

"What are some examples of situations in which basic statistical concepts, such as population, sample, parameter, and statistic, could be useful for making decisions or drawing conclusions? How can Python be used to help analyze data in these situations?"

Python can be used to perform statistical tests and calculations to compare the average lifespans from the sample data, visualize lifespan distributions, and handle data preprocessing. Python can be used to perform statistical tests to infer about the population, and visualize the data for better understanding. Python libraries such as Pandas for data manipulation, NumPy for numerical calculations, Matplotlib and Seaborn for data visualization, and SciPy or Statsmodels for statistical analysis are typically used in these scenarios.

Comparing Lifespan of Different Dog Breeds Situation: A veterinary researcher wants to compare the lifespan of Labrador Retrievers and Beagles to understand breed-specific health trends.

Population: 96 Various Dog Breeds Parameter: The true average lifespan of each breed. Statistic: The average lifespan of the sampled dogs from each breed.

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In [ ]: #import Libraries
import matplotlib.pyplot as plt
import pandas as pd
import seaborn as sns

#import data
dog_data = pd.read_csv("C:/Users/khbil/Documents/GCU/DSC-510/Week_1/DQs/dog_breeds.csv")
dog_data['average_life_expectancy'] = (dog_data['min_life_expectancy'] + dog_data['max_life_expectancy']) / 2
print(dog_data.head)
```

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<bound method NDFrame.head of
                                Name  min_life_expectancy  max_life_expectancy  \
0                Golden Retriever                10                12
1                Dachshund                12                16
2                Labrador Retriever                10                12
3                Great Dane                7                10
4                Boxer                10                12
..                ...                ...                ...
92  American Staffordshire Terrier                12                16
93                Australian Shepherd                12                15
94                Pembroke Welsh Corgi                12                13
95                Yorkshire Terrier                11                15
96                French Bulldog                10                12

```

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                                max_height_male  max_height_female  max_weight_male  max_weight_female  \
0                24.0                24.0                75.0                65.0
1                9.0                9.0                32.0                32.0
2                24.5                24.5                80.0                70.0
3                32.0                32.0                175.0               140.0
4                25.0                25.0                80.0                65.0
..                ...                ...                ...                ...
92                19.0               19.0                70.0                55.0
93                23.0               23.0                65.0                55.0
94                12.0               12.0                31.0                28.0
95                8.0                8.0                 7.0                7.0
96                13.0               13.0                28.0                26.0

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                                min_height_male  min_height_female  min_weight_male  ...  grooming  \
0                23.0                23.0                65.0  ...      2
1                8.0                8.0                16.0  ...      2
2                22.5               22.5                65.0  ...      2
3                30.0               30.0               140.0  ...      1
4                23.0               23.0                65.0  ...      2
..                ...                ...                ...  ...      ...
92                18.0               18.0                55.0  ...      1
93                20.0               20.0                50.0  ...      2
94                10.0               10.0                24.0  ...      2
95                7.0                7.0                 7.0  ...      5
96                11.0               11.0                20.0  ...      1

```

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                                drooling  coat_length  good_with_strangers  playfulness  protectiveness  \
0                2                1                5                4                3
1                2                2                4                4                4

```

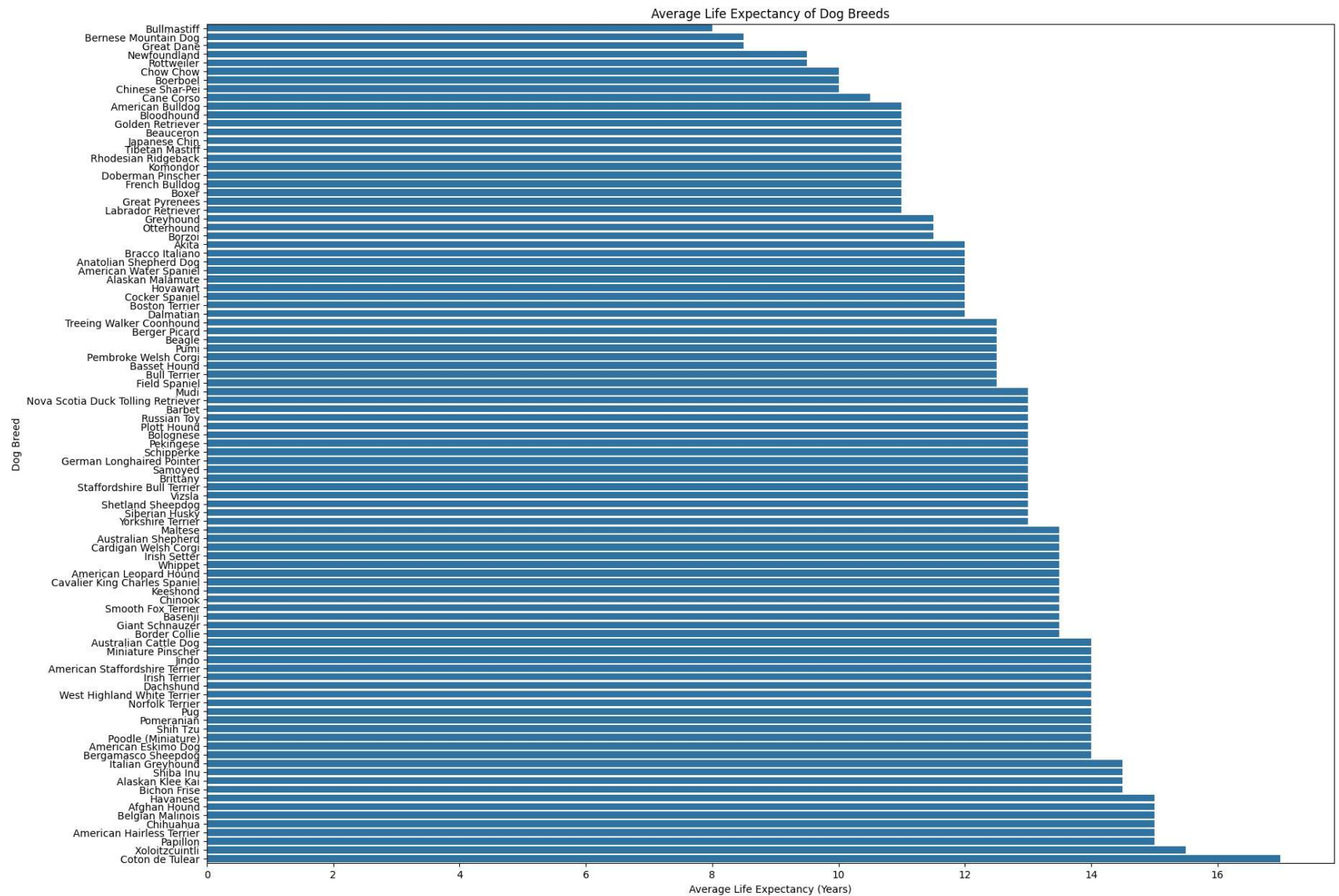
2	2	1	5	5	3
3	4	1	3	4	5
4	3	1	4	4	4
..
92	1	1	4	3	5
93	1	1	3	4	3
94	1	1	4	4	5
95	1	1	5	4	5
96	3	1	5	5	3

	trainability	energy	barking	average_life_expectancy
0	5	3	1	11.0
1	4	3	5	14.0
2	5	5	3	11.0
3	3	4	3	8.5
4	4	4	3	11.0
..
92	3	3	3	14.0
93	5	5	3	13.5
94	4	4	4	12.5
95	4	4	4	13.0
96	4	3	1	11.0

[97 rows x 24 columns]>

```
In [ ]: # sort the data
dog_data_sorted = dog_data.sort_values(by='average_life_expectancy')

# create a bar chart
plt.figure(figsize=(20, 15))
sns.barplot(x='average_life_expectancy', y='Name', data=dog_data_sorted)
plt.xlabel('Average Life Expectancy (Years)')
plt.ylabel('Dog Breed')
plt.title('Average Life Expectancy of Dog Breeds')
plt.show()
```



In []: References

Q. Shen, "Research on Intelligent Matching Model Between Employees and Positions Based on Python Big Data Analysis," Communication and Engineering (ECICE), Yunlin, Taiwan, 2022, pp. 386-390, doi: [10.1109/ECICE55674.2022.10042840](https://doi.org/10.1109/ECICE55674.2022.10042840).

Rogel-Salazar, J. (2023). Snakes, Bears & Other Numerical Beasts: NumPy, SciPy & pandas. In Statistics and data visu

Data can be downloaded on Kaggle:

<https://www.kaggle.com/datasets/warcoder/dog-breeds-details?resource=download>