Text-Based Tourism Recommendation System

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Problem Statement

- For exploring downtown Victoria: the user writes a brief paragraph describing what they like to do when visiting a place and what they are looking for in a tourist attraction
- Using text analysis, the model compares the user input to reviews of attractions in the area and returns 5 attractions that the user is likely to enjoy
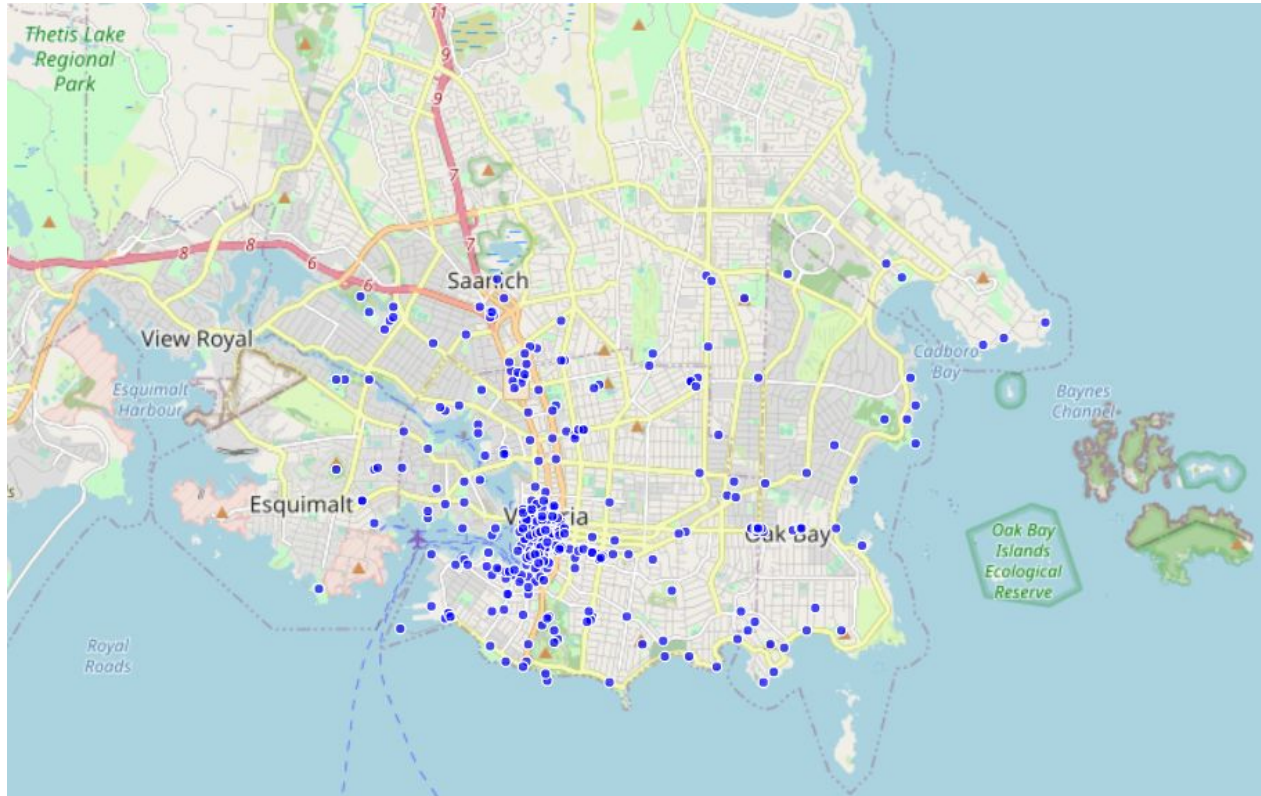
Dataset

- Google prevents web scraping by using measures such as bouncing calls from the same IP address that are less than 2 seconds apart
- Wrote a scraper to circumvent these measures
- Selected necessary fields from Google Places API
- location_searches = ["things to do", "tourist attractions", "scenic view points", "historical sites", "beaches", "clothing stores", "restaurants", "breakfast", "lunch", "dinner", "rentals", "biking"]
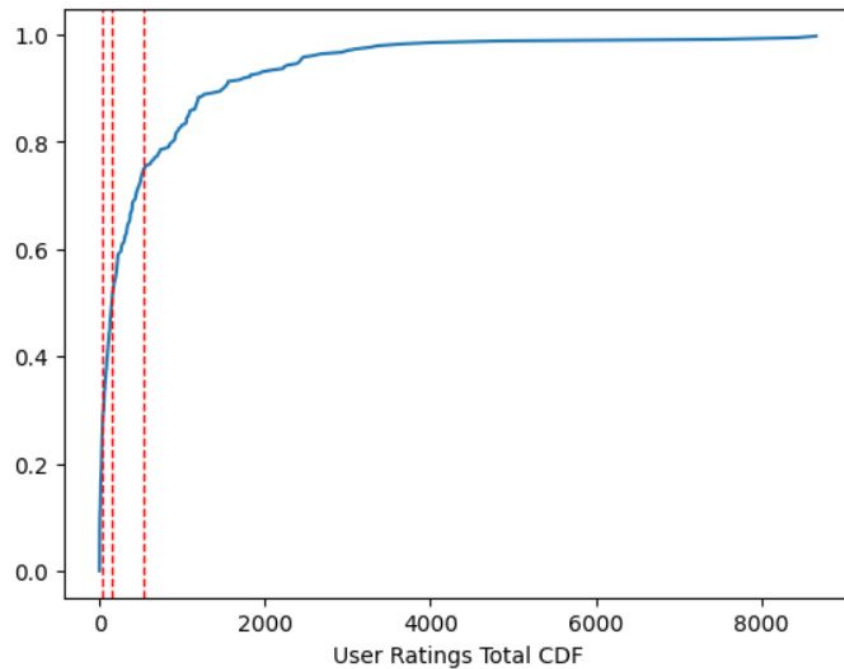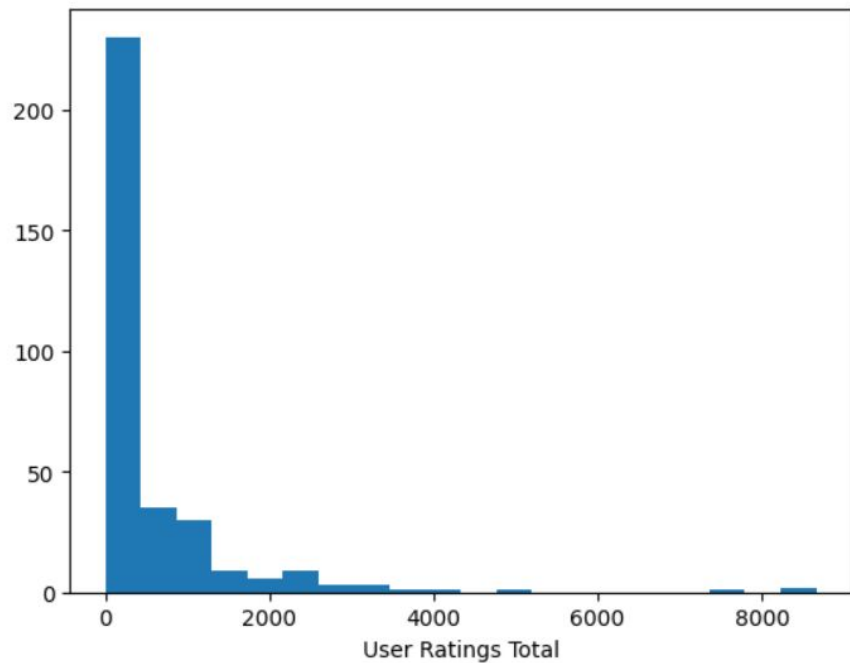
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df.head()
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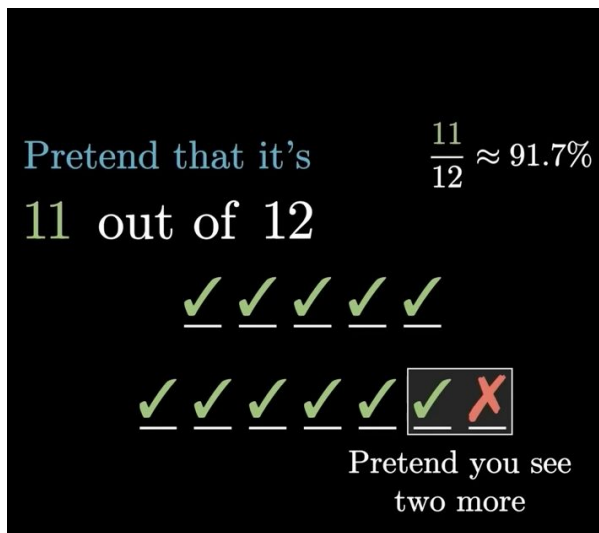|	place_id	name	avg_rating	lat	lng	user_ratings_total	reviews
0	ChIJ1e5UJJF0j1QR6VpPNf8TYiQ	Royal BC Museum	4.6	48.419811	-123.367450	8661	Great museum has very nice and extensive exhib...
1	ChIJmXc0Z6J0j1QR4CJUS73dyZk	Fisherman's Wharf Park	4.5	48.421950	-123.383014	7523	A popular tourist attraction on the Victoria w...
2	ChIJueKTCmtzj1QRxJZTfhNWIsY	Esquimalt Gorge Park & Pavilion	4.7	48.446345	-123.404949	1078	This park is so lovely! City staff do a great ...
3	ChIJ5ZScPpF0j1QRBLCY8tTvWsM	Thunderbird Park	4.3	48.419794	-123.366680	203	Like the totems and of course worth visiting t...
4	ChIJS9YYcJB0j1QRPWHIFtwTr18	Victoria Bug Zoo	4.5	48.423300	-123.366668	1822	My daughter and I had a fantastic time at the ...

Data Visualization

Data Analysis

Feature Engineering Using a Bayesian Approach

Pretend that it's

$$\frac{11}{12} \approx 91.7\%$$

11 out of 12

✓ ✓ ✓ ✓ ✓

✓ ✓ ✓ ✓ ✓ ✓ ✗

Pretend you see two more

- Problem: Consider comparing the ratings of two locations. Location A has 94% positive out of 85 193 reviews. Location B has 98% positive out of 20 785 reviews. *Which location do you have a higher chance of enjoying?*
- Solution: Pretend that there are two more reviews, one positive and one negative, for each location. The resulting ratio is your probability of having a good experience at the location.
- Using this information, we can create a scaling feature for each location which takes into account the average rating as well as the number of ratings.
- "Probability of Enjoyment"

Building the Recommendation Model

- Given user input, convert the raw text into a vector of TF-IDF features
- Compute the cosine similarity between the user input and each location's TF-IDF vector
- Multiply the cosine similarities by the "Probability of Enjoyment" scaling feature
- Print 5 most promising locations

	00	10	100	1000	10pm	10th	11	1130pm	11am	11pm	...	zambri	zambris	zara	zero	zesty	zip	zipline	zone	zoo	zoom
0	0.068927	0.0	0.0	0.0	0.095589	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.000000	0.0
1	0.000000	0.0	0.0	0.0	0.000000	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.000000	0.0
2	0.000000	0.0	0.0	0.0	0.000000	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.000000	0.0
3	0.000000	0.0	0.0	0.0	0.000000	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.000000	0.0
4	0.000000	0.0	0.0	0.0	0.000000	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.336469	0.0

TD-IDF feature matrix for database reviews

Main Results

user_input = "I love going to a beach or a park for a walk at sunset, ideally at a place with great views. I also enjoy live music or any kind of theatre where there is a performance happening. I also love to go to museums and learn about the history of the place I'm visiting. My favourite food is Italian and I love eating anywhere with a great staff and professional service."

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Highrock Cairn Park
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Great place to take your dog to run around in a safe environment! Fantastic view of Victoria.
Natural beauty fun little walk with beautiful views for sunset! Great views and a nice place to
see a sunset once and a while. Good little journey to downtown but worth the views .
Favourite childhood park. Great place to walk your dog or hang out and read a book. Has
a great view of Victoria and Esquimalt from the summit

II Terrazzo
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We went there for my birthday. The atmosphere is fantastic. Great restaurant and outstanding service. We
love the mussels, and it's juicy and fresh. Just a little bit disappointed about the lamb we
ordered. The lamb quality is excellent, but the style of the dishes is not our type. Really
enjoyed the food and the service. The portions were generous. Definitely a must go if you are
in Victoria Incredible Italian food with large portions and super friendly staff. Really fun atmosphere
inside as well. Easily the best meal we had during our trip to Victoria. Easily the best
and most authentic Italian cuisine on the island. Fantastic menu, fabulous service, and a truly incredible
wine selection. I recommend this restaurant to anyone visiting Victoria. We have been many times and
always have a great experience alongside friendly and attentive service It's a great restaurant. It's
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Main Results

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Macaulay Point Park
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You absolutely can't loose visiting. Nice ocean views and history of Canada's defences. With old military
ramparts and even a tunnel for old and young too explore. This park is well worth the
visit. We'll groomed trails walk you through a historic military site with interpretive information and
great views or Victoria and towards the Olympic Mountains. This is a high calibre (no pun
intended) park with free parking and no entry fee. It's dog friendly… a real local gem. A
nice place for a quick walk along the water, some historic sites and a beautiful view of
the mountains! We stayed in an AirBnB right at the entrance of this park and it was
stunning! You can watch the cruise ships come and go, as well as explore the old barracks.
There is wildlife to watch, and very friendly locals walking their dogs. Fabulous park that we
almost missed out on. We were confused by the locked gate and no parking signs every where
near the entrance. Glad we took a chance and parked further down the street. The park had
lots of pathways leading to the water and along the water. This is a great place to walk
your dog and/or enjoy great views of Juan de fuca straight. There are benches along the look
outs and even a picnic area. The park signs say the park is only open from dawn to
dusk however. Overall a really nice park well worth the visit.
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Main Results

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Cadboro-Gyro Park
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Amazing beachfront park with soft sand and a great playground. Perfect for a picnic with several tables. An ideal place for families with kids. The playground has swings for little kids and big kids, a few climbable sea monsters and sea creatures, and a great pirate ship with a plank! Most importantly, there is a washroom right next to the play area with water bottle refill station and rinse-off station for sandy little toes. Our son loved this park and so did we! One of the best playgrounds I've been to! Octopus slides, whale and sea serpent climbing structures, and many more ocean-themed original creations. The beach itself is sandy and clean. What a beautiful park! Beautiful park and beach. It has everything that a family can enjoy. I can spend a whole day in that park. Love that they also have zipline. Our favourite beach and park to visit when in Victoria. While busy at times, the beach has a tranquil vibe. Great for kids and for chill get-togethers with friends and family. Cadboro Gyro Park is a great place to visit in Victoria, British Columbia. It has a beautiful beach with soft sand and a section for dogs and another section for kids to play without dogs. The playground is really fun and boasts a kiddie zip line. There are also picnic tables and a large grassy area with washrooms. It's a great family park at the beach with free parking lot

Main Results

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Royal BC Museum
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Great museum has very nice and extensive exhibits. I went there when they had the wildlife photo-
journalism exhibit which was a interesting one. It wasn't busy whatsoever but I did go on a
rainy Sunday around 3:00. Would definitely recommend going. It also seems like there was a third
floor exhibit but for some reason it's closed and I don't know why. Maybe it will be
open sometime in the future. The Grand Dame of Museums in Victoria, BC. In the heart of
the city; next to the Iconic Empress Hotel and across from the Famed Victoria Harbour. The
displays in the different themed exhibits are awesome! The extensive information and detail in the
displays is fabulous. Plan on spending a minimum of three hours; more, if your a history buff!
This is one of the best museums we have visited. It has natural history, art, First People
cultural history, and an interactive town/ship/ mine from British colonial history. Really great. Two weeks
ago, that section was closed for remodel. I'm hoping it is still as awesome as ever when
it reopens. Great place to visit and learn about the ice age and stuff. They even had a
showing of covid portraits which was cool. Likes: it was cheap. $5 per person and it was
absolutely worth it. Lots to see and learn. Dislikes: Nothing I can think of Must visit!! But
set aside at least 3 hours for this place. On Saturdays(Summers I think) they are open until
10pm, which worked in our favour.There is so much information to absorb in limited time. During
our visit - The first floor was dedicated for First Nations, Second floor of Animal evolution,
Third floor was set aside for Stu the dinosaur (T-Rex fossil discovered in Canada) and the
related discoveries. We also had the opportunity to visit -The Angkor wat display- which was excellent,
but many of the idols were missing parts while on exhibition :(. The museum is well-maintained,
clean, wheelchair accessible and has very friendly staff.
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Key Insights

- Model does not understand negative sentiment in user input
  - For example, if a user says that they don't like a certain activity the model will recommend that activity
- The model is using single words as tokens and is unable to gain insight from input such as "rock music". They might get recommended Mariachi *music* and *rock* climbing.