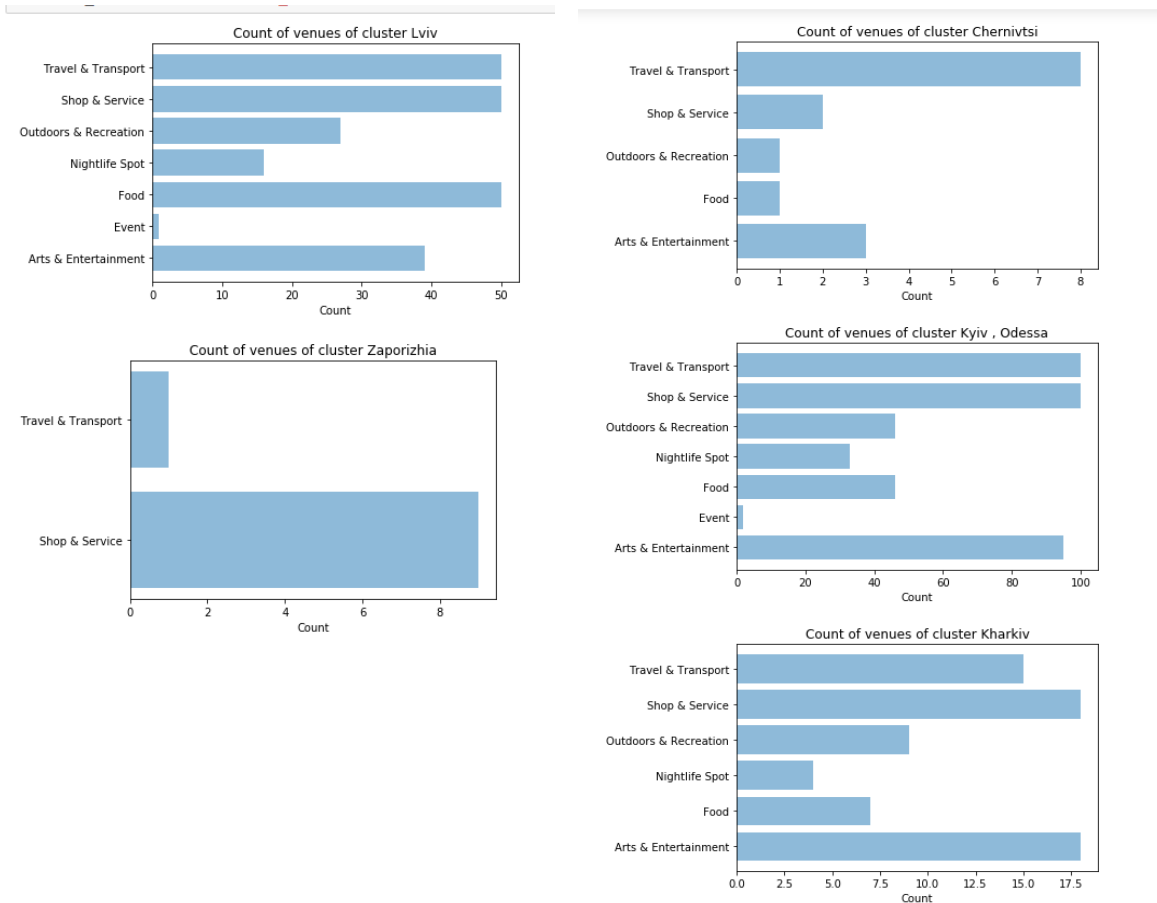
### 3. Analysis

I checked whether these cities have something in common with the help of popular machine learning technique - Clustering. Before that, I will transform data that I have into appropriate formatted data frame. I will get dummies for categories and move city column to the first column.

I've separated 5 clusters and got this result:



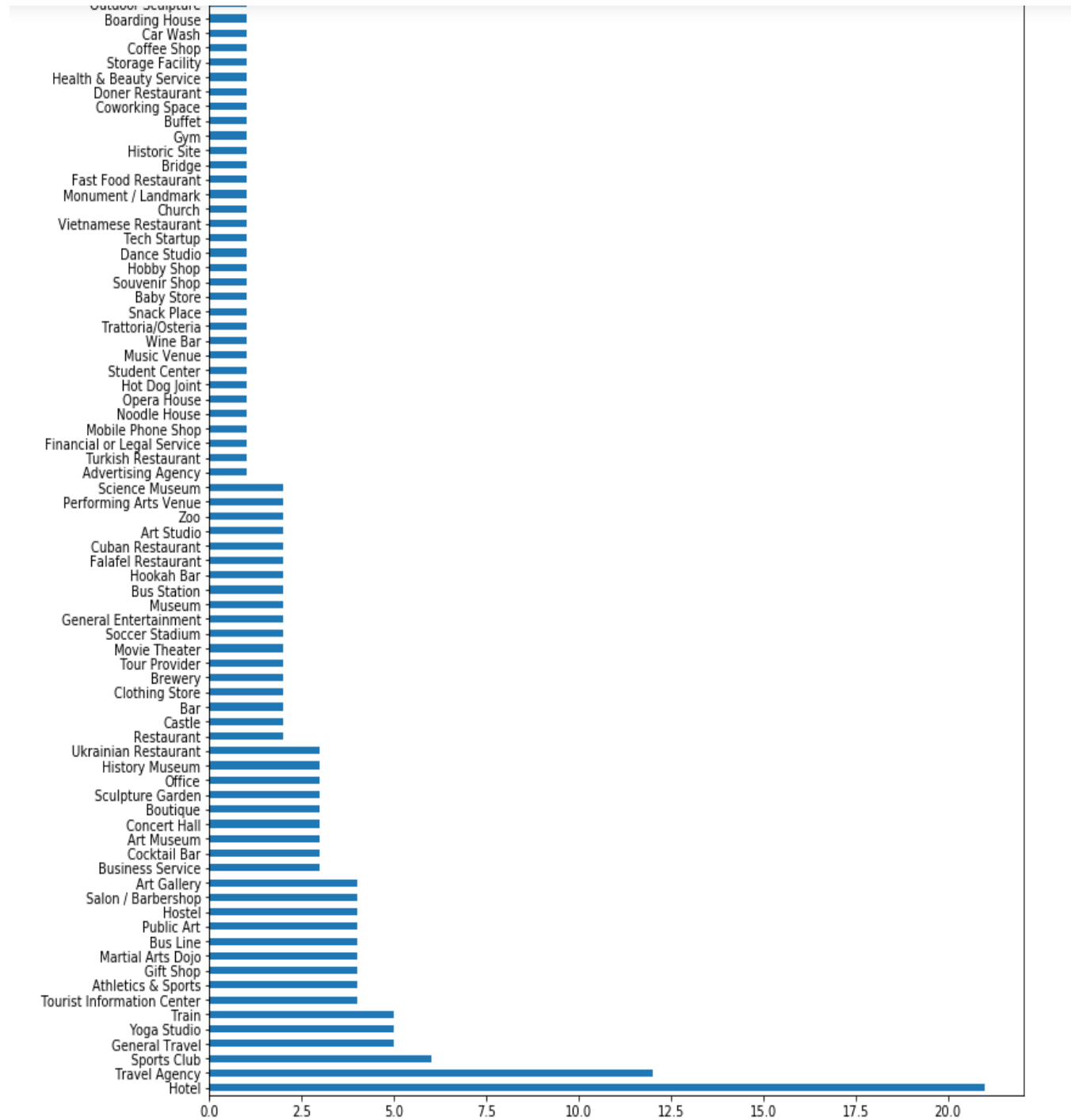
As we can see, most cities are unique so they form their own cluster. But Kyiv and Odesa seem to have something in common. First of all, I'm going to see each cluster and then I will move to top cities analysis.



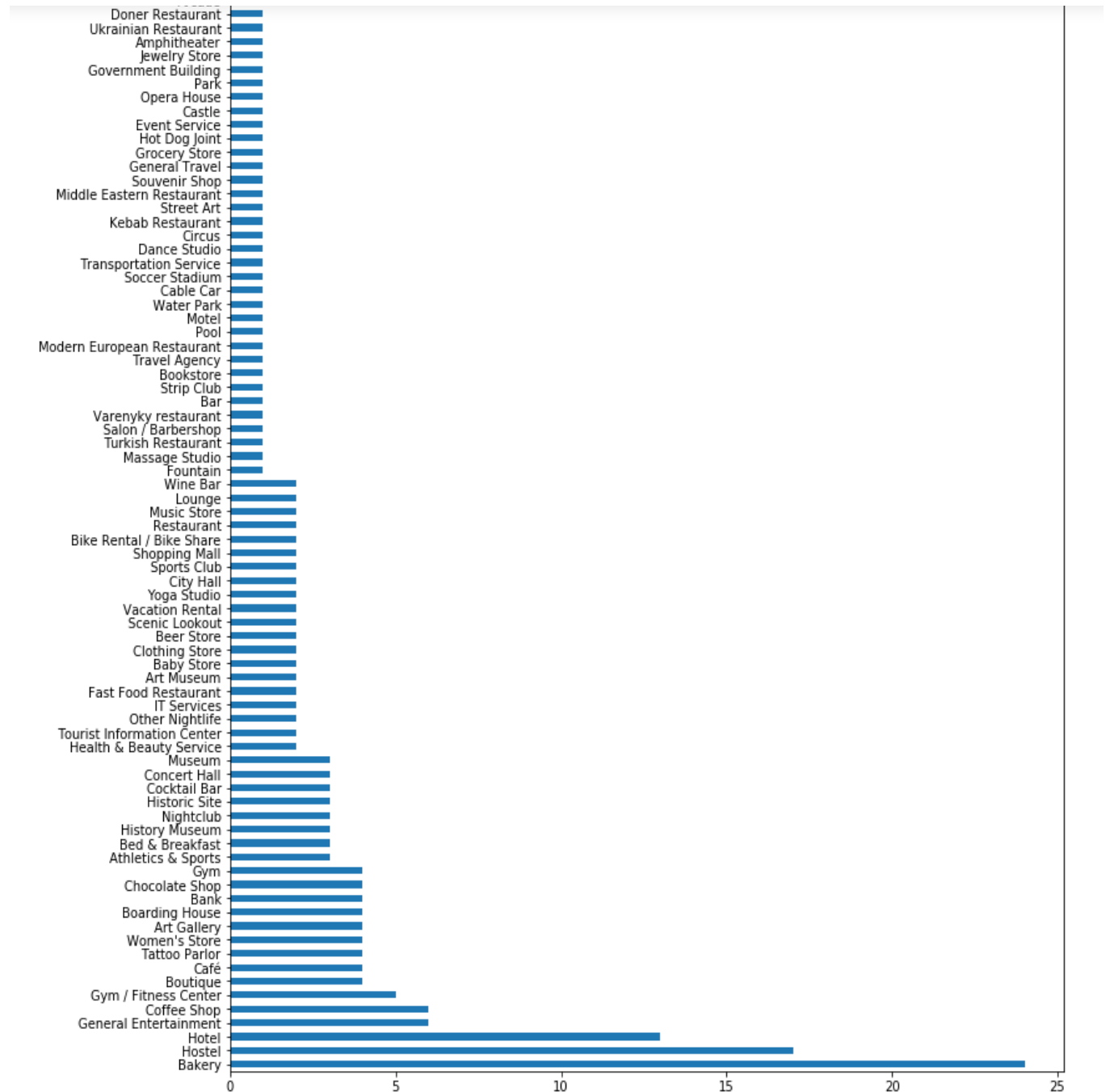
Let's start from the cluster containing two cities. It's cluster 4, with Kyiv and Odesa. Most popular venues there are shops and travel services, because there is a good transport system in these cities. Also, there are a lot of art objects. As for Kharkiv, we can see that there much less interesting for tourists' venues, but most of them are arts & entertainment, so it will be interesting city for tourists. Zaporizhia seems to have only a decade of useful for tourists' spots, mostly shops. Chernivtsi is a great small town with good transport system and several art objects, but there isn't plenty of them, so it's a one-two day city for tourists. And Lviv can easily compete with Kyiv and Odesa, as there are a lot of shops, cafes and art objects that will draw tourist's attention.

Now, I will explore three top cities with more details.

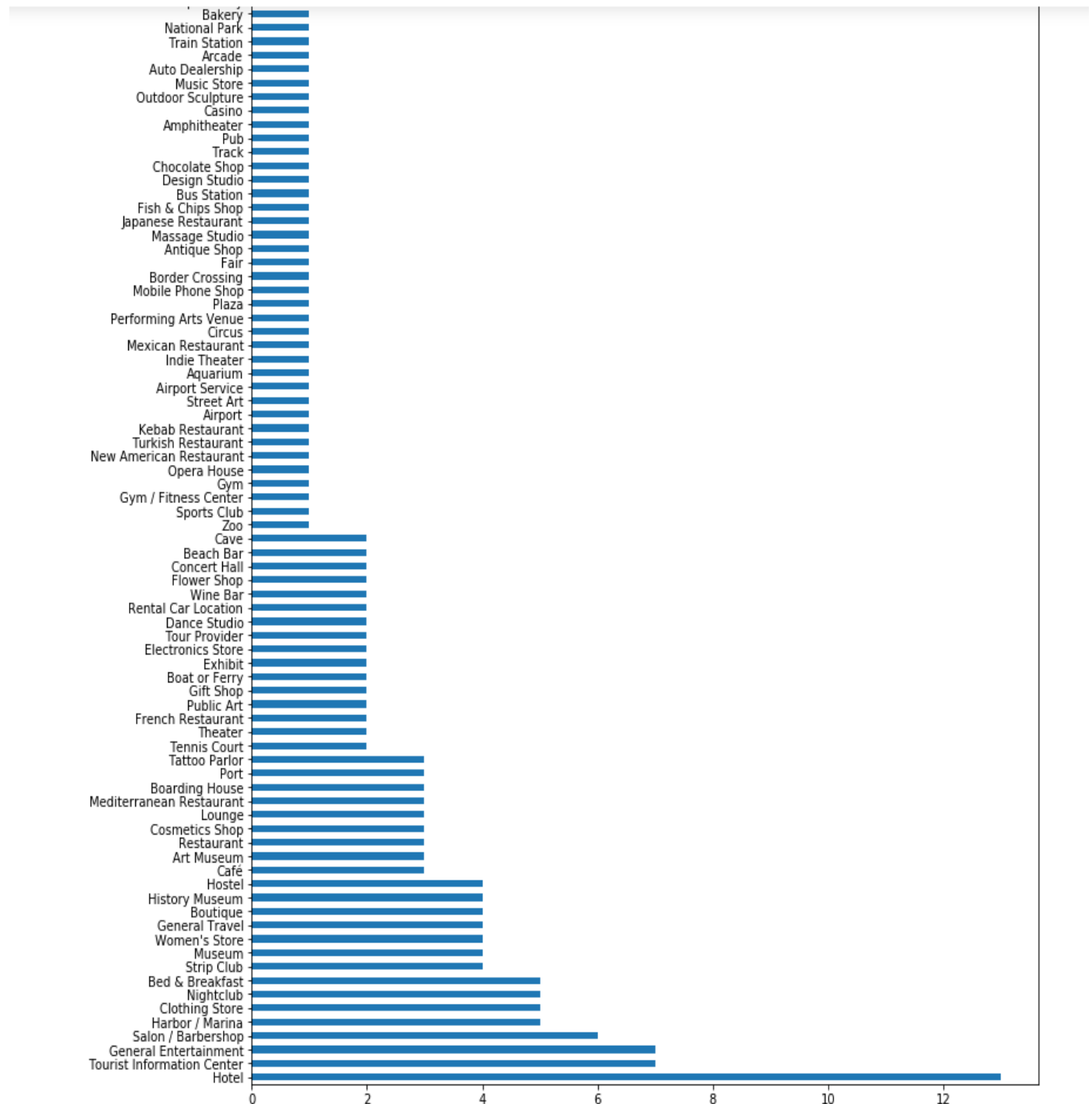
Kyiv is the capital of Ukraine, the biggest and richest city. Thus there are a lot of hotels and travel agencies. There are also lot's of shops and interesting museums and landmarks. Also, this is business city, so expect to see many business centers and luxury cars.



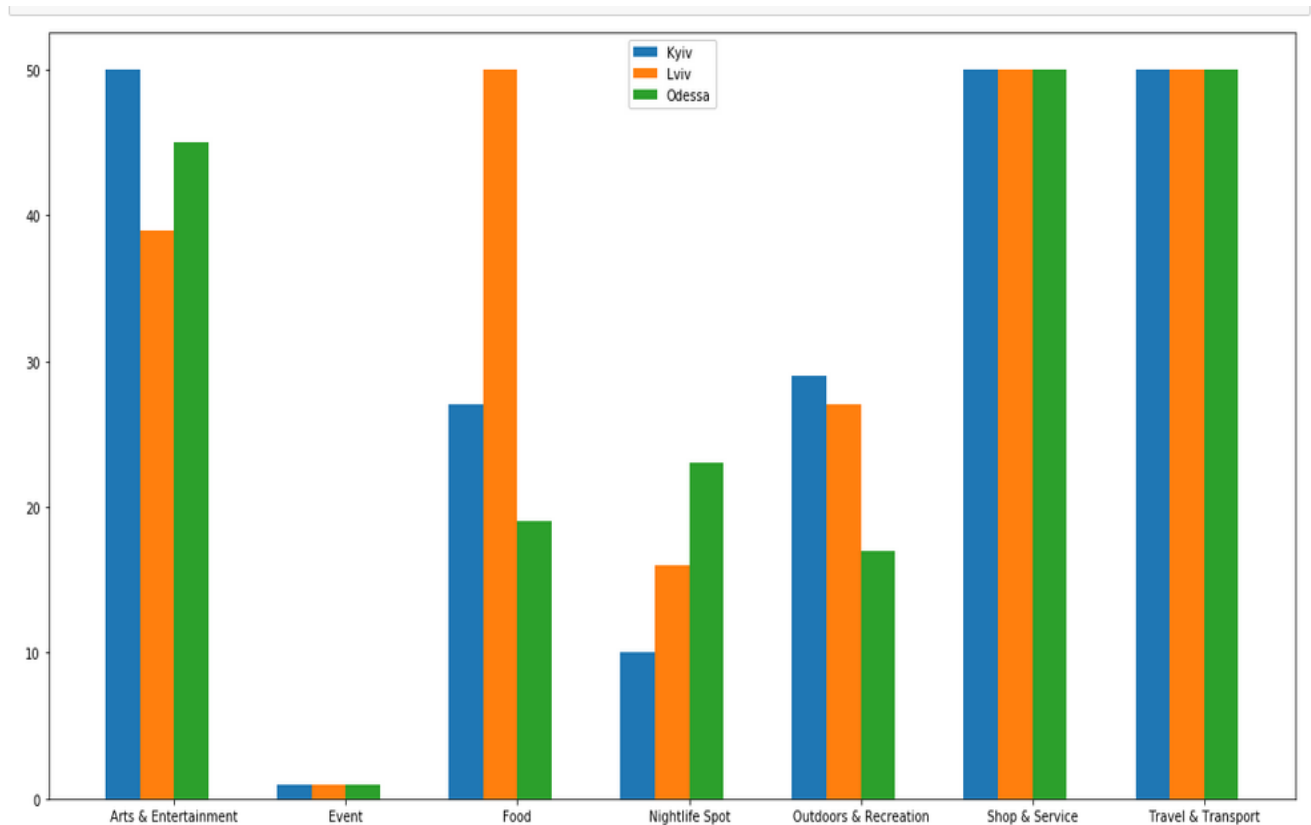
Lviv is considered to be culture capital thanks to it's unique atmosphere and architecture. And also, this city is famous by it's bakeries and coffe. We can see that these are not just words, but facts supported by the image we see above. Apart from bakeries and coffee shops there are a lot of places where you can stay (hotels and hostels).



Odesa is a beautiful city near the Black Sea. It's really populr amongst tourists thus there are a lot of hotels and places to stay. As we can see, there are a lot of night clubs and activities on it's charming quay. Apart from that, we can find some art museums and landmarks.



Let's compare these cities by some main categories for travelers.



The results are pretty interesting. There is equal amount of shops in these cities and transport system is good in all of them. Kyiv is the leader at arts and entertainment as there are a lot of interesting objects and services that offer some entertainment or outdoors activities. Odessa has a plenty of entertainment activities and the most developed nightlife - event top DJs sometimes give performances in Odessa's clubs. And Lviv majorly wins in Food category, thanks to its chocolate and coffee shops, bakeries and west Ukrainian cuisine.



Now, I would like to focus on nearby spots like castles, caves, national parks and palaces.

	name	categories	formattedAddress	main_category
	Київська Фортеця / The Kyiv Fortress (Київська...	Castle	[вул. Госпітальна, 16, Київ, Україна]	Castle
	Київщина / Kyiv Region	National Park	[Ukraine, Kyivs'ka Oblast, Україна]	National Park
	Львівська Цитадель / Lviv Citadel (Львівська Ц...	Historic Site	[Грабовського, Львів, Україна]	Castle
	Lviv High Castle	Castle	[Україна]	Castle
	Odessa Catacombs	Cave	[Україна]	Cave
	Odessa IBB Park	National Park	[Україна]	National Park

As we can see from the data frame, there are:

- two castles near Lviv
- one castle and one national park near Kyiv
- one cave and one national park near Odesa

## 4. Results and Discussion

My analysis shows, that Ukraine has some really interesting cities to visit and a lot of interesting places to see and things to do. This analysis shows that there are big cities with lots of activities and some other cities that might be not so popular amongst tourists. Our top 3 cities: Lviv, Odesa and Kyiv can be interesting for different people from different age groups. All of them have good transport system, a huge variety of places where to stay and most important - beautiful landmarks.

Here are my pieces of advice about these cities: If you're looking for nice and charming atmosphere with smell of sweets, then Lviv is your bet. If you're fan of activities and big cities - go to Kyiv and you will be satisfied. If you're in mood for parties, sea and rest - visit Odesa and get there everything you desire.

Visit Ukraine and you'll get unforgettable emotions and impression!

## 5. Conclusion

I wanted to show to travel agencies that it is possible to discover country and its most beautiful cities for tourism without spending weeks discovering the city and a huge amount of money on that. It can be done with the help of Data Science in a smart way. And I believe, that the results are pretty good and trustworthy. Also, this research will be useful for people that want to discover some new country and want to select appropriate city for their wishes.