DOG MICROHABITAT & EFFECT OF HUMAN ESTABLISHMENT

LS3204 PROJECT

Group Members

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Question

WHAT WE WANT TO STUDY

Why we see dogs making clusters at some specific places inside such a big campus?

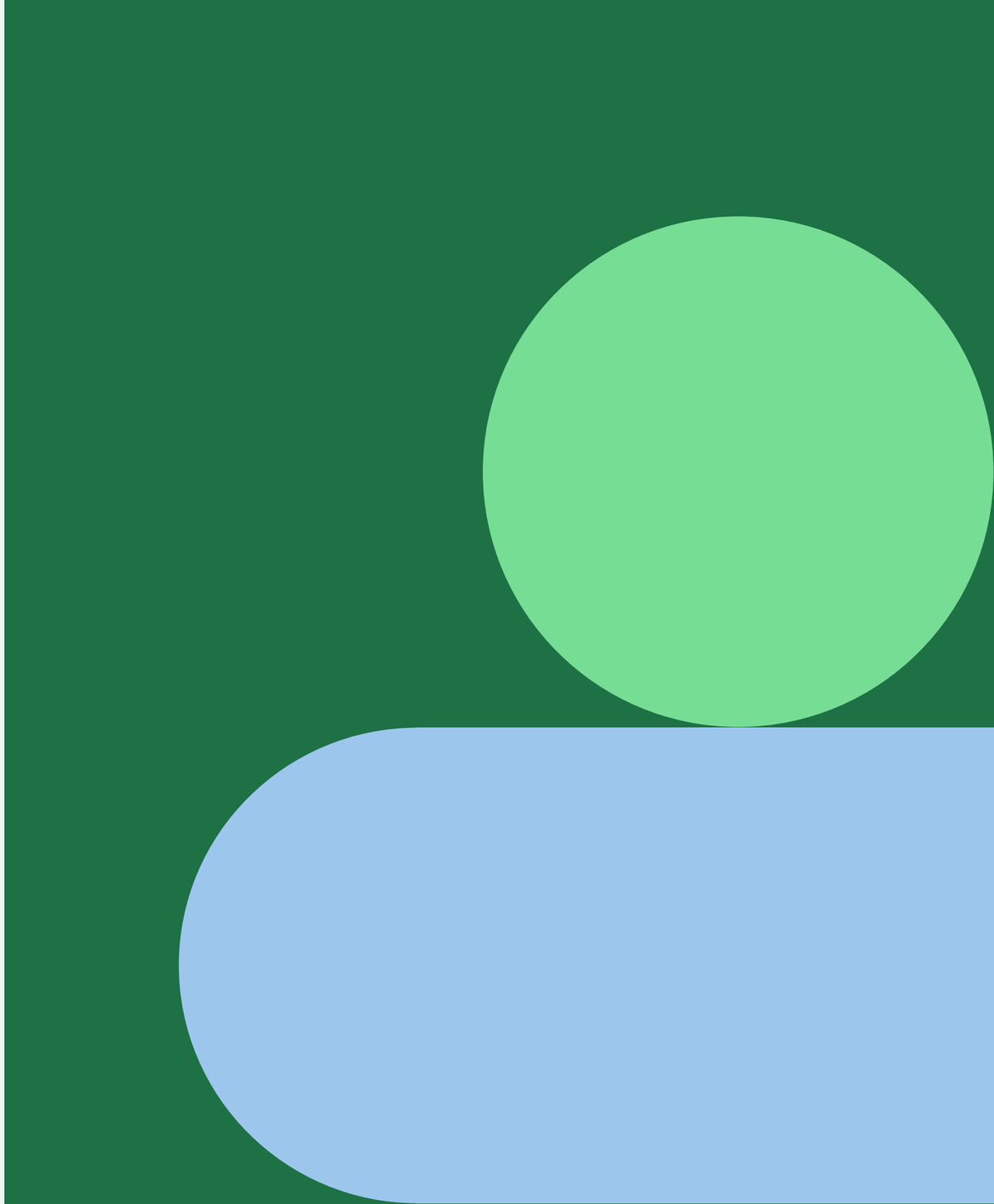
Hypothesis

WHAT WE WANT TO PROVE OR DISPROVE

1. The dog microhabitats are formed near human establishment
2. frequency of dogs decreases with distance from the food source

Introduction

— PART 1



Niche

NICHE IS THE RANGE OF SOURCES AND ENVIRONMENTAL CONDITIONS IN WHICH A SPECIES LIVES.

IT IS DESCRIBED AS A MULTIDIMENSIONAL HYPERVOLUME, WHERE EVERY DIMENSION REPRESENTS ONE OF THE NEEDS OF THE SPECIES

Habitat

A HABITAT REPRESENTS THE PHYSICAL DIMENSION OF A SPECIES' ECOLOGICAL NICHE.

IT REPRESENTS THE RANGE OF SOURCES AND PHYSICAL AND BIOTIC FACTOR PRESENT IN A GIVEN AREA TO SUPPORT THE SPECIES.

MicroHabitat

MICROHABITAT CAN BE SUGGESTED AS THE SUBSET OF THE HABITAT, WHICH IS OCCUPIED BY THE POPULATION OF A SPECIES.

IT IS A SMALL AREA WITHIN THE LARGE HABITAT, WHICH DIFFERS SOMEHOW FROM ITS SURROUNDING WHICH MAKES IT MORE HABITABLE.

OCCURRENCE OF MICROHABITAT CAN BE NOTICED IN EVERYDAY LIFE, WHERE WE SEE SOME ANIMALS MORE FREQUENTLY AT SOME PLACES THAN OTHERS.

Objectives

WHAT WE WANT TO ACHIEVE

To determine the dog microhabitats inside the campus and observe the effect of human establishments and food sources.

Methodology

— PART 2

LOCATING THE DOGS

We take a specified time duration within which we take the observation. We took all our observations during 4pm to 6pm inside IISER-K campus.

During the specific interval, we walk around the whole campus. We avoid walking through the same area twice.

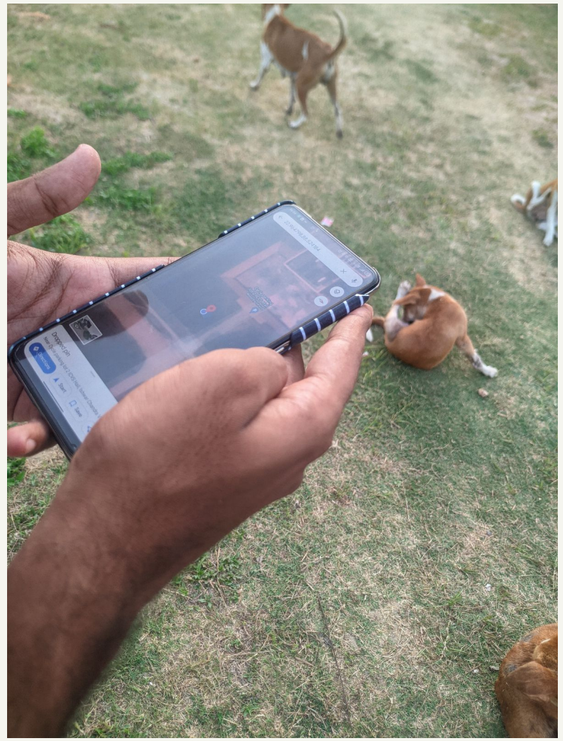
During walking whenever we see a dog within 25m distance in our eyesight, we go to the location, stand on near the dog and pin the location on Google maps, save the location on a list which we create for the particular day.

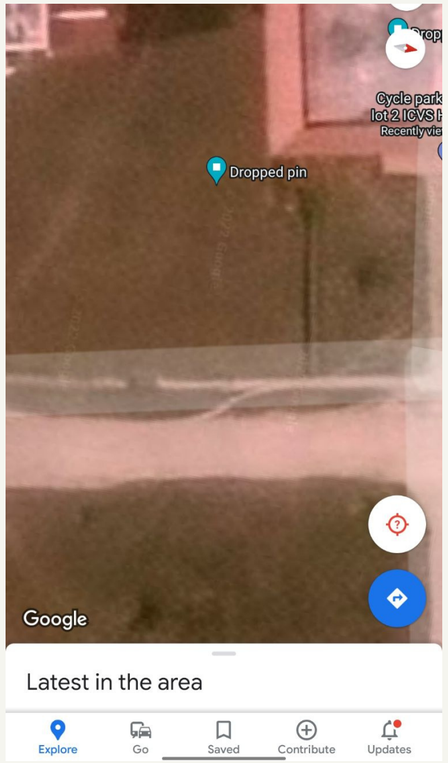
During pinning the location on the map should be zoomed to the maximum to get most accurate pinned location.

We repeat our observation on 3 different days, so we get 3 set of location pins to get the general location of the dogs.

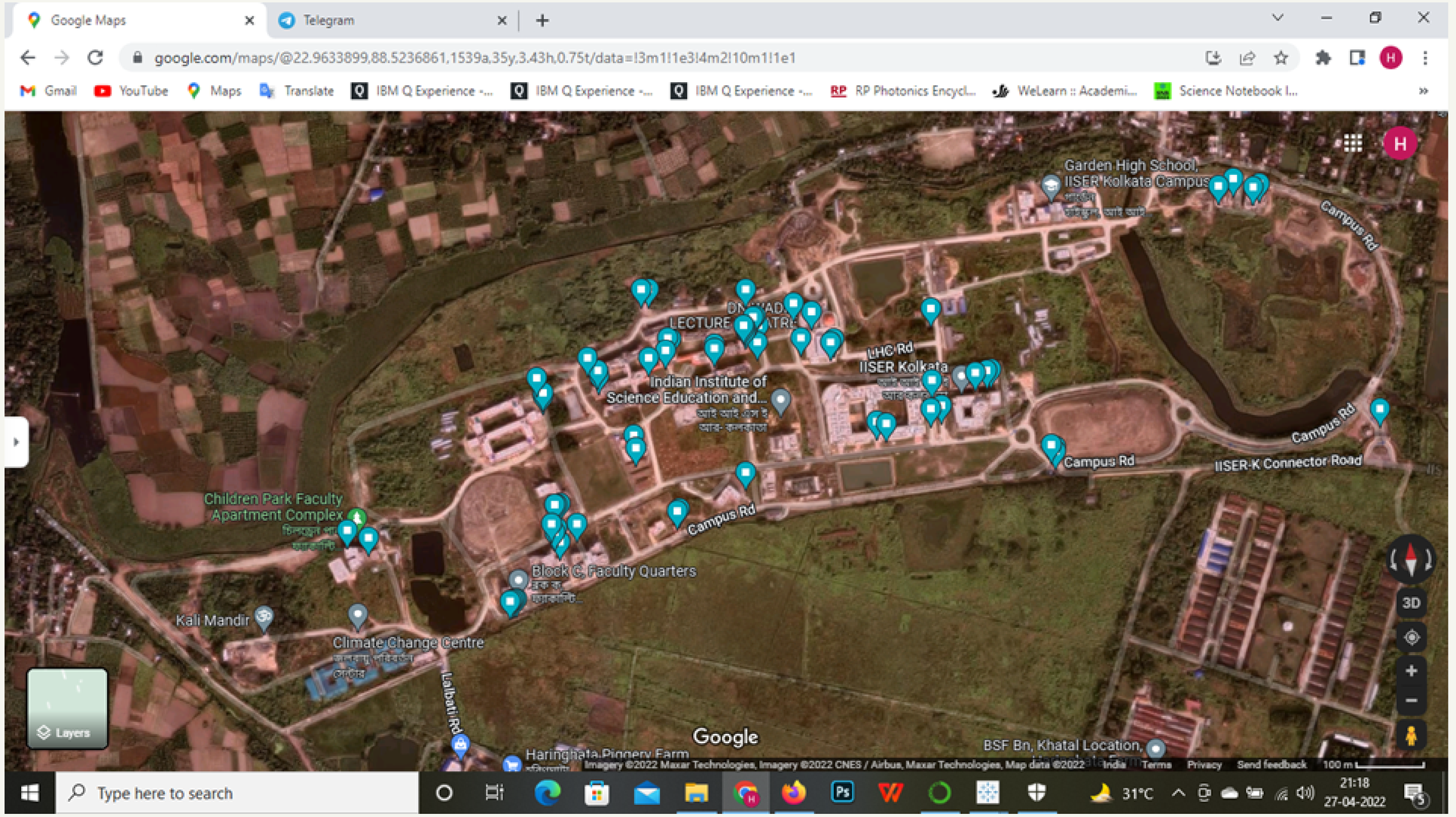
Data Collection Methods

STEP 1 → STEP 2 → STEP 3





Collected Data



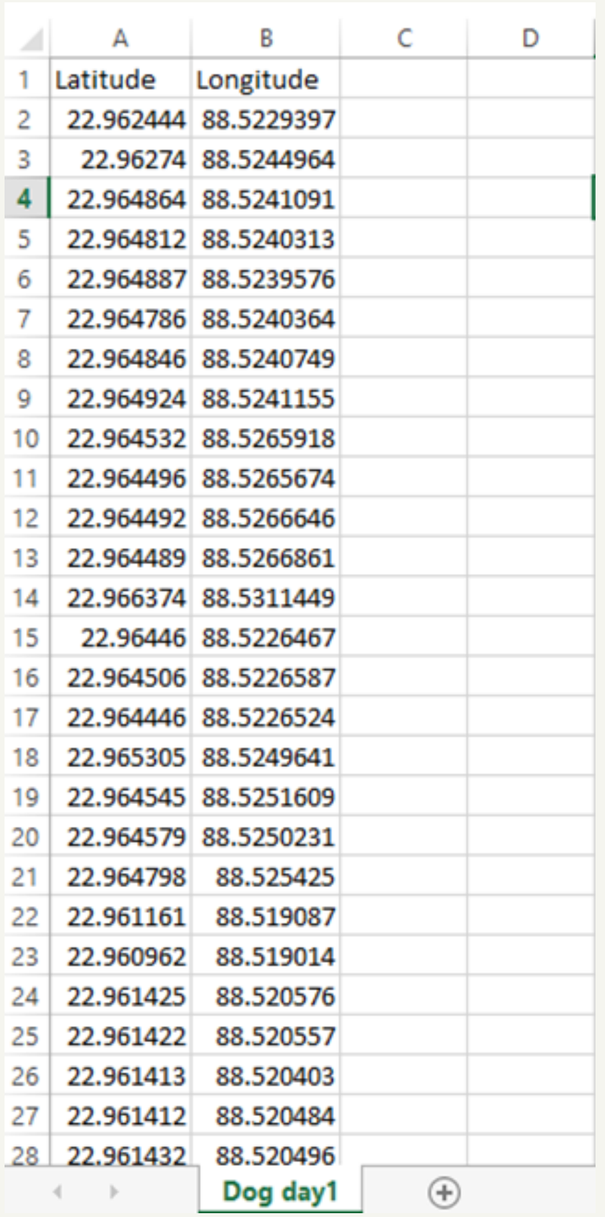
Food source locations

Sheet 1

Map based on average of Longitude and average of Latitude. The marks are labeled by Legends.

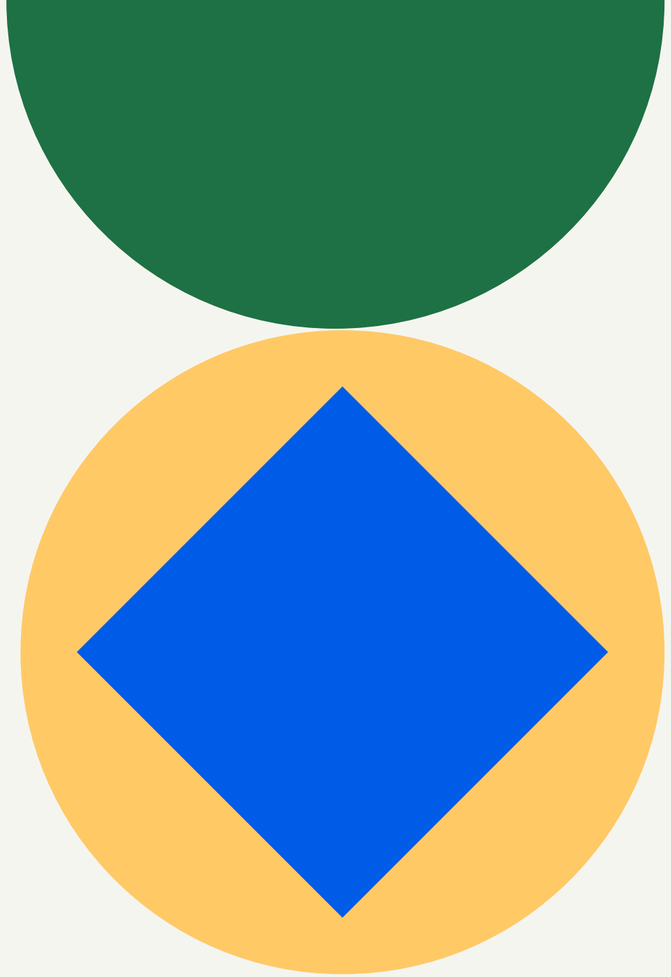
Geo- coordinate Data

We extracted the Longitude and Latitude of the pinned location the observed dogs using Google Take-out



	A	B	C	D
1	Latitude	Longitude		
2	22.962444	88.5229397		
3	22.96274	88.5244964		
4	22.964864	88.5241091		
5	22.964812	88.5240313		
6	22.964887	88.5239576		
7	22.964786	88.5240364		
8	22.964846	88.5240749		
9	22.964924	88.5241155		
10	22.964532	88.5265918		
11	22.964496	88.5265674		
12	22.964492	88.5266646		
13	22.964489	88.5266861		
14	22.966374	88.5311449		
15	22.96446	88.5226467		
16	22.964506	88.5226587		
17	22.964446	88.5226524		
18	22.965305	88.5249641		
19	22.964545	88.5251609		
20	22.964579	88.5250231		
21	22.964798	88.525425		
22	22.961161	88.519087		
23	22.960962	88.519014		
24	22.961425	88.520576		
25	22.961422	88.520557		
26	22.961413	88.520403		
27	22.961412	88.520484		
28	22.961432	88.520496		

Dog day1



K-mean clustering of the data-points

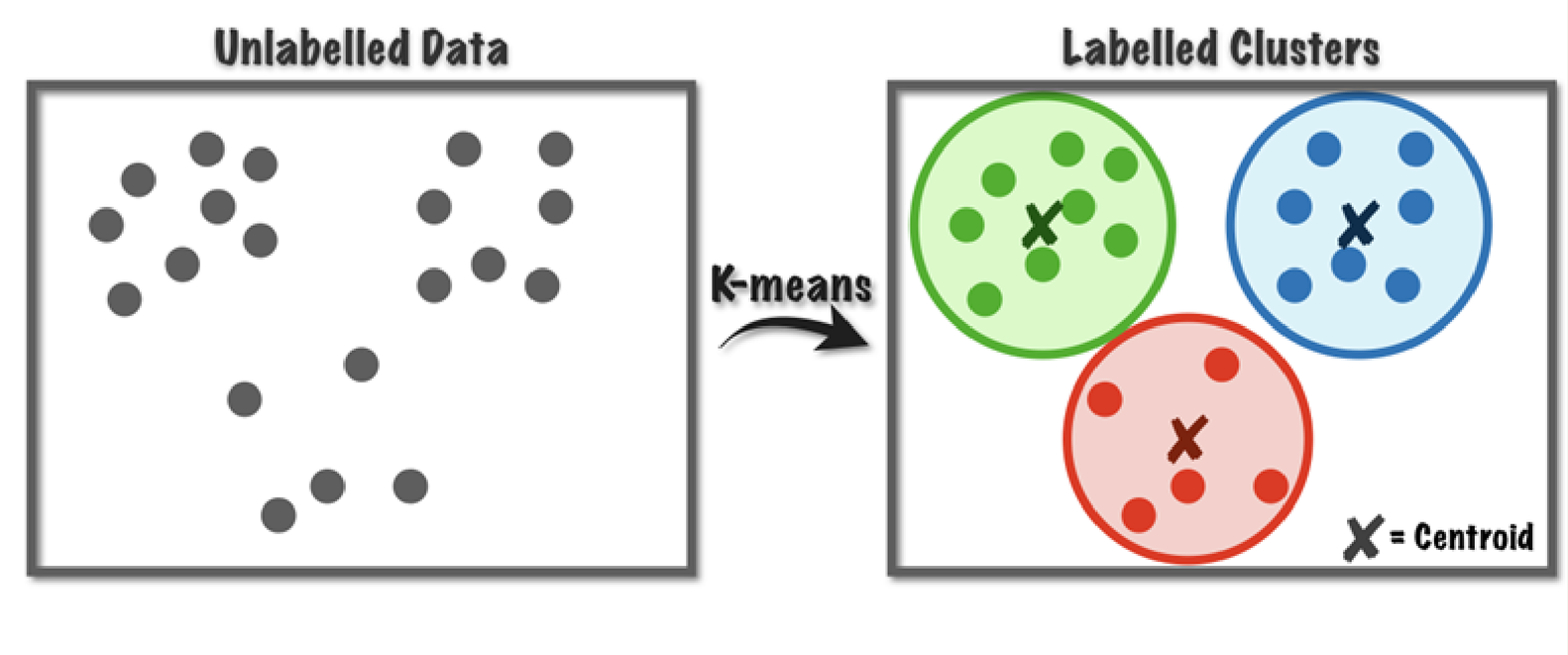
first set k

Randomly choose k cluster center locations (centroids)

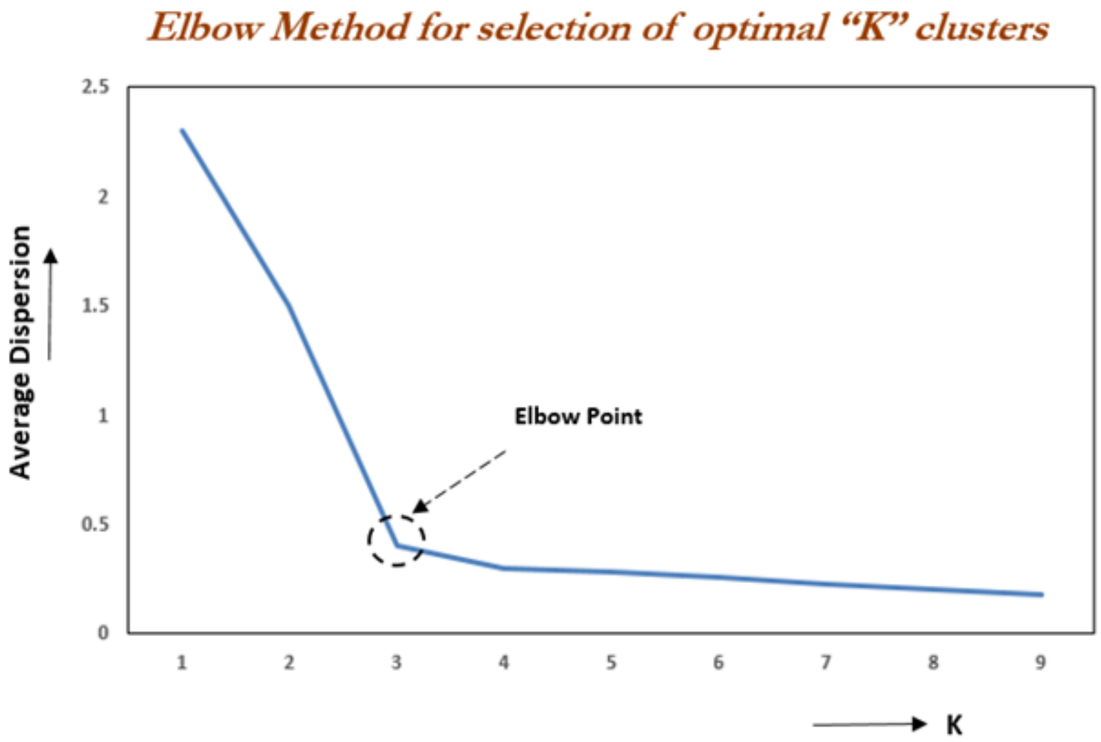
Loop until convergence assign each point to the cluster of the closest centroid.

Re-estimate the cluster centroids based on the data assigned to each

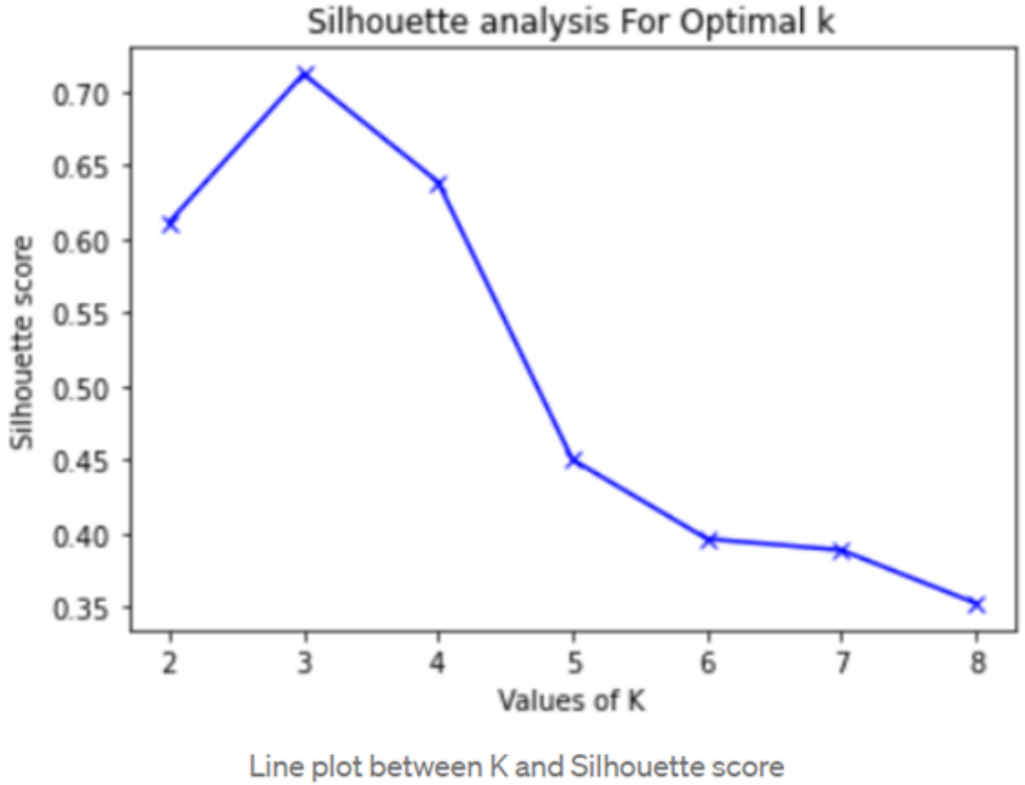
K-mean clustering of the data-points



To get the optimum K-value we have used 2 methods

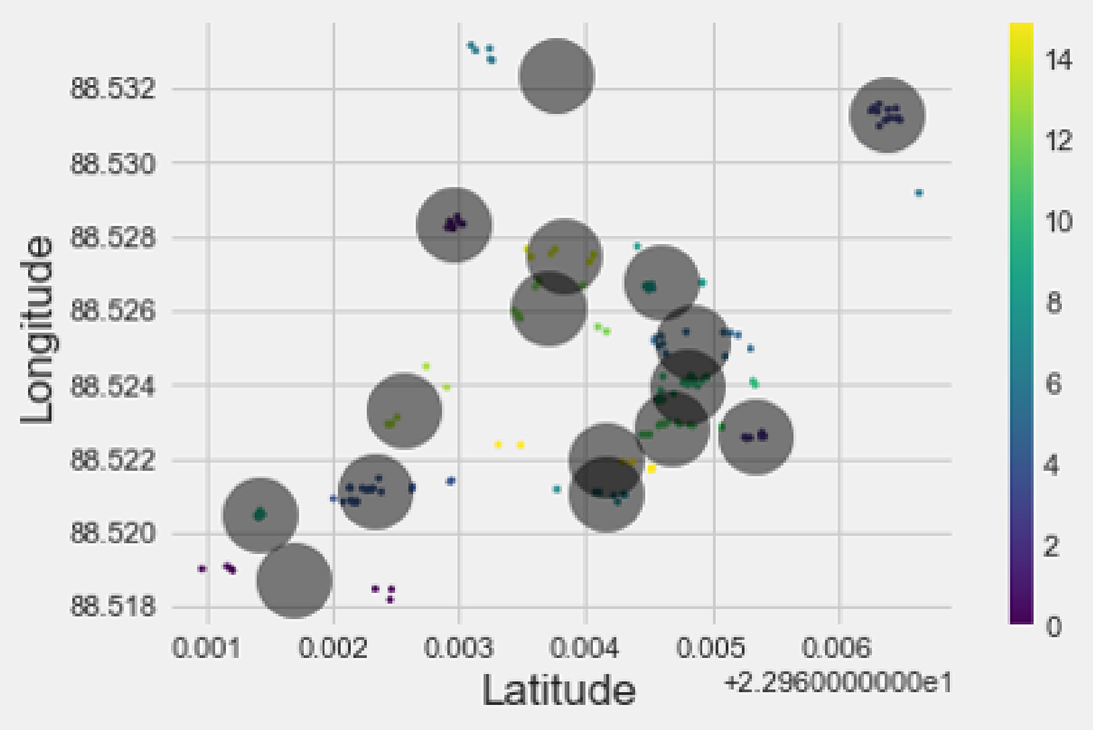


Elbow Curve

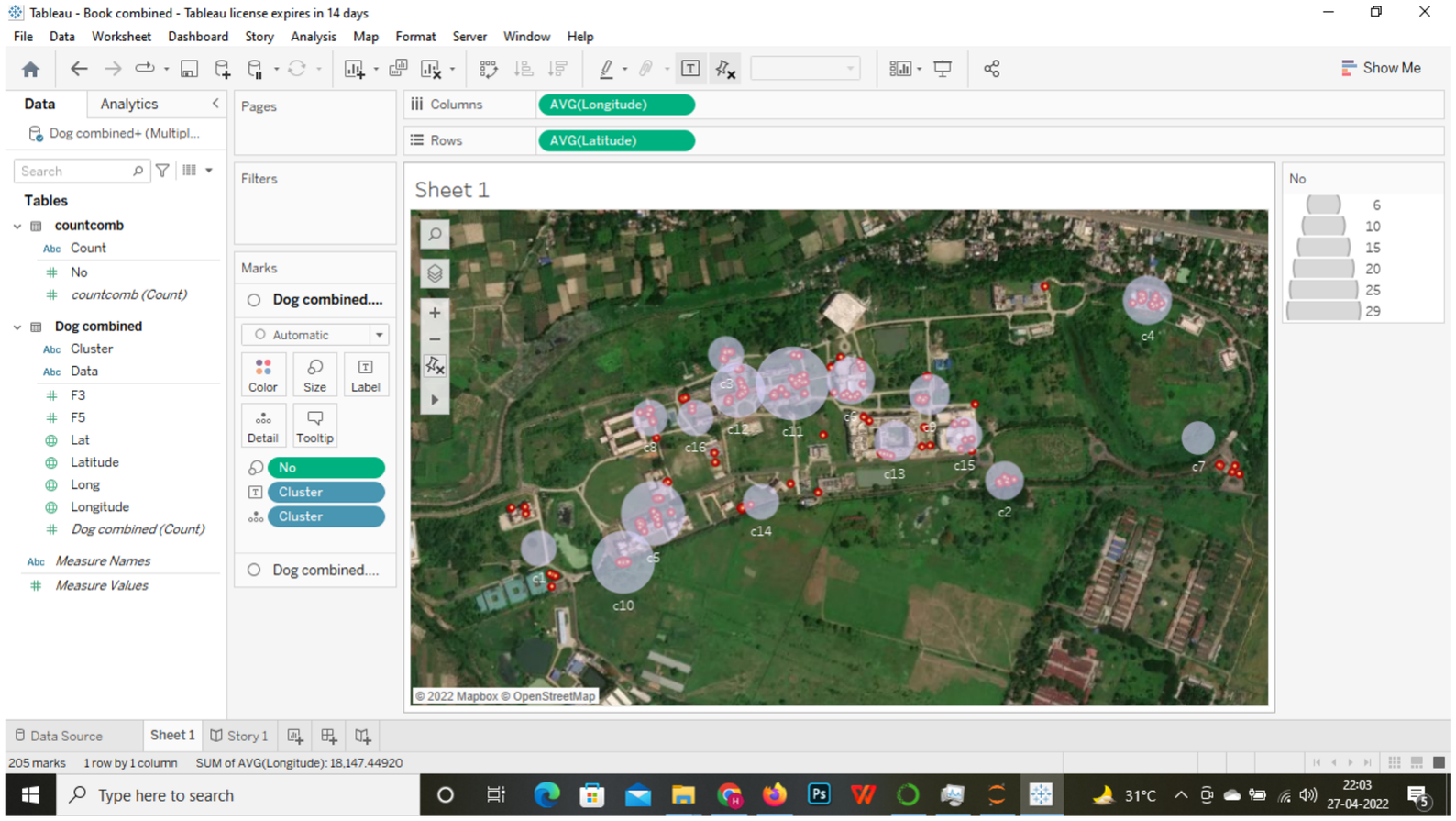


Silhouette coefficient

Cluster formation on Longitude Latitude plot



Visualization of clusters on the map



For Trend with food source

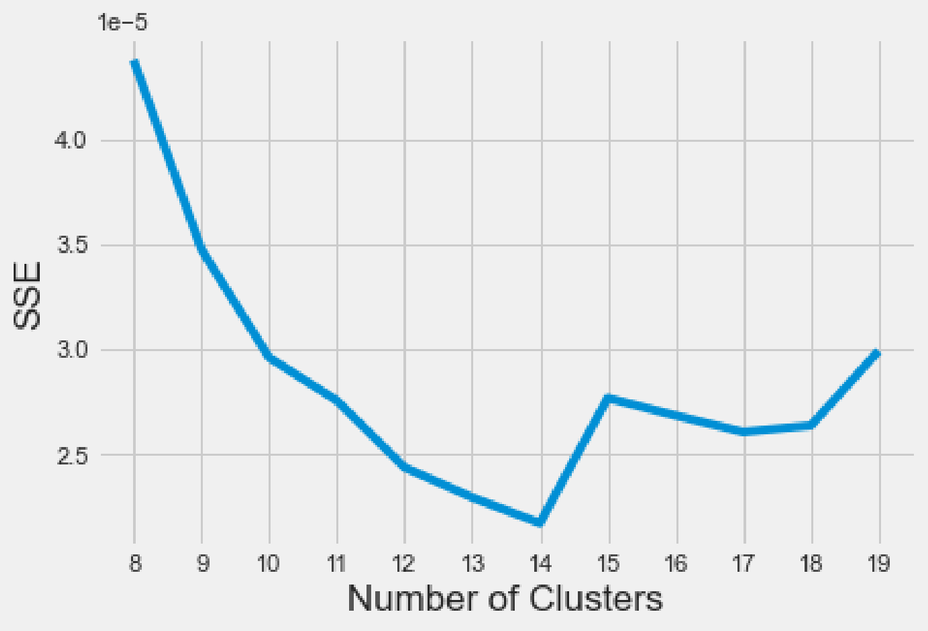
we calculated minimum distance of each data points from the all 8 food sources. For this, first distance of all the food source from the each data point was calculated, and the values were put into a matrix.

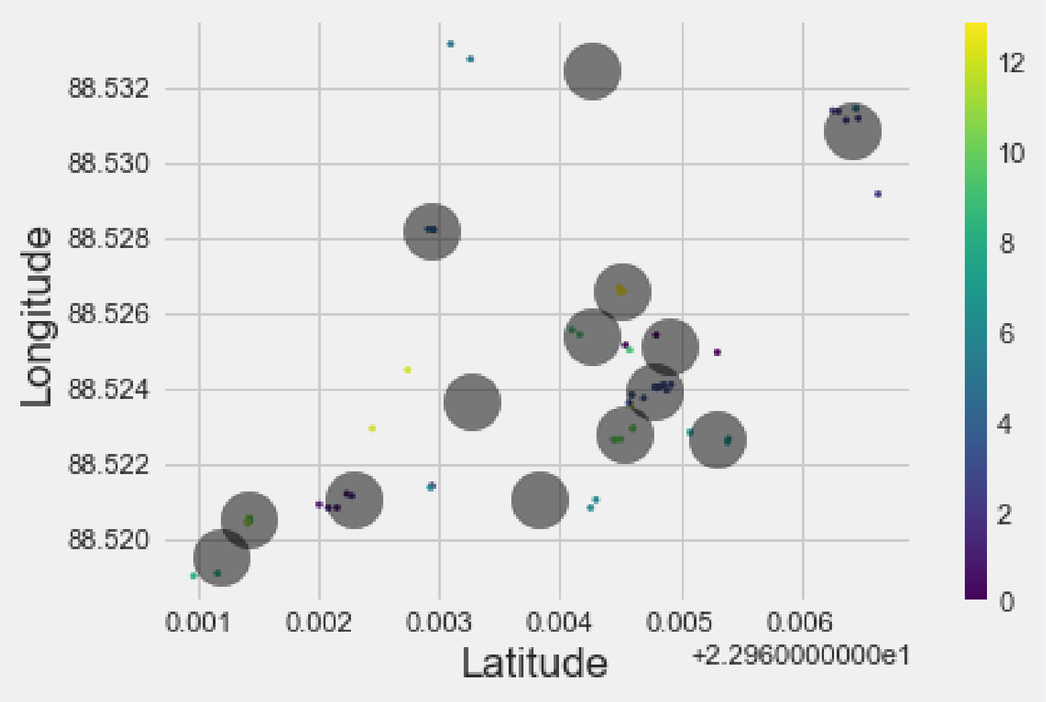
Then, Plotted the histogram for distance from food source versus frequency of dogs for each of the 3 days and lastly for all 3 days combined

Results of the Study

— PART 3

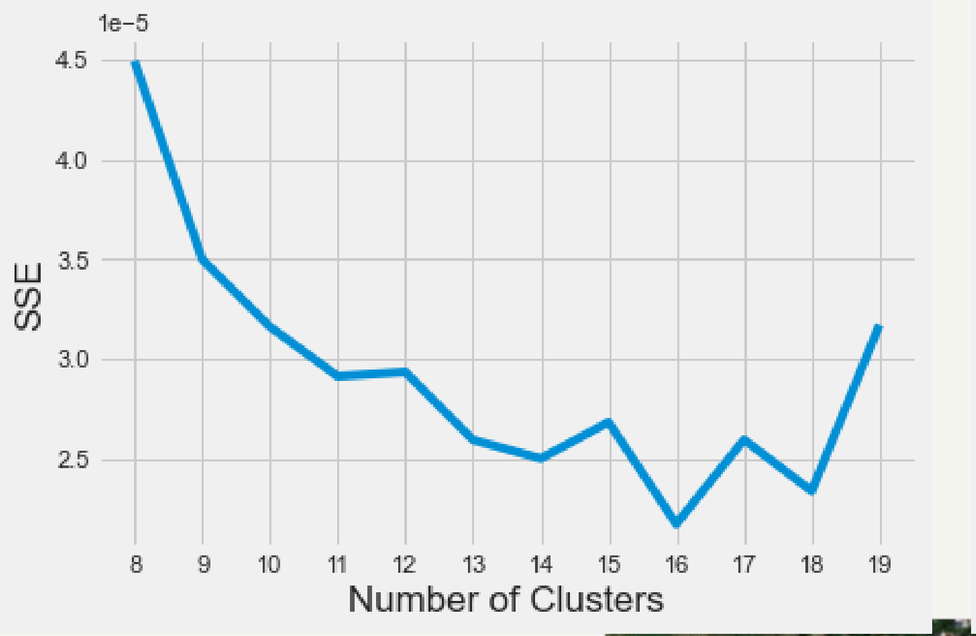
Day 1 clustering

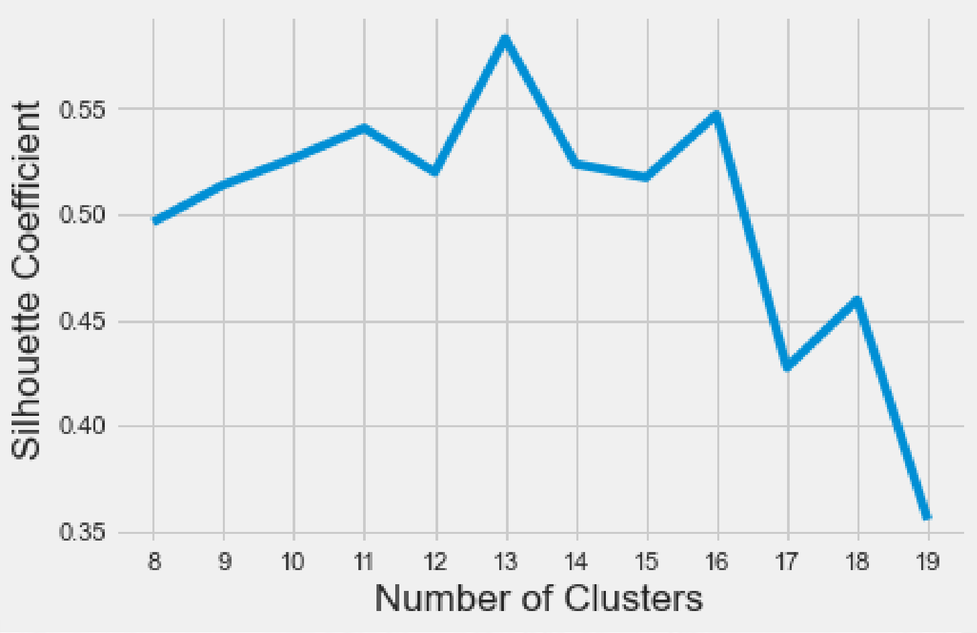


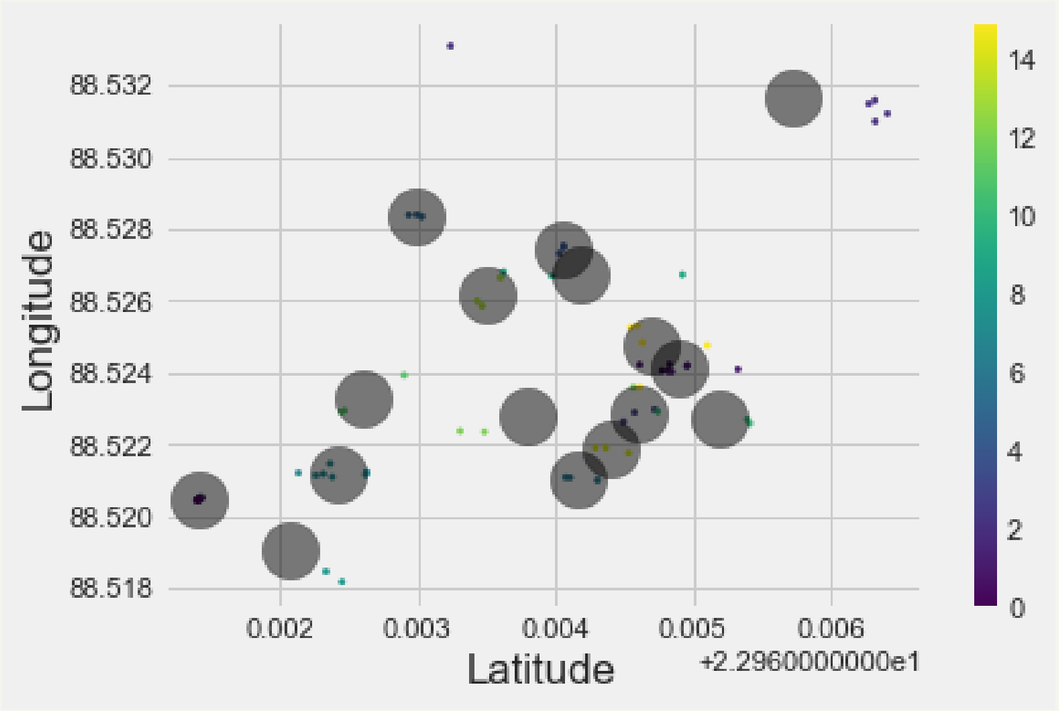


Map based on average of Longitude and average of Latitude. For marks layer Dog day1.Latitude: Details are shown for Data. For marks layer Dog

Day 2 clustering

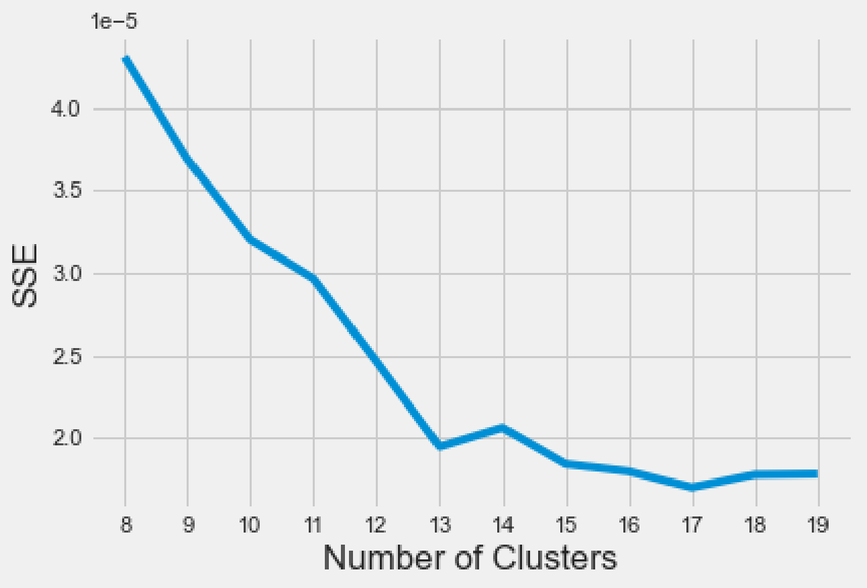


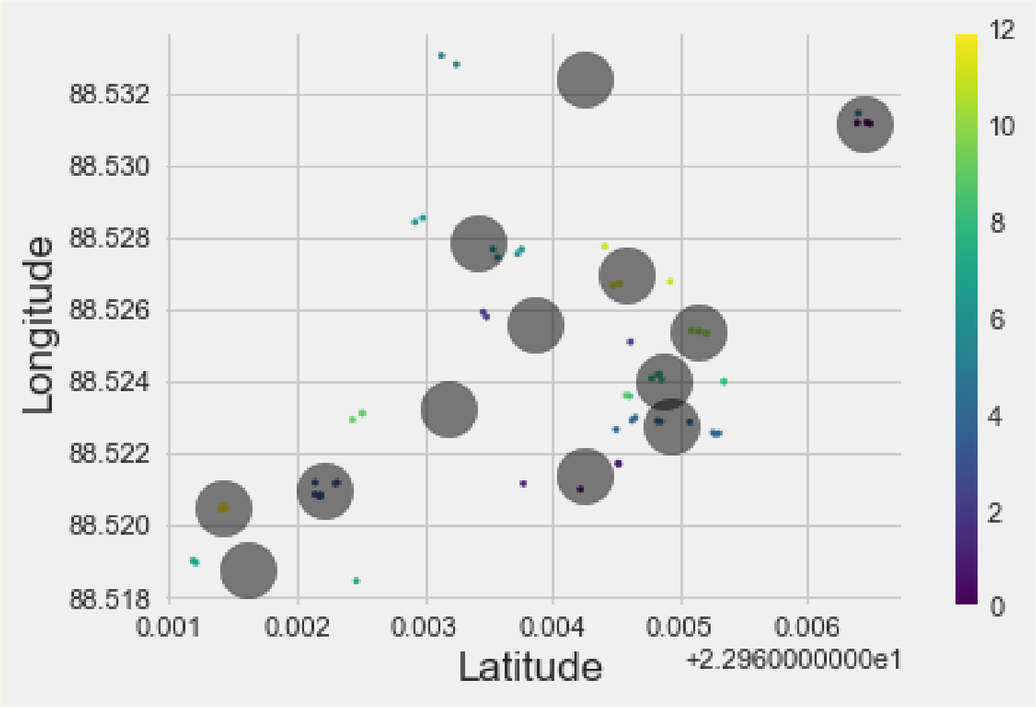




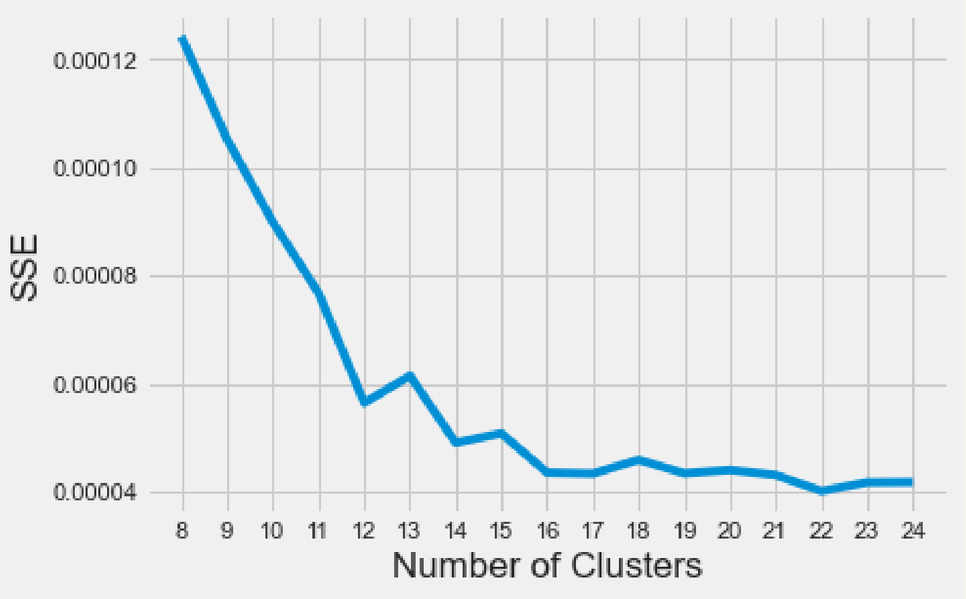
No

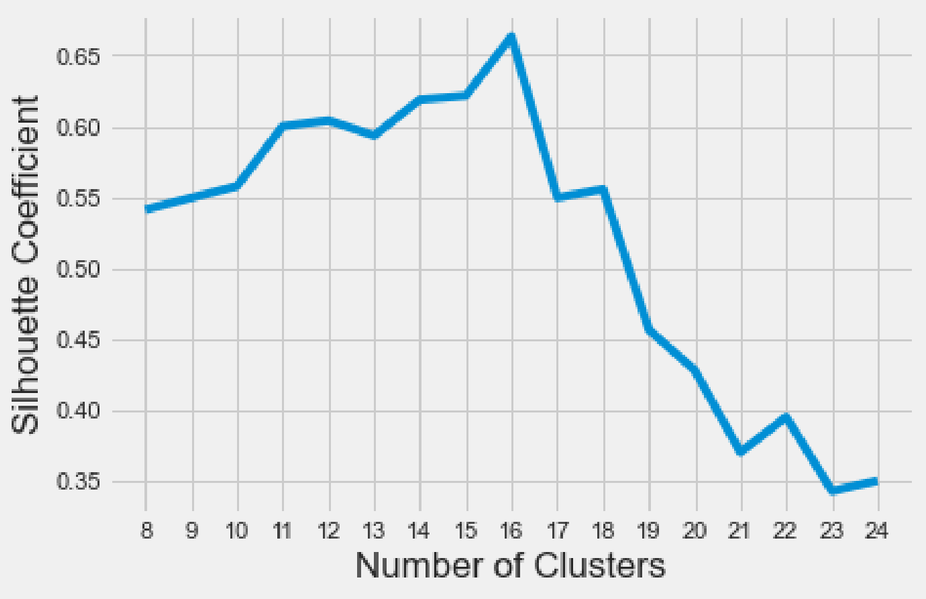
Day 3 clustering

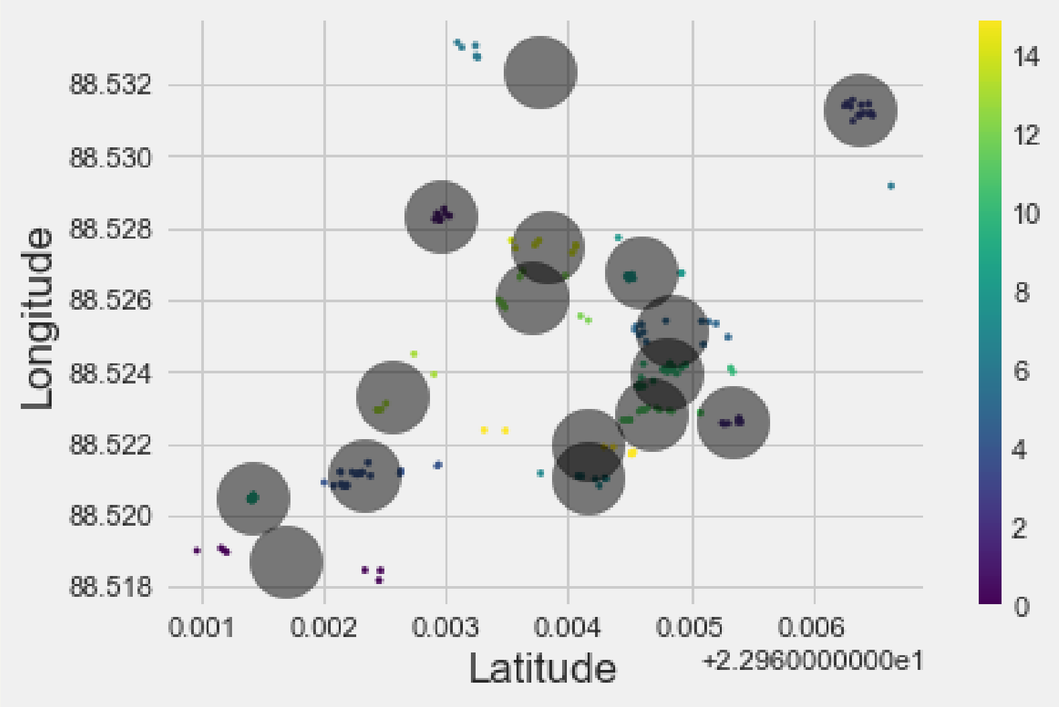


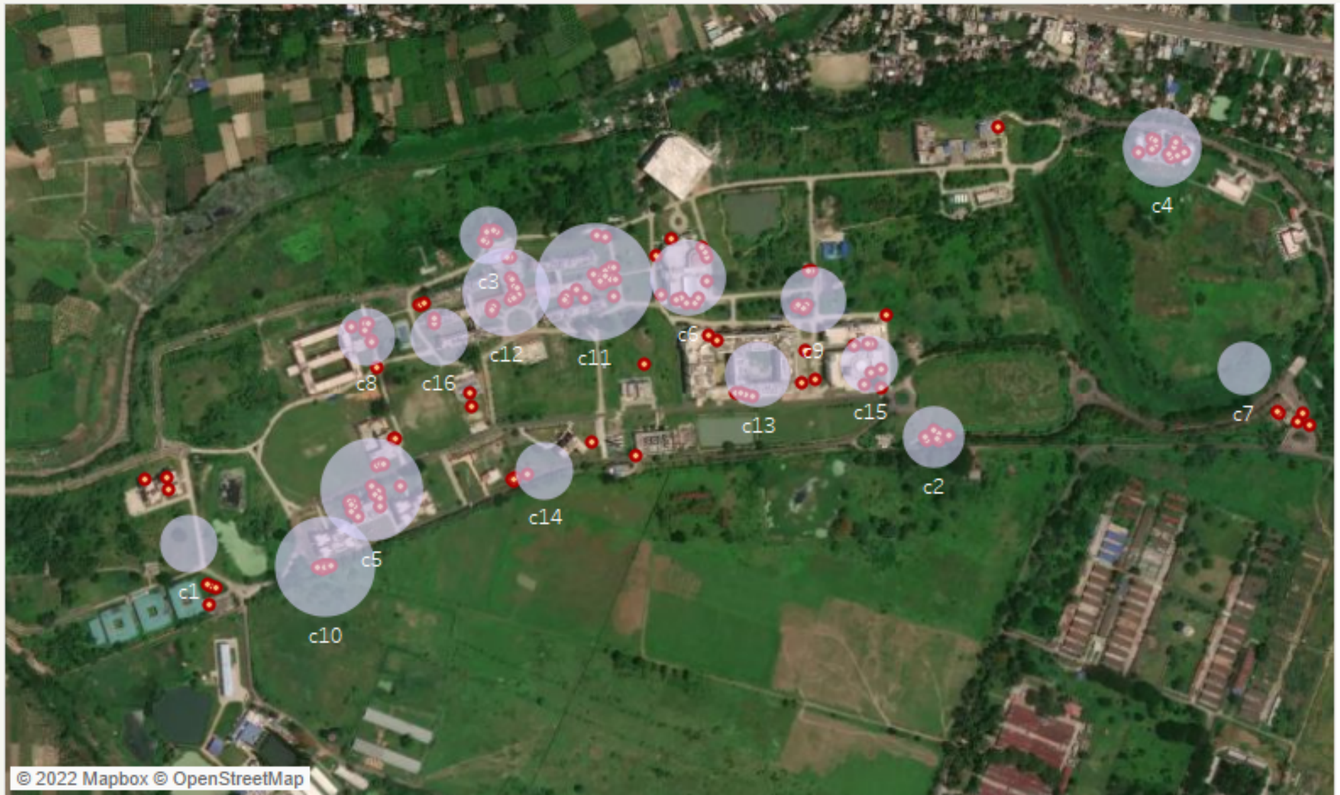


All 3 days combined

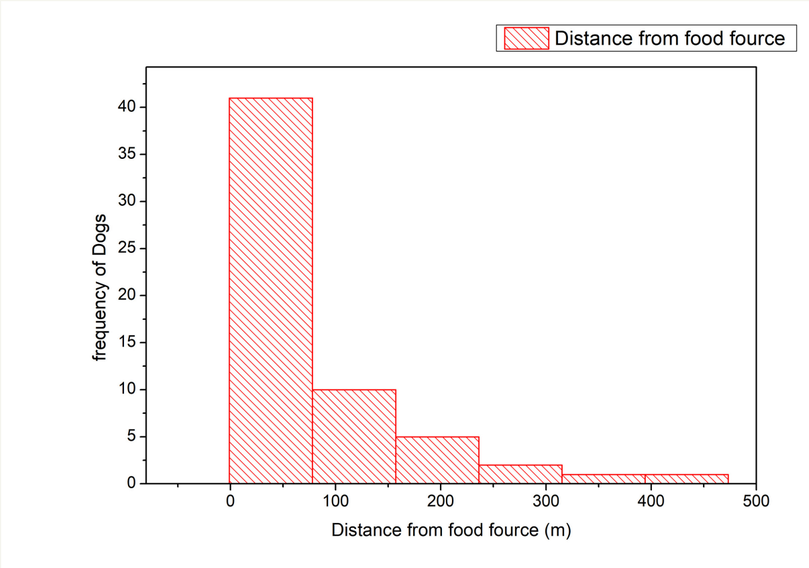


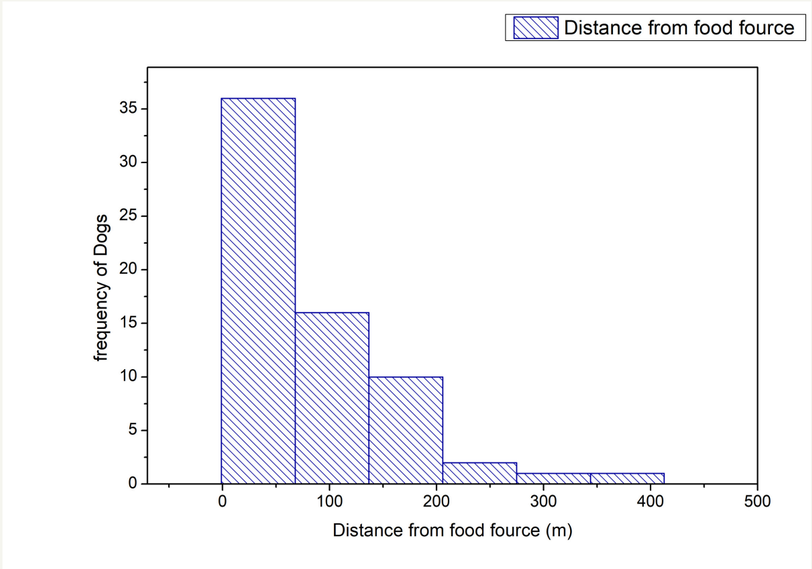


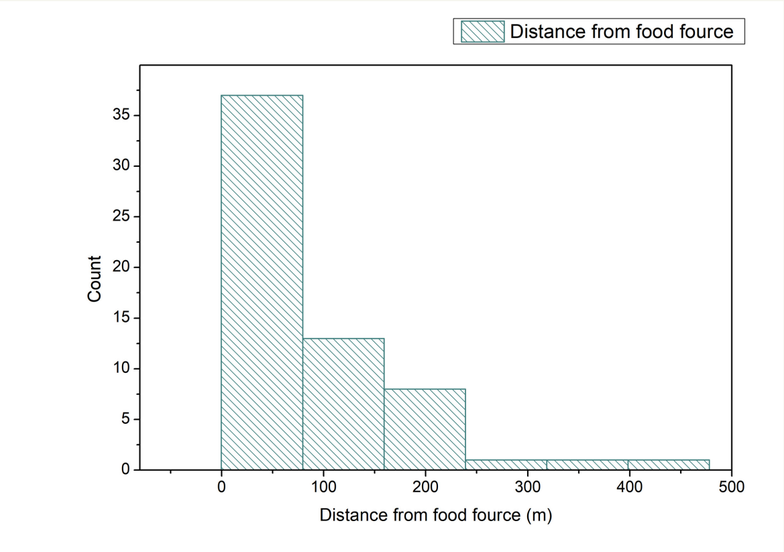




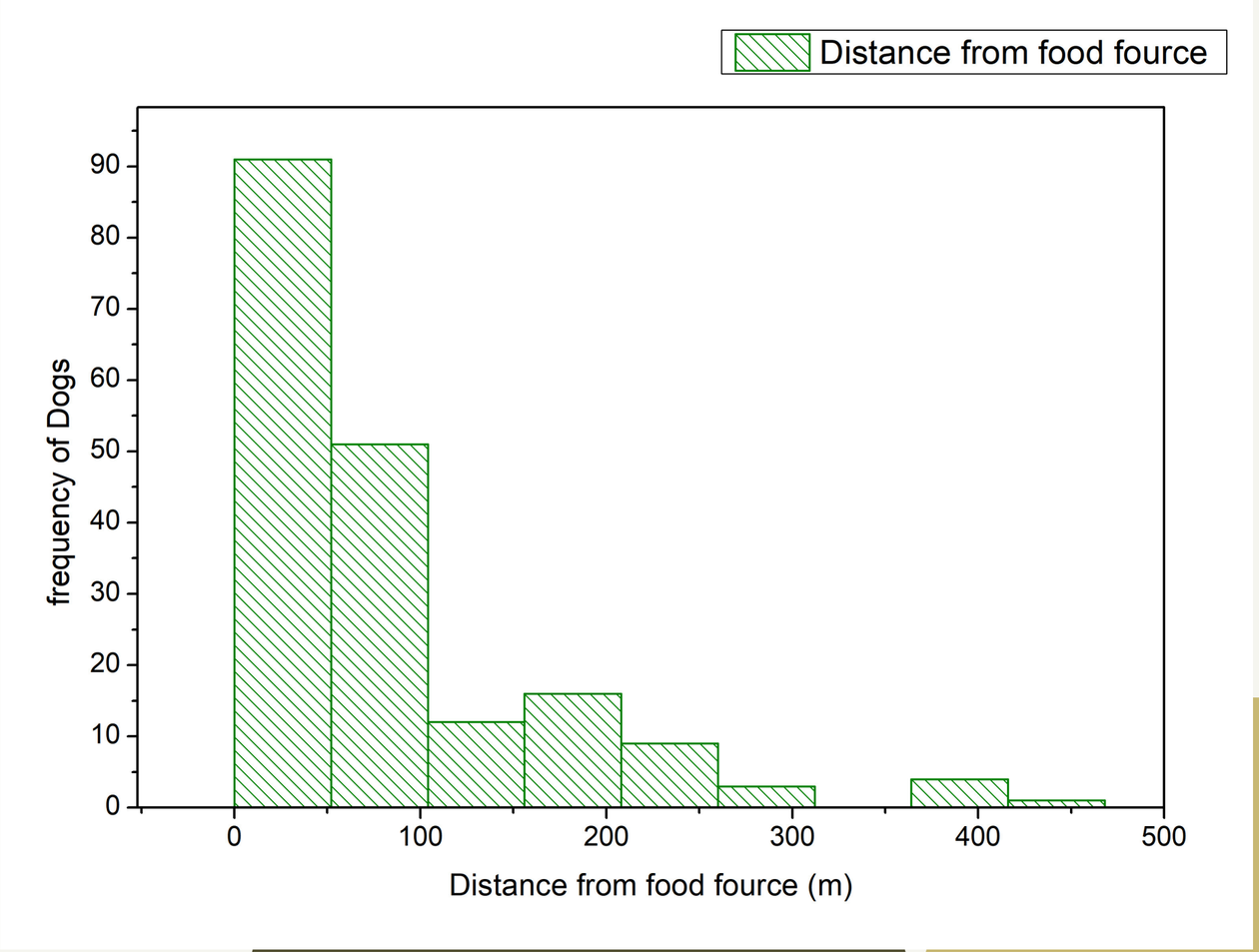
Trend with food source

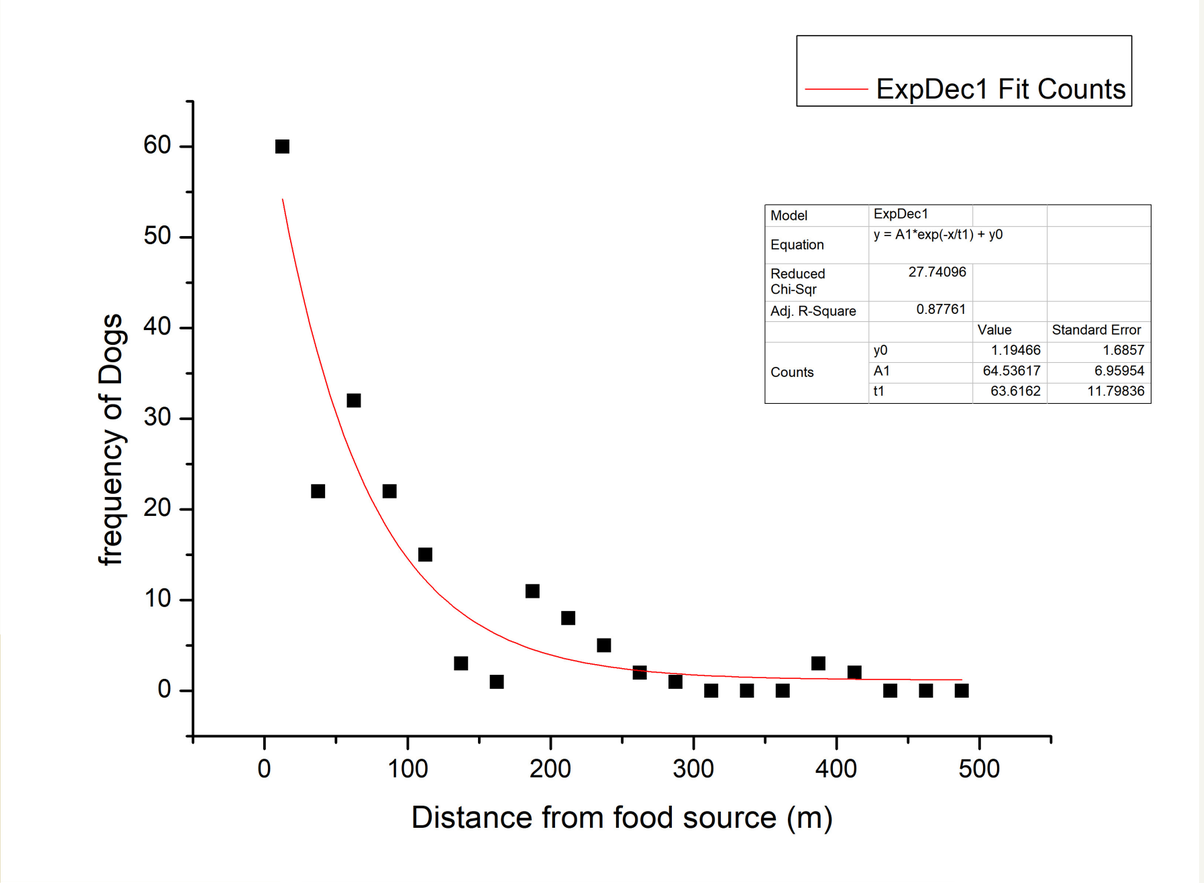






Trend with food source



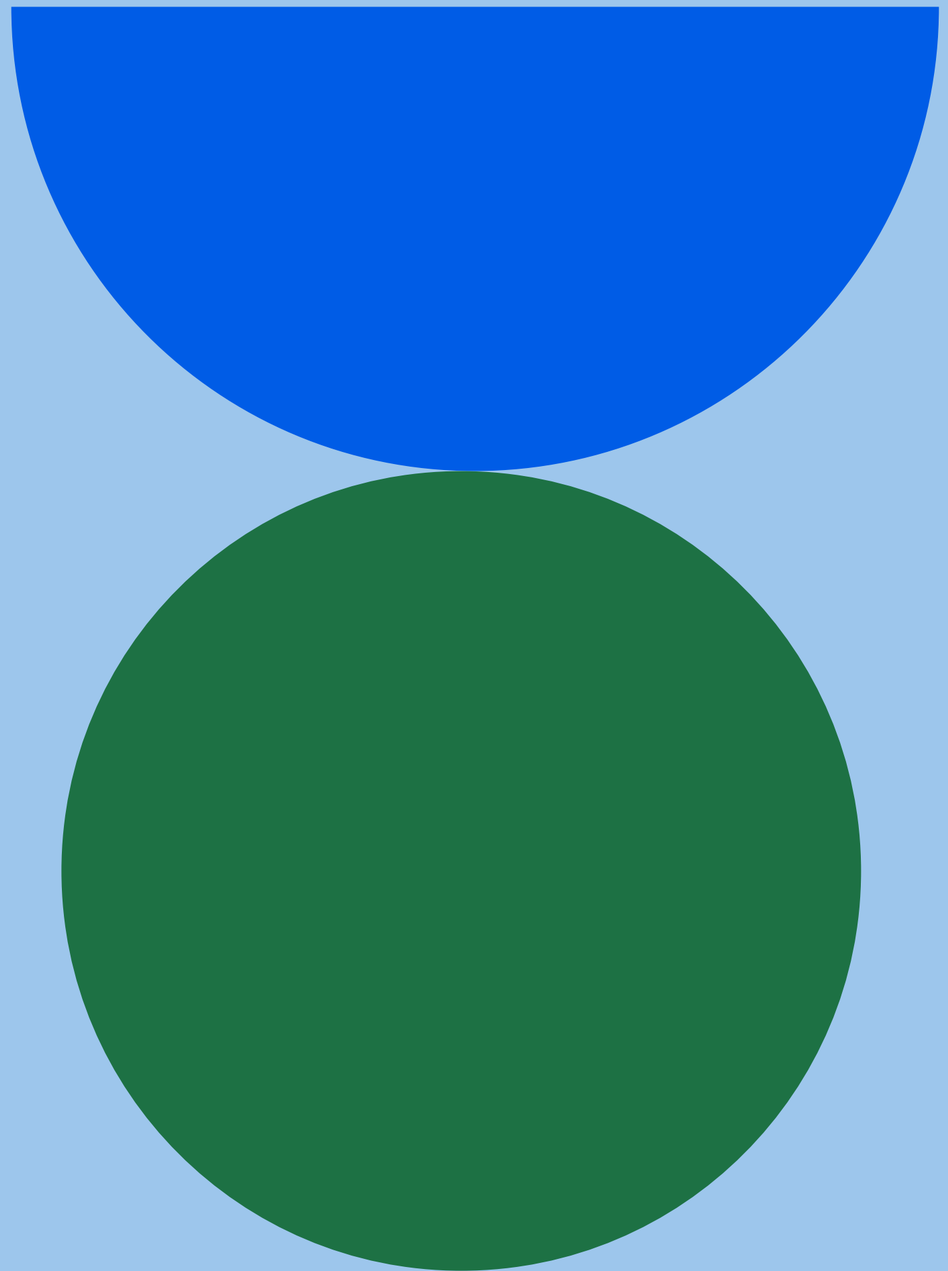


ANOVA Results

Summary of Data						
	Day					
	1	2	3	4	5	Total
N	60	66	61			187
∑X	4533.8905	5846.0725	5118.1945			15498.1575
Mean	75.5648	88.5769	83.9048			82.878
$\sum X^2$	811316.2011	932166.619	914354.4311			2657837.2512
Std.Dev.	89.1308	79.8402	89.8993			85.9289

F = 0.36429

Result Details				
Source	SS	df	MS	
Between-Samples	5416.7333	2	2708.3667	F = 0.36429
Within-Samples	1367966.5761	184	7434.601	
Total	1373383.3095	186		



Conclusion

— PART 4

Study highlights

We observed high concurrence of Dog cluster, with the human establishments.

we saw a relationship between food source and occurrence of dog, the number of decrease as distance from the food source increases.

understanding of the Question

Microhabitat formation was controlled by availability of resting place and food availability.

This trend may be due to the effective resting place inside the buildings, as the observations are in summer the amount of shades might affect.

Another possibility is the gradual development of human-dog relationship with time.

Food availability may also be one of the reason for concurrence of dog clusters and the buildings, with humans giving the dogs food frequently.

Areas of improvement

The study can be done over different seasons, so the weather won't affect the actual habitats, and make them shift to another place.

Territoriality of the group of dogs can affect the formation of microhabitats, which can be studied by inter-cluster distance study.