

Capstone Introduction/Business Problem:

Washington DC, is one of the most well-known cities in the world. Not just because it is the Country capital of The United States but also due to it being a very touristic location with a wide variety of attractions. There are numerous government buildings, historic monuments, museums, parks and also the national zoo with the panda bears. Smithsonian museums are some of the most well know museums around.

Suppose a person is on a visit to Washington DC and would like to visit some of the major attractions, with the person's interest mainly in the field of arts/science and science museums in particular. All these attractions require considerable time for exploration. This capstone project aims at exploring the various attractions within the arts/science field, and selecting a few of the top-rated museums for visit recommendation based on user rating. Food places are also recommended based on user ratings as well.

Capstone Data from Foursquare API:

Foursquare API is used to explore the area and also obtain the venues belonging to field of arts. Exploratory analysis is done to obtain the number of attractions in each category in the field of arts. This will be depicted by a suitable chart. The top 4 science museums based on user rating would be marked on the map using the folium library. Initial co-ordinates of the person would be the Union Station, Washington DC. Only 4 museums are chosen due to the fact that it could be done in one day. (Personally, I have spent an entire day just at the National Air and Space Museum, and for me it would take a lot more time to explore other museums)

Foursquare API data is also used to discover restaurants/food trucks near the venues of interest. And finally, one restaurant is suggested for a good end of day dinner, considering user ratings. For food place recommendation, the average location of the person, depending on the location of the 4 recommended museums will be used.

Any venues, be it a tourist attraction or food place, is excluded if no user rating is returned by Foursquare API.

Data Set:

1. Foursquare API with search/explore options and using "arts" in the section option is used to obtain the venues and categories related to the field of art
<https://api.foursquare.com/v2/venues/explore?>
2. Exploratory analysis is done in form of [Horizontal bar charts](#) for the categories found in the field of art
3. Locations of the venues (related to both museums and food places) and person is mapped using Geolocator package and Folium maps.
4. Foursquare API with venue IDs are used to obtain venue user ratings and for recommendations.
https://api.foursquare.com/v2/venues/venue_ID

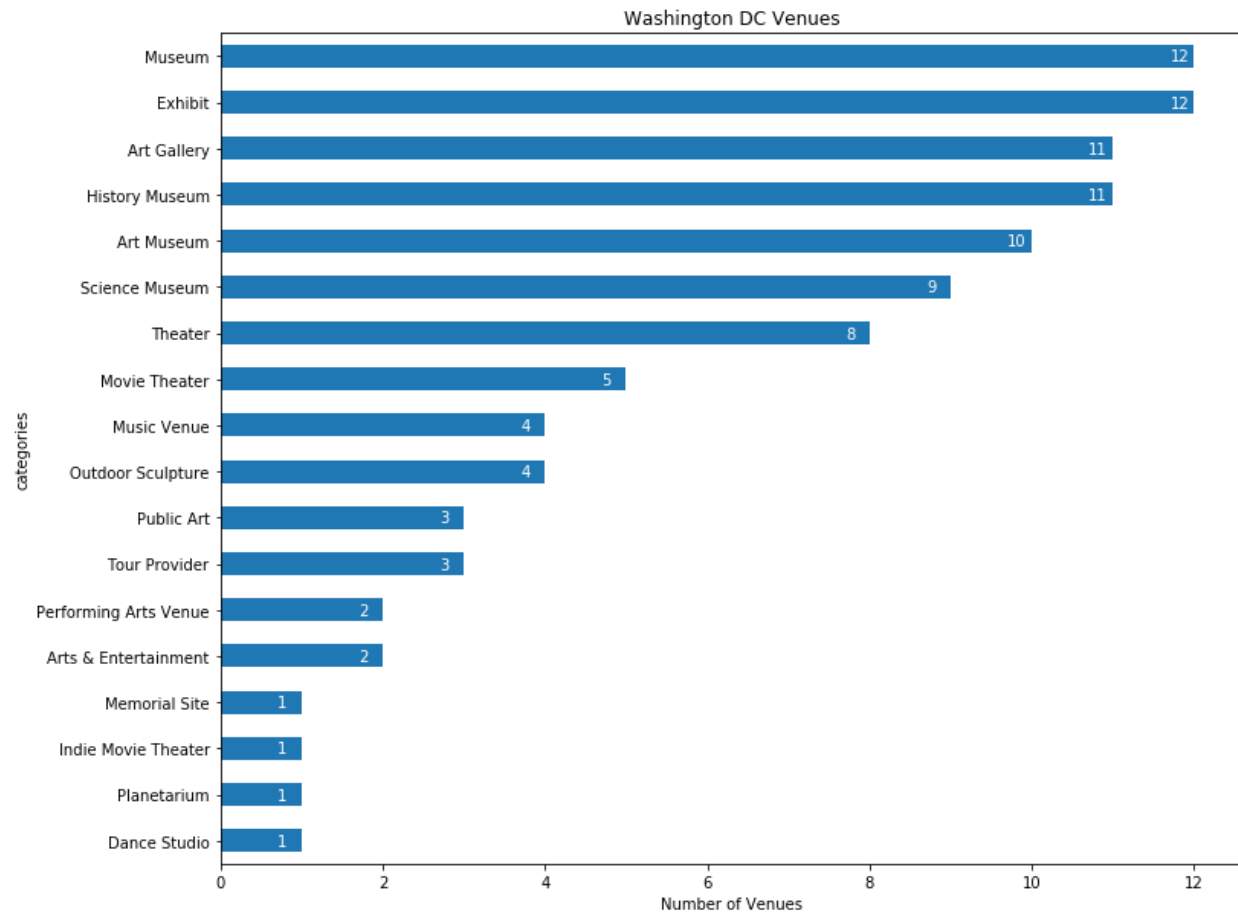
Methodology:

To begin with, some web scrapping was done to obtain some info about Washington DC and to visualize what words describe the city. A word cloud was created after scraping text from a website, which provided the following word cloud



The next step was to find the information related to museums centered around the person's location. The initial location of the person is chosen to be Union Station, Washington DC. This is chosen assuming a person arrives there, well, by train or a metro. And from there any other location can be reached easily.

Considering Union Station as the center point, using Foursquare API, a search is made to find venues related to the field of art (science museums are also included in the same field), within a radius of 2000m and limiting to a total of 100 venues. The search gives us venues in 18 different categories in the field of art. A horizontal bar chart is plotted to give an indication of the various categories and the venues in each category.



From the chart, we observe that there is a total of 42 museums, among which 9 museums are classified as Science museums. Since the venues of interest are science museums, let's take a closer look into these venues.

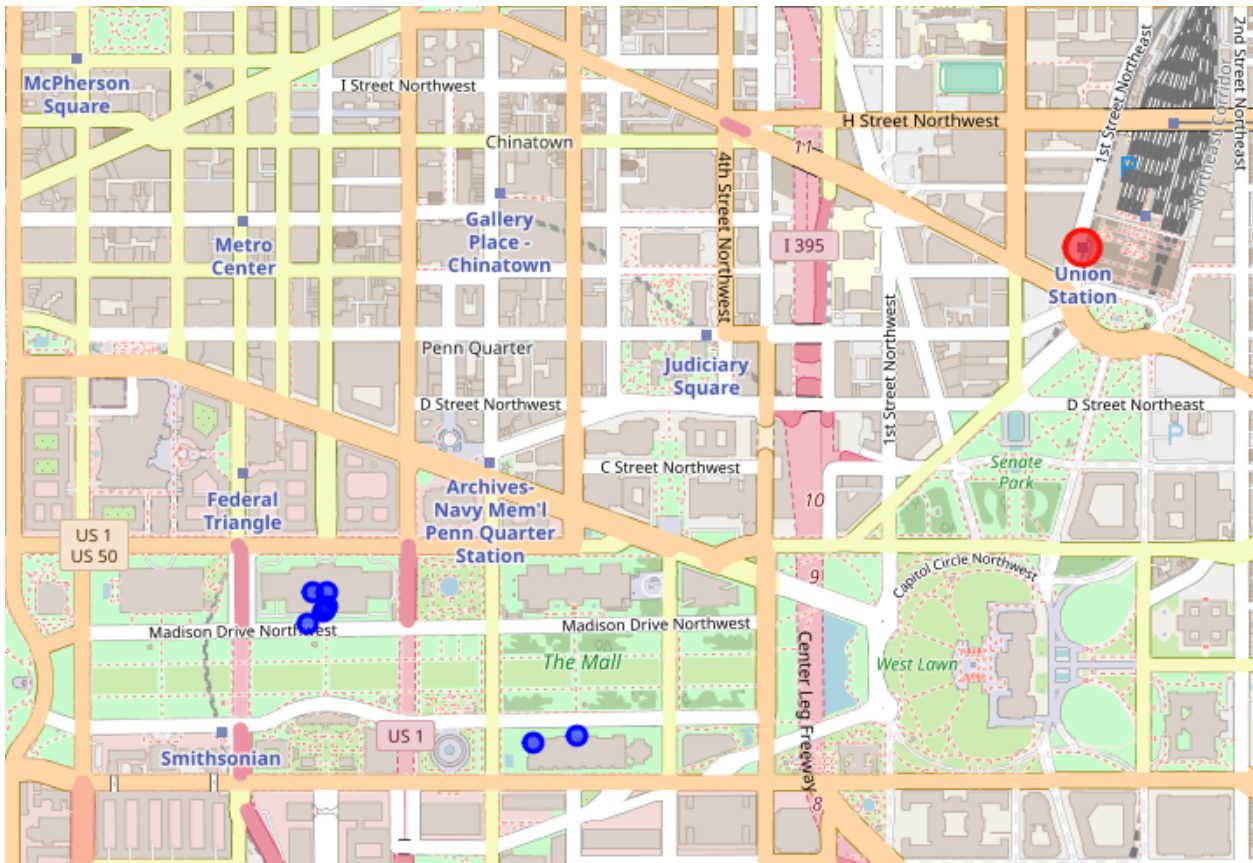
The science venues are as in the table:

name	address	crossStreet	lat	lng	distance	postalCode	cc	city	state	country	formattedAddress
National Air and Space Museum	655 Jefferson Drive SW	NaN	38.888444	-77.019846	1495	20560	US	Washington	D.C.	United States	[655 Jefferson Drive SW, Washington, D.C. 2056...
Smithsonian National Museum of Natural History...	1000 Constitution Ave NW	at 10th St NW	38.891204	-77.025982	1766	20560	US	Washington	D.C.	United States	[1000 Constitution Ave NW (at 10th St NW), Was...
Dinosaurs/Hall of Paleobiology Exhibit	Lenfant Plz SW	at National Museum of Natural History	38.891190	-77.026325	1794	20560	US	Washington	D.C.	United States	[Lenfant Plz SW (at National Museum of Natural...
Butterflies and Plants - Partners in Evolution	Lenfant Plz SW	at National Museum of Natural History	38.890594	-77.026433	1830	20560	US	Washington	D.C.	United States	[Lenfant Plz SW (at National Museum of Natural...
Flight Simulator	NaN	NaN	38.888316	-77.020904	1572	20001	US	Washington	D.C.	United States	[Washington, D.C. 20001, United States]
National Gem Collection	NaN	NaN	38.890926	-77.025955	1777	20001	US	Washington	D.C.	United States	[Washington, D.C. 20001, United States]
Kenneth E. Behring Family Rotunda - Smithsonian...	Lenfant Plz SW	at 10th Street NW	38.890788	-77.025971	1785	20560	US	Washington	D.C.	United States	[Lenfant Plz SW (at 10th Street NW), Washingto...
The Kenneth E. Behring Family Hall of Mammals	Lenfant Plz SW	at National Museum of Natural History	38.890824	-77.026049	1789	20560	US	Washington	D.C.	United States	[Lenfant Plz SW (at National Museum of Natural...
Giant Leatherback Turtle	Natural History Museum	NaN	38.890873	-77.026024	1785	NaN	US	Washington	D.C.	United States	[Natural History Museum, Washington, D.C., Uni...

Using Foursquare API, user rating is obtained for each science museum venue. The science museums according to user ratings are as below:

name	rating
Smithsonian National Museum of Natural History...	9.2
National Air and Space Museum	9.1
Dinosaurs/Hall of Paleobiology Exhibit	8.2
Butterflies and Plants - Partners in Evolution	8.2
Flight Simulator	7.3
National Gem Collection	7.3
Kenneth E. Behring Family Rotunda - Smithsonian...	6.9
The Kenneth E. Behring Family Hall of Mammals	6.7
Giant Leatherback Turtle	0.0

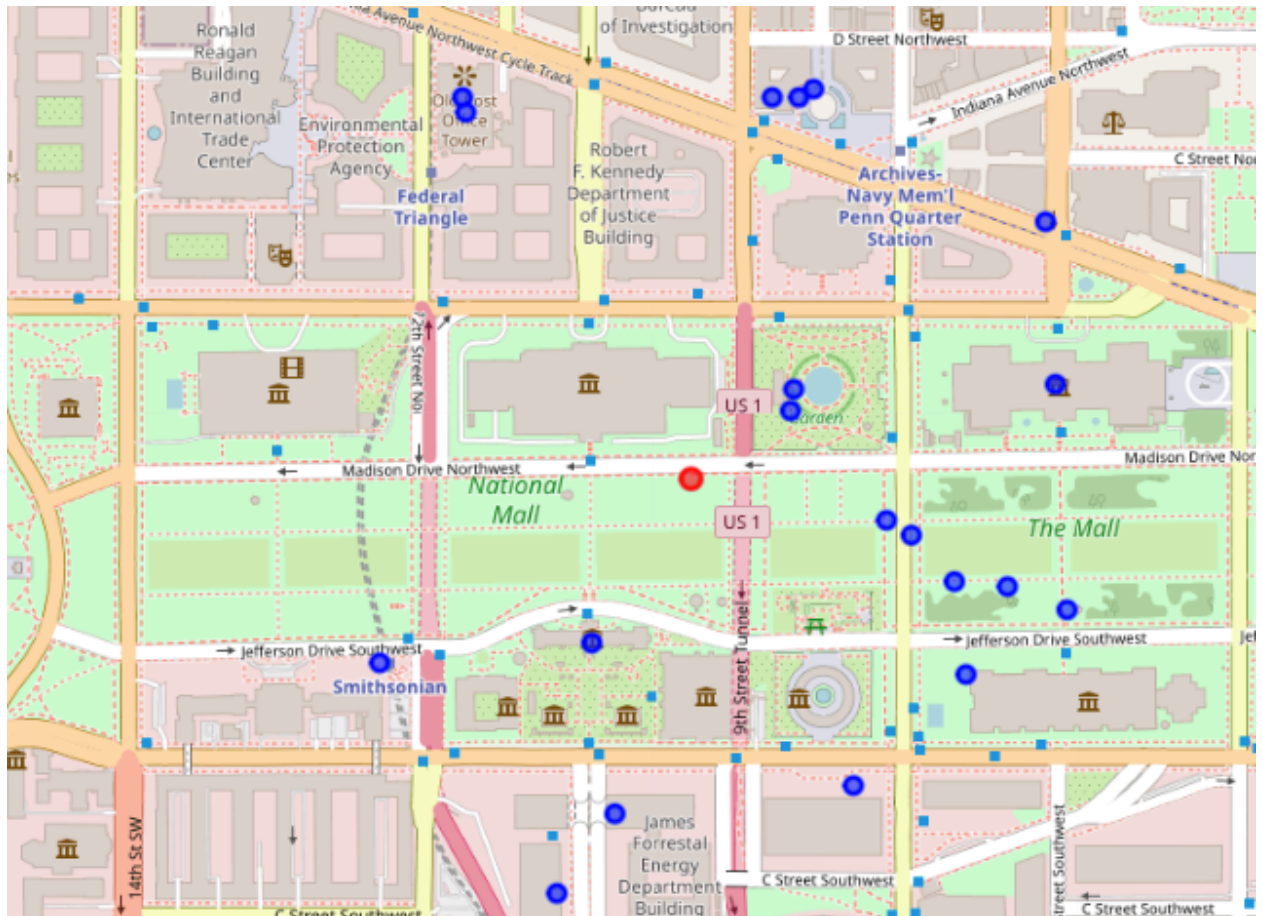
The locations of the museums are shown using Folium:



Using the average co-ordinates of the science museums as the location of the person once the visits have begun, Foursquare API is again used to get the food venues that are available around the area. With the person's location as the center, food venues within a radius of 250m are searched for using the Foursquare API. Some food venues are as follows

name	address	lat	lng	distance	postalCode	cc	neighborhood	city	state	country	formattedAddress
The Capital Grille	601 Pennsylvania Ave NW	38.892957	-77.020067	491	20004	US	Penn Quarter	Washington	D.C.	United States	[601 Pennsylvania Ave NW, Washington, D.C. 200...
Food Truck Land	NaN	38.887267	-77.022557	388	NaN	US	NaN	NaN	Washington, D.C.	United States	[Washington, D.C., United States]
BLT Prime by David Burke	1100 Pennsylvania Avenue NW	38.894213	-77.027607	499	20004	US	NaN	Washington	D.C.	United States	[1100 Pennsylvania Avenue NW, Washington, D.C....
CHOPT	801 Pennsylvania Ave NW	38.894207	-77.023256	445	20004	US	NaN	Washington	D.C.	United States	[801 Pennsylvania Ave NW (at 9th St NW), Washi...
b DC Penn Quarter	801 Pennsylvania Ave NW	38.894287	-77.023065	458	20004	US	Penn Quarter	Washington	D.C.	United States	[801 Pennsylvania Ave NW (at 8th St NW), Washi...

The locations of the food venues are mapped using folium

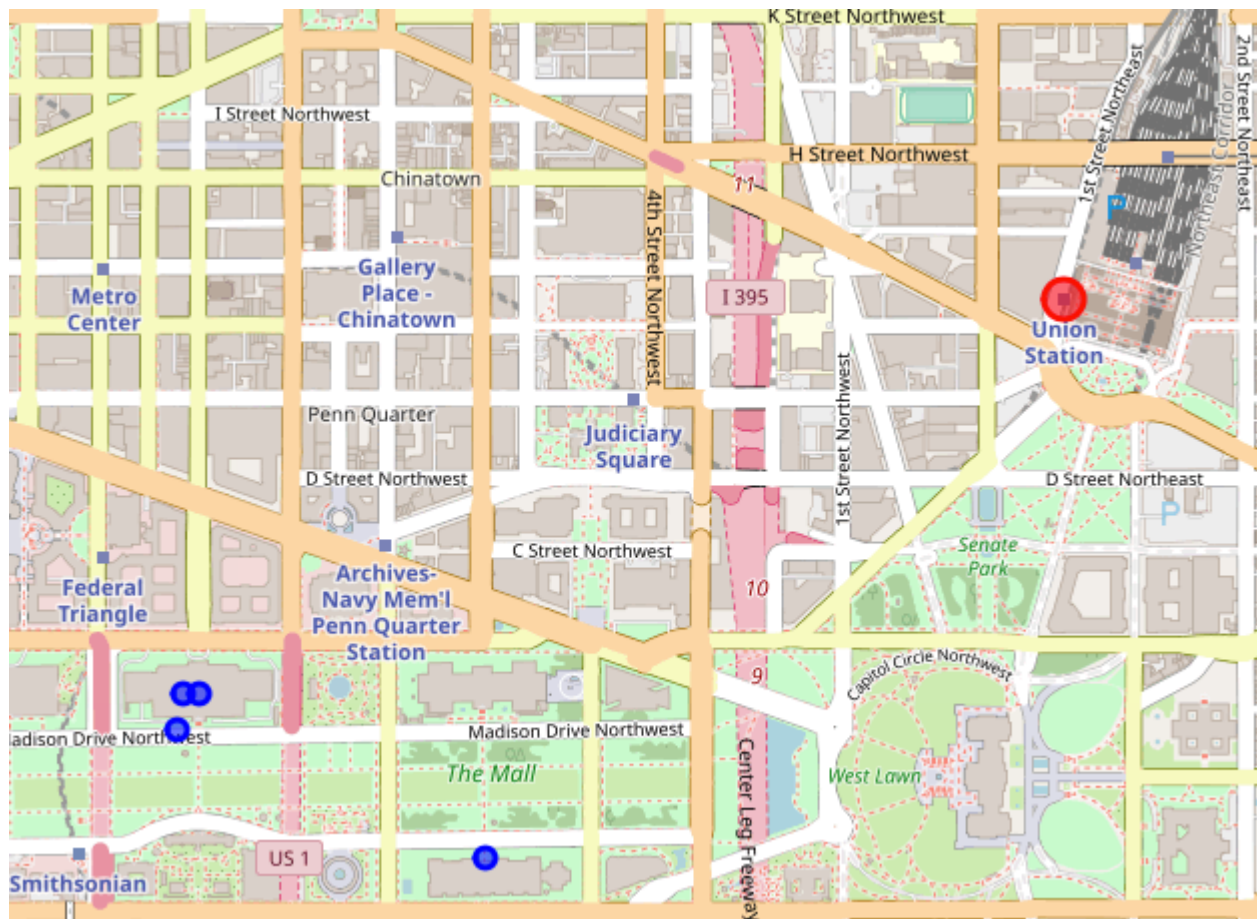


Results and Discussions:

From the obtained data and information about the science museums, there are a total of 9 science museums and the top 4 science museums by user ratings are

name	rating
Smithsonian National Museum of Natural History...	9.2
National Air and Space Museum	9.1
Dinosaurs/Hall of Paleobiology Exhibit	8.2
Butterflies and Plants - Partners in Evolution	8.2

The location of the top 4 museums are as shown



And for lunch/dinner, there are many choices of food venues available. Some are food trucks which are fast for a quick bite, not to interrupt the main agenda, or restaurants are also available for a laid-back meal. The top food venue according to user rating is found to be The Capital Grille, with a rating of 8.8



Recommendations:

For a person on a visit to DC, interested in science museums, it would be a good recommendation to visit the top 4 museums to begin with. These are the Museum of National History, National Air & Space Museum, Dinosaurs Exhibit and the museum of butterflies and plants. These are but just a beginning to many other amazing venues/museums to explore.

And during these visits, to refuel, there are many food trucks around the area and also numerous restaurants in and around the museums. The top-rated food place is The Capital Grille which is roughly within 250m of the museums. So, after a long and tiring day of museums, it would be nice to have a leisurely dinner before calling it a night or heading out into other parts of DC to explore the fantastic night life the city has to offer.

Conclusions:

This report gives an insight into the top 4 science museums in Washington DC and some food venues around the same area. The reason for choosing only 4 venues is that it does take a lot of time to explore these venues in details and even just 4 in a day may seem a tedious task. Of course, given the magnanimity of DC and the attractions it has to offer, this is a very small report. But the various options available in each field of interest, and the categories they offer in itself can be a good topic of analysis. Hopefully this report has given some introduction and insight into the world of museums available in DC, and in the next visit maybe one can look at the city with a different perspective.