Venues Data and Reachability Analysis of Waterfalls in Sri Lanka

By

T.M.Chandima Bandara Tennakoon

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1.Introduction :

1.1.Background

As you all know Sri Lanka is a well-known country for natural scenery and beauty. It is called "The pearl of the Indian Ocean" and "Wonder of Asia" because of its beauty for a long time up to now. Sri Lanka is a country which has a great history and historic venues and places all over the country. Also, It is well reputed for great quality tastes such as tea, cinnamon, cardamom and many spices and food all over the world. So fascinating natural wonders, great historic venues, delicious food and beverages, a wide range of wildlife and treasures and its location on the silk road make Sri Lanka as an ideal place to visit, travel or business for a well known time. So tourism is one of the major incomes of Sri Lanka and many travellers all over the world love to visit Sri Lanka very well.

When It's comes to favourite places of the travellers, waterfalls are a certain destination of that list. Sri Lanka consists of more than 100 waterfalls all over the central hills. Most of the travellers prefer to watch, bathe and swim, spend time near a waterfall in one or many of the above waterfalls without a second thought.

1.2.Problem and Solutions

Colombo is the business capital of Sri Lanka and most tourists start their travel from there. Not only the tourists, Tour guides, travelling agencies start their job from Colombo.So what if they need to visit a waterfall nearby or far away in a lonely hill? Yes, This project is made to answer that question. More than 30 famous waterfalls with a great tourist attraction have been analyzed in this project for that. Waterfall lovers can explore the waterfalls with distance to plan their journey. Also if there is a traveller who likes to visit a waterfall with good nearby facilities or a traveller who like to enjoy food or watch more nature sceneries near a waterfall will be definitely benefited from this project. All the waterfall locations were analyzed and provided with nearby venues for the users to select their preferred location using Foursquare Data.

1.3.Benefited people

Travellers can plan their trip with the distance or with the taste they like to feel by referring to this analysis. Also Tour guides, Travel Agencies have a chance to take their travellers to the place they prefer by referring to this project. If a businessman wants to start a business near a waterfall, such as a hotel or a cafe, he can refer to this project to select the optimum place based on distance and venues. Finally, all the travellers inside Sri Lanka can make this project as a good referring point to their travels

2.Data Description.

I have referred many sources to collect data to this project.

❖ According to my research, there was not any data set about waterfalls in Sri Lanka to access directly. So I created a reliable and accurate dataset by doing some research.
❖ Wikipedia and some local tour guide sites with good ratings provided me with the list of the waterfalls in SriLanka.https:Amazinglanka.com was one of those local tour guiding sites.[1],[2]
❖ Then I used google maps to find the exact coordinates of the waterfalls. All the waterfalls are checked by that way.[3]
❖ I used Google Maps direction feature to get the distance from Colombo Central to the waterfall. I have selected the shortest distance to every waterfall from Colombo. It gives the actual paths on roads and distances accurately.
❖ I used the Foursquare API to get the details of the nearby venues. I have used 5km radius as some of the waterfalls are situated in rural locations and it gives some good locations to analyze.

3.Methodology

3.1.Main Dataset

My main dataset was the dataset I created with the data of waterfall name, distance from Colombo and the Location(Latitude and Longitude).

	Name	Distance	Latitude	Logitude
0	Bambarakanda Ella Falls	165	6.773591	80.831241
1	Kalugala Gerandi Ella Waterfall Cluster	181	7.042377	80.682780
2	Kurundu Oya Ella Falls (Maturata Ella Falls)	182	7.080446	80.850209
3	Diyaluma Ella Falls	189	6.733192	81.031401
4	Mapalana Ella Falls	111	6.774521	80.461450

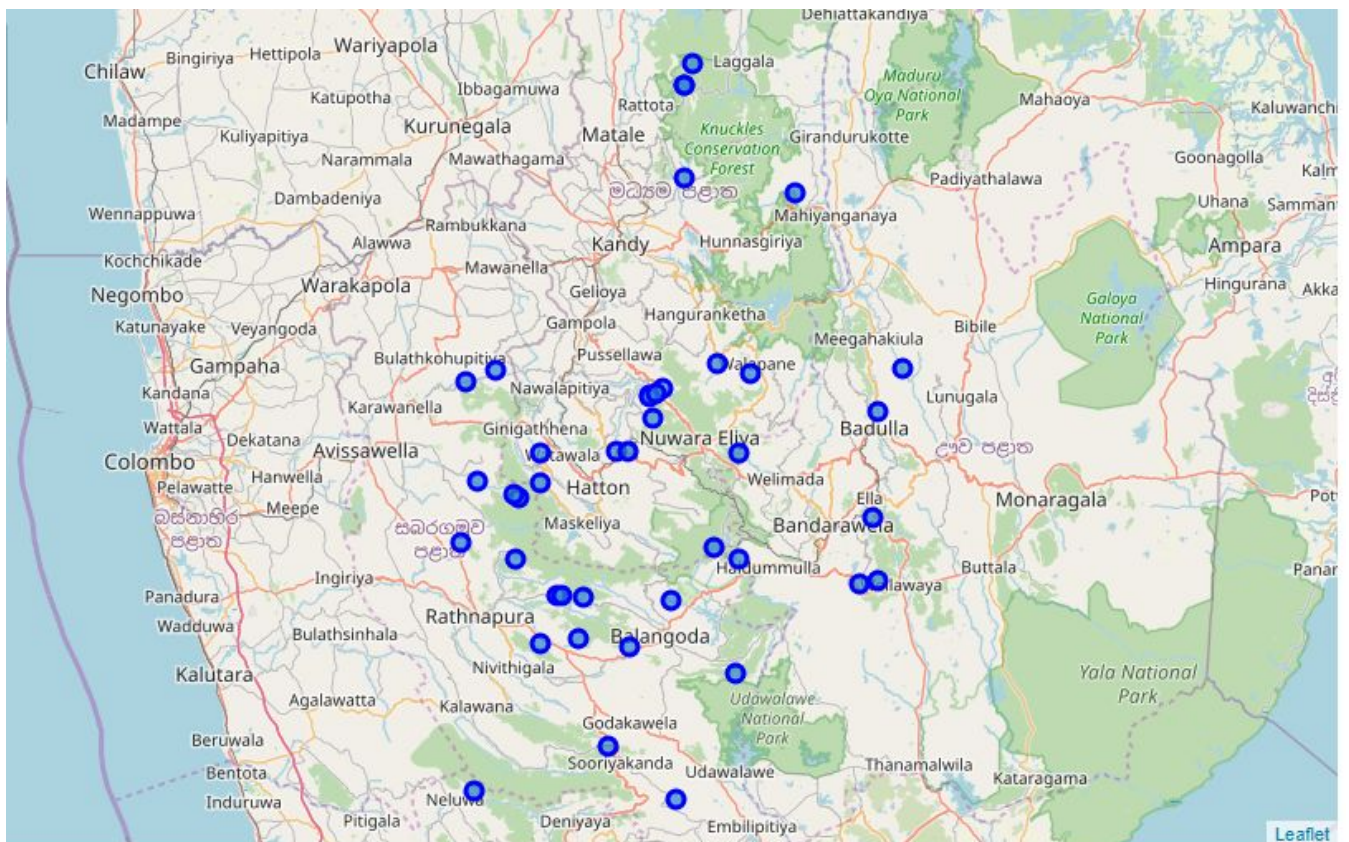Based on the distance I have created five ranges to classify the data. The distance was divided in as follows.

Distance Range(km)	Distance Category
0-100	Very close
100-150	Close
150-200	Average
200-250	Far
250-300	Very Far

Distance Categories for each waterfall have been added as a new column to the dataset. It was referred to as the main dataset.

	Name	Distance	Travellable	Latitude	Logitude
0	Bambarakanda Ella Falls	165	Average	6.773591	80.831241
1	Kalugala Gerandi Ella Waterfall Cluster	181	Average	7.042377	80.682780
2	Kurundu Oya Ella Falls (Maturata Ella Falls)	182	Average	7.080446	80.850209
3	Diyaluma Ella Falls	189	Average	6.733192	81.031401
4	Mapalana Ella Falls	111	Close	6.774521	80.461450

3.2.Geographical Location and Map plotting

Geopy library and Folium library were used to get the geographical coordinates of Sri Lanka and plot the map with the locations of the waterfalls. I have got the location data of Sri Lanka as I analyzed the waterfalls spread in the whole country. Folium has marked the exact locations on the map correctly.

3.3 Foursquare API

Foursquare API connection was established by the credentials of my foursquare account. All the venues around 5 km radius of the location were gathered by defining a function to collect the data and calling it.5 km Radius was chosen because of the rural location of some areas where there isn't any nearby venues for shorter distances.

Waterfalls were grouped by the number of venues and Foursquare data for the second data frame of the analysis.

Name	Name Latitude	Name Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
Aberdeen Falls	6	6	6	6	6	6
Alakola Ella Falls	4	4	4	4	4	4
Bakers Falls	4	4	4	4	4	4
Bambarakanda Ella Falls	4	4	4	4	4	4
Bomburu Ella Falls	9	9	9	9	9	9
Bopath Ella Falls	6	6	6	6	6	6
Dehena Ella Falls (Gaslabu Ella)	3	3	3	3	3	3
Demali Ella Falls	5	5	5	5	5	5
Devon Falls	9	9	9	9	9	9

Foursquare has given 48 unique categories and afterwards, each waterfall was analysed for the given categories.

	Name	American Restaurant	Asian Restaurant	Bakery	Bar	Bed & Breakfast	Botanical Garden	Bridge	Buffet	Bus Station	Cafeteria	Café	Campground
0	Bambarakanda Ella Falls	0	0	0	0	0	0	0	0	0	0	0	0
1	Bambarakanda Ella Falls	0	0	0	0	0	0	0	0	0	0	0	0
2	Bambarakanda Ella Falls	0	0	0	0	0	0	0	0	1	0	0	0
3	Bambarakanda Ella Falls	0	0	0	0	0	0	0	0	0	0	0	0
4	Kalugala Gerandi Ella Waterfall Cluster	0	0	0	0	0	0	0	0	0	0	0	0

Mean of the number of venue category occurrences for each waterfall was calculated and the data frame was redefined by that.

	Name	American Restaurant	Asian Restaurant	Bakery	Bar	Bed & Breakfast	Botanical Garden	Bridge	Buffet	Bus Station	Cafeteria
0	Aberdeen Falls	0.000000	0.000000	0.000000	0.00000	0.000000	0.000000	0.00000	0.0	0.166667	0.000000
1	Alakola Ella Falls	0.000000	0.000000	0.250000	0.00000	0.000000	0.000000	0.00000	0.0	0.250000	0.000000
2	Bakers Falls	0.000000	0.000000	0.000000	0.00000	0.000000	0.000000	0.00000	0.0	0.000000	0.000000
3	Bambarakanda Ella Falls	0.000000	0.000000	0.000000	0.00000	0.000000	0.000000	0.00000	0.0	0.250000	0.000000
4	Bomburu Ella Falls	0.000000	0.000000	0.000000	0.00000	0.000000	0.111111	0.00000	0.0	0.000000	0.000000
5	Bopath Ella Falls	0.000000	0.166667	0.000000	0.00000	0.000000	0.000000	0.00000	0.0	0.166667	0.000000

The venues categories were filtered out to show only the top 10 categories of the meaned values for waterfalls.

	Name	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	Aberdeen Falls	Train Station	Sri Lankan Restaurant	Bus Station	Convenience Store	River	Waterfall	Campground	Hotel	Historic Site	Grocery Store
1	Alakola Ella Falls	Bakery	Other Great Outdoors	Bus Station	Resort	Waterfall	Diner	Hotel Bar	Hotel	Historic Site	Grocery Store
2	Bakers Falls	Scenic Lookout	Motel	Mountain	Waterfall	Hotel	Historic Site	Grocery Store	Food	Fast Food Restaurant	Farm
3	Bambarakanda Ella Falls	Scenic Lookout	Mountain	Bus Station	Waterfall	Hotel Bar	Hotel	Historic Site	Grocery Store	Food	Fast Food Restaurant
4	Bomburu Ella Falls	Hotel	Restaurant	Hotel Bar	Trail	Botanical Garden	Fast Food Restaurant	Waterfall	Convenience Store	Historic Site	Grocery Store

3.4 Clustering

Some common venues are occurred by categorizing. In this reason, unsupervised learning K-means algorithm was used to cluster the waterfalls as it is one of the most common cluster methods of unsupervised learning. I have run K-mean to get three clusters for the best results. Then the two tables were merged and below is the merged tables with clusters.

	Name	Distance	Travellable	Latitude	Logitude	Cluster Labels	Cluster Name	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
0	Bambarakanda Ella Falls	165	Average	6.773591	80.831241	1	Nature Lover	Scenic Lookout	Mountain	Bus Station	Waterfall	Hotel Bar
1	Kalugala Gerandi Ella Waterfall Cluster	181	Average	7.042377	80.682780	0	Comfort Zone Lover	Tea Room	American Restaurant	Bus Station	Hotel	Museum
2	Kurundu Oya Ella Falls (Maturata Ella Falls)	182	Average	7.080446	80.850209	1	Nature Lover	Scenic Lookout	Mountain	Snack Place	Waterfall	Hotel
3	Diyaluma Ella Falls	189	Average	6.733192	81.031401	0	Comfort Zone Lover	Hotel	Campground	Scenic Lookout	Other Great Outdoors	Rock Climbing Spot
4	Mapalana Ella Falls	111	Close	6.774521	80.461450	1	Nature Lover	Mountain	Waterfall	Lake	Hotel Bar	Hotel

I have added another column as Cluster Names to give meaningful insights to the clusters. Three clusters were analyzed and they were named with regarding the similar qualities in them. 0th Cluster represents the qualities for a traveller who loves to have everything in the place they visit. It was named as "Comfort Zone Lover " because it has pretty much every venue nearby.1st cluster has the characteristics of a traveller who loves to enjoy more natural scenarios. It was named as "Nature Lover" .2nd Cluster is for the travellers who love to visit, rest with food and natural scenarios and come back from a short period of time. It was named "Visit and Come".
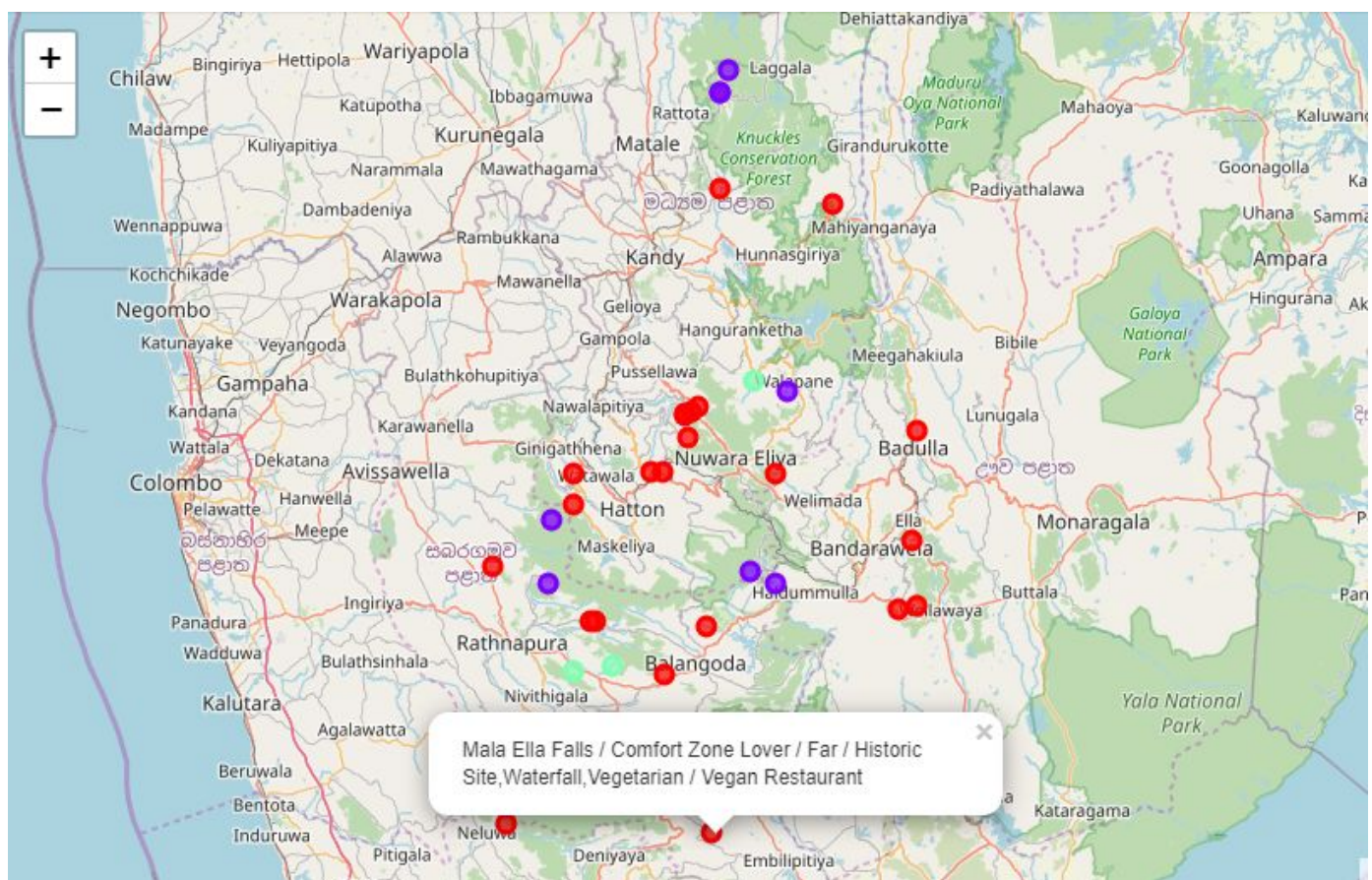
3.5. Visualizing

I have added meaningful insights such as waterfall name, category prefered by the traveller, distance range, and three most common venues nearby. Also, Users can directly visualize the locations by its colour such as red for "Comfort Zone Lover", Purple for "Nature Love" and green for "Visit and come".
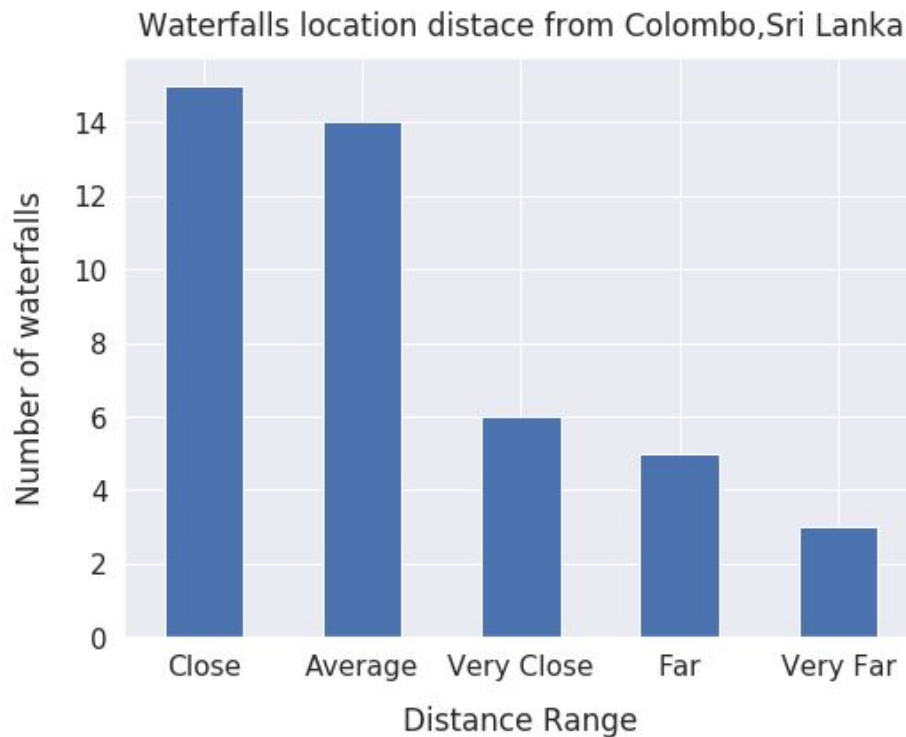
Another thing I have done is visualizing the Distance range of waterfalls with its count of each category. This can be used to get a good idea about what they can achieve from each distance range. I have used the seaborn library to create meaningful insights.

4. Results

After visualising the clusters final results seems like in the below figure.

It implies that most of the travellers can achieve waterfall sightseeing with many options nearby as a "Comfort Zone Lover".Also, Travelers have at about 8 special locations to be alone with nature itself. Only three specific locations have been clustered for "Visit and Come".All the places are distributed with a good variety over the Central Hills.

Waterfalls location distace from Colombo,Sri Lanka

Highest Number of waterfalls are in close range. Second-highest number of waterfalls are in Average range. Also thirdly, the very close range has a good number of waterfalls. So most of the waterfalls are situated in close ranges. Also, some waterfalls are situated far for travellers who love to explore the country.

5.Discussion

Almost any traveller with any mid-set has the preferred waterfall that they are looking forward to visiting in Sri Lanka. Travel guides and agencies can take their customers to a waterfall in a Comfort Zone as it is very safe for them and they can fulfil their client needs easily. So I prefer that category for tour guides. I prefer travellers to visit a waterfall in "Nature Lover Category" to get the most of the scenic beauty of Sri Lanka. Although the "come and Visit " places are low, People who love that category can fulfil their needs from the "Comfort Zone" category as they are pretty much similar.

Most number of waterfalls are in the close category and average category. So it implies that travellers have many waterfalls in Sri Lanka to go and visit in a shorter range from Colombo. Actually they have a pretty good collection for that. They can see the country and reach a very far range waterfall To get the ultimate experience.

6.Conclusion

Sri Lanka is one of the best countries to observe and visit waterfalls. Any type of traveller can find their favourite waterfall location in Sri Lanka. Travellers, Guides can use this project to find their favourite waterfall venue by distance or by their tastes nearby.

7.References

[1] https://en.wikipedia.org/wiki/List_of_waterfalls_of_Sri_Lanka
[2] https://amazinglanka.com/wp/waterfalls-indexed-by-name/
[3] https://www.google.lk/maps