

# Pet Ownership Analysis

Python Dashboard Presentation



# Introduction

## Having a pet

### Companionship



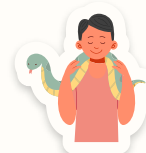
A pet provides constant, non-judgmental presence that alleviates feelings of loneliness and creates a profound emotional bond within home

### Responsibility



Caring for a living creature establishes a consistent routine and fosters a sense of accountability through the daily demands of feeding, grooming, and safety

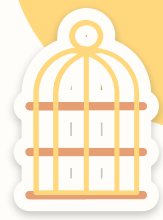
### Health benefits



Interacting with animals is scientifically shown to lower stress levels, reduce blood pressure, and encourage physical activity through play or daily walks



# Introduction



## Popular pet names

### Dogs

- Max
- Bella
- Luna
- Charlie
- Lucy
- Bailey
- Cooper
- Daisy
- Rocky

### Cats

- Kitty
- Oliver
- Leo
- Luna
- Bella
- Simba
- Chloe
- Charlie
- Lucy

After you get a pet – the first thing you could do is to name him/her. We named our cat – Loki. He is on the picture below.



That's Loki

# Introduction

## What to do with your pet

- Play and cuddle daily
- Provide regular exercise
- Feed balanced meals
- Groom and clean
- Vet check-ups
- Positive training
- Ensure a safe environment
- Engage in fun activities
- Show love and care



# Introduction

## USA even has a National Pet Day

<b>Date</b>	April 11th
<b>Purpose</b>	To celebrate and promote responsible pet ownership and appreciate the companionship of pets
<b>Importance</b>	Raising awareness about pet adoption, responsible pet ownership, and animal welfare. Encouraging people to provide love and care to their pets
<b>Origin</b>	Founded in 2006 by Colleen Paige, an animal welfare advocate and a lover of animals
<b>Activities</b>	<ul style="list-style-type: none"><li>● Adopt a pet from a shelter or rescue</li><li>● Volunteer at animal shelters</li><li>● Donate to animal-related charities</li><li>● Educate about pet care and safety</li><li>● Host pet-friendly events</li><li>● Share photos of pets on social media</li></ul>



# Our Python Presentation



## Companionship

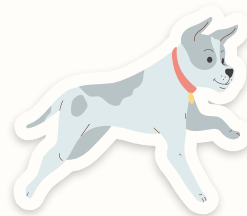
Identifies the regions with the largest pet communities, celebrating the millions of individual bonds that fulfill our universal need for companionship



Promotes  
core benefits  
of pet  
ownership

## Responsibility

By visualizing the high percentage of households that own pets across the country, we highlight the widespread commitment to the daily responsibility of nurturing and protecting animal life



## Health Benefits

Comparing dog and cat ownership rates allows us to celebrate the diverse ways pets promote human health, whether through the active lifestyle encouraged by dogs or the stress-reducing presence of cats

# Presentation Dashbard Data



Population and ownership of dogs and cats by household broken down by state.  
Provided by: American Veterinary Medical Association



location	total_households	pet_ownership_pct	total_pet_households	dog_ownership_pct	total_dog_households	dog_mean_number	dog_population	cat_ownership_pct	total_cat_households	cat_mean_number	cat_population
Total / Avg	117,791.0	56.9	65,787.0	37.0	42,942.0	1.6	69,294.0	31.6	35,675.0	2.0	73,147.0
Alabama	1,828.0	59.5	1,088.0	44.1	807.0	1.7	1,410.0	27.4	501.0	2.5	1,252.0
Arizona	2,515.0	59.5	1,497.0	40.1	1,008.0	1.8	1,798.0	29.6	743.0	1.9	1,438.0
Arkansas	1,148.0	62.4	716.0	47.9	550.0	2.0	1,097.0	30.6	351.0	2.3	810.0
California	12,974.0	52.9	6,865.0	32.8	4,260.0	1.6	6,687.0	28.3	3,687.0	1.9	7,118.0
Colorado	1,986.0	61.3	1,217.0	42.5	845.0	1.6	1,349.0	32.3	642.0	1.9	1,191.0
Connecticut	1,337.0	54.4	728.0	28.3	379.0	1.3	507.0	31.9	427.0	1.9	796.0
Delaware	334.0	56.6	189.0	33.7	113.0	1.4	163.0	33.7	113.0	1.7	187.0
District of Columbia	287.0	21.9	63.0	13.1	38.0	1.1	42.0	11.6	33.0	1.9	63.0
Florida	7,609.0	54.4	4,138.0	35.7	2,718.0	1.5	4,210.0	27.3	2,079.0	2.1	4,375.0
Georgia	3,798.0	55.1	2,093.0	40.1	1,522.0	1.6	2,479.0	27.3	1,037.0	2.1	2,162.0
Idaho	568.0	62.0	352.0	42.7	242.0	1.5	357.0	34.6	196.0	2.0	393.0
Illinois	5,026.0	51.8	2,602.0	32.4	1,627.0	1.5	2,365.0	26.3	1,321.0	1.9	2,453.0
Indiana	2,478.0	59.9	1,484.0	39.9	989.0	1.6	1,619.0	34.4	852.0	2.2	1,912.0
Iowa	1,219.0	53.6	654.0	33.4	407.0	1.5	610.0	30.3	370.0	2.2	805.0
Kansas	1,133.0	61.0	691.0	42.3	480.0	1.6	774.0	33.3	378.0	1.9	731.0
Kentucky	1,777.0	61.6	1,094.0	45.9	816.0	1.9	1,531.0	36.8	654.0	2.1	1,349.0
Louisiana	1,702.0	55.1	937.0	36.4	619.0	1.8	1,115.0	25.9	441.0	2.0	877.0
Maine	548.0	62.9	345.0	34.6	190.0	1.6	300.0	46.4	254.0	1.9	498.0
Maryland	2,169.0	52.3	1,134.0	30.8	667.0	1.4	915.0	29.8	645.0	2.6	1,677.0
Massachusetts	2,618.0	50.4	1,318.0	23.6	618.0	1.4	850.0	34.1	892.0	1.8	1,593.0
Michigan	3,804.0	55.4	2,108.0	34.6	1,318.0	1.5	2,036.0	31.3	1,192.0	2.0	2,420.0



# Pet Ownership Dashboard

Pet Ownership Analysis

Header

DASHBOARD

Loading Indicator 

Pet Data (1000s) Pet Households Pet Ownership Density Pet Population Pet Ownership Pet Mean Population

Top 20 Household States

Navigation Tabs

Arizona 2.5 M  
California 13.9 M  
Florida 7.6 M  
Georgia 3.8 M  
Illinois 5.0 M  
Indiana 2.5 M  
Maryland 2.2 M  
Massachusetts 2.6 M  
Michigan 3.0 M  
Missouri 2.5 M  
New Jersey 3.2 M  
New York 7.5 M  
North Carolina 3.7 M  
Ohio 4.7 M  
Pennsylvania 5.2 M  
Tennessee 2.6 M  
Texas 9.0 M  
Virginia 3.0 M  
Washington 2.6 M  
Wisconsin 2.4 M

Main Area Row

Top 20 Pet Household States

Colorado 1.2 M  
Massachusetts 1.3 M  
Wisconsin 1.4 M  
Indiana 1.5 M  
Arizona 1.5 M  
Missouri 1.5 M  
Tennessee 1.5 M  
Virginia 1.6 M  
New Jersey 1.6 M  
Washington 1.6 M  
North Carolina 2.1 M  
Georgia 2.1 M  
Michigan 2.1 M  
Illinois 2.6 M  
Ohio 2.7 M  
Pennsylvania 2.9 M  
New York 3.0 M  
Florida 4.1 M  
Texas 5.3 M  
California 6.9 M



Main Area Column 1

Main Area Column 2





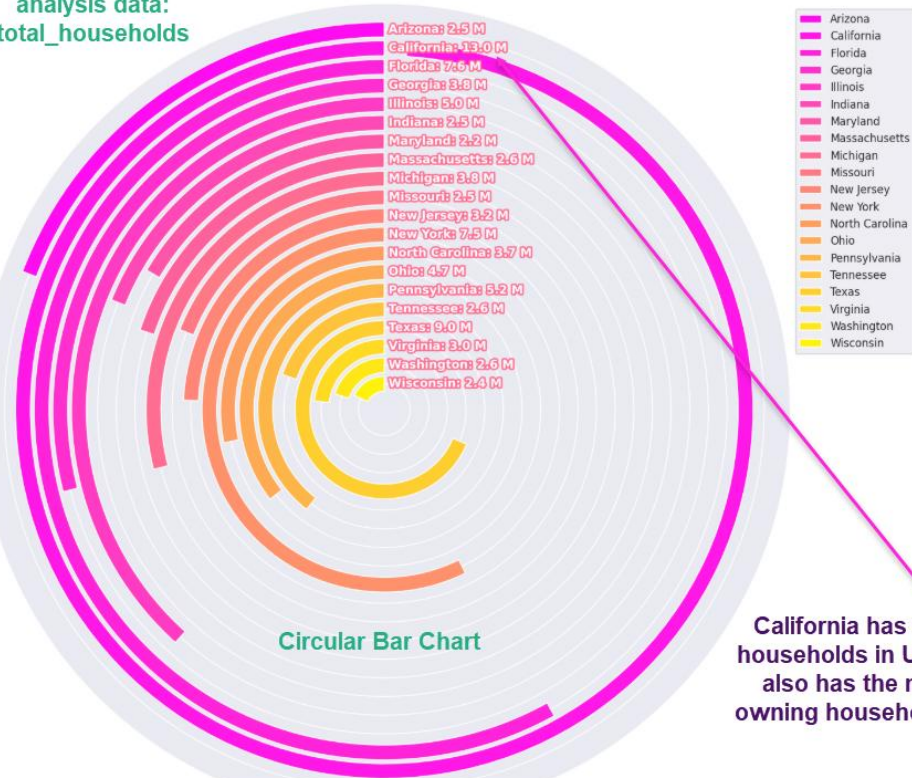
# Top Pet Owning Households

Circular bar chart displays data as concentric bars radiating from a common starting point around a central axis, where the bar that extends furthest around the circle represents the highest value.



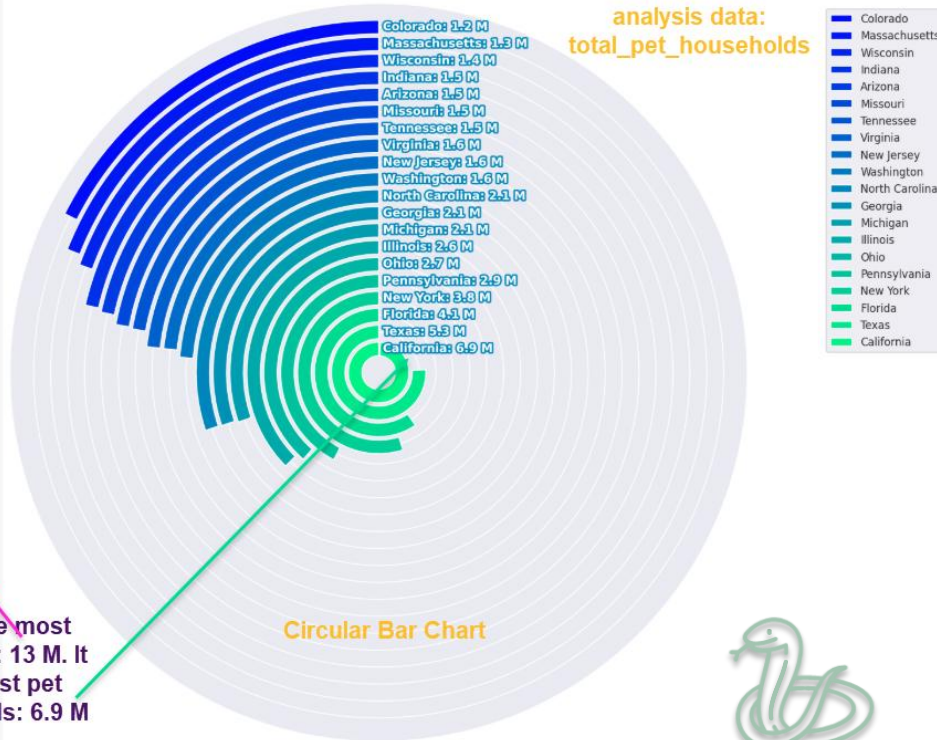
## Top 20 Household States

analysis data:  
total\_households



## Top 20 Pet Household States

analysis data:  
total\_pet\_households



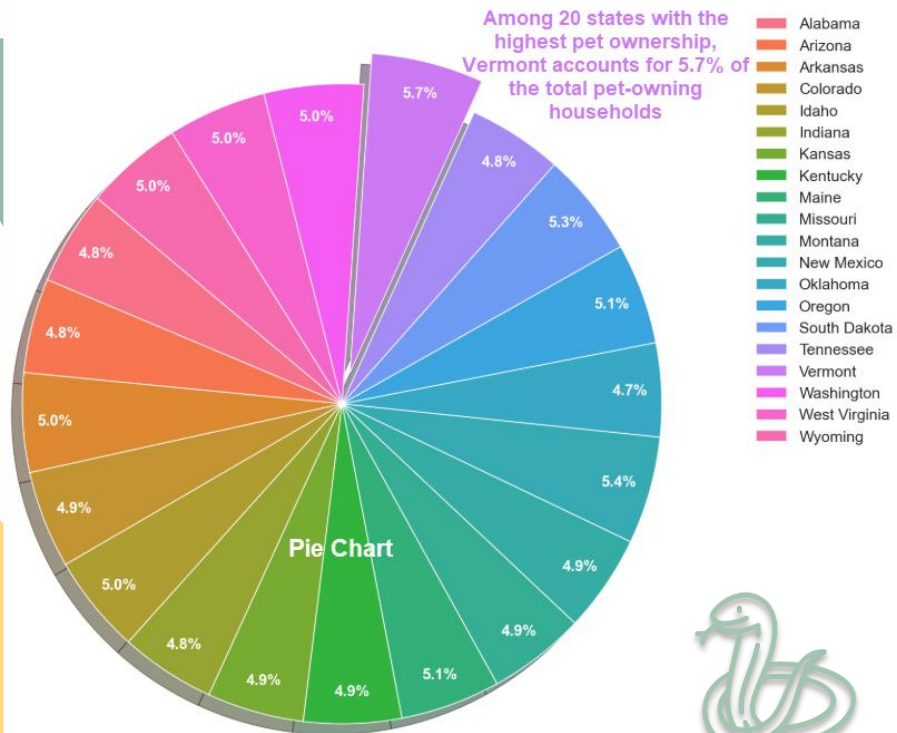
California has the most households in US: 13 M. It also has the most pet owning households: 6.9 M



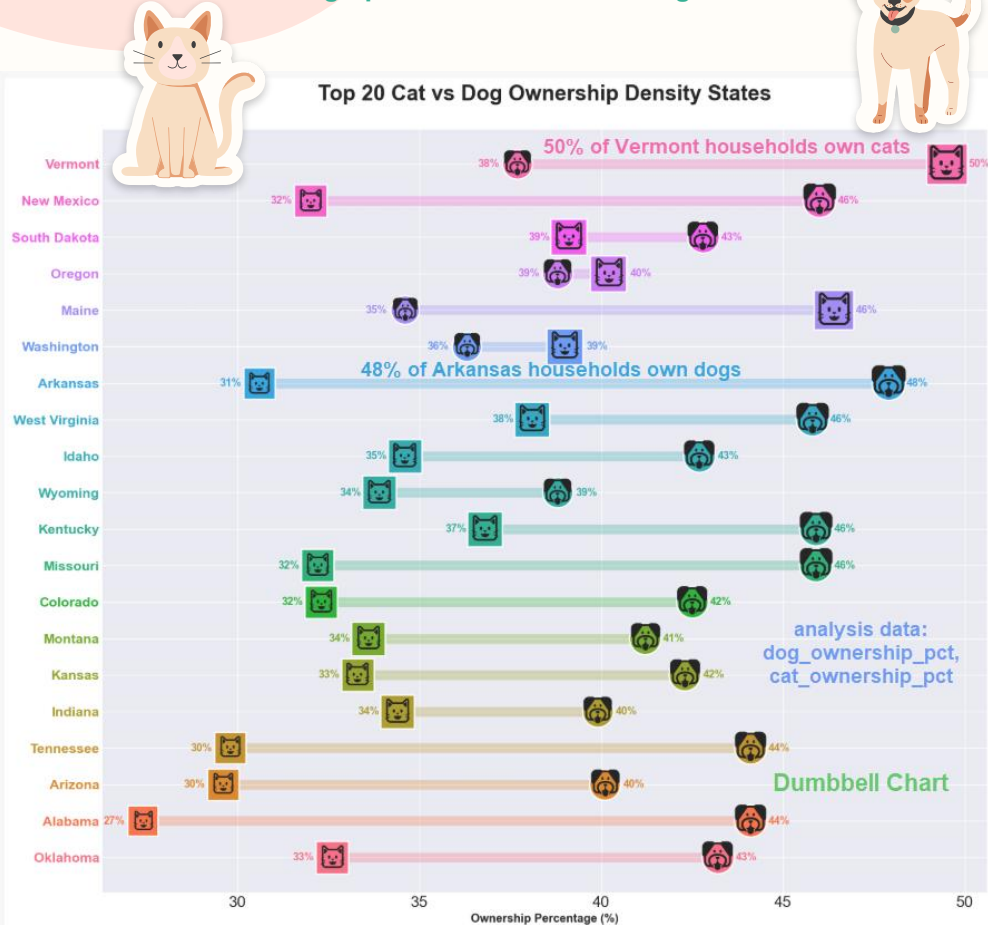
# Top Pet Density States

Pie chart is a circular graphic that represents categorical data by dividing a circle into slices, where the area of each slice reflects its proportional contribution to the whole based on a percentage of the total 360 degrees equal to 100%.

Top 20 Pet Density States



Dumbbell chart is a graph for comparing two data points. The chart consists of two graphics unified with a straight line.



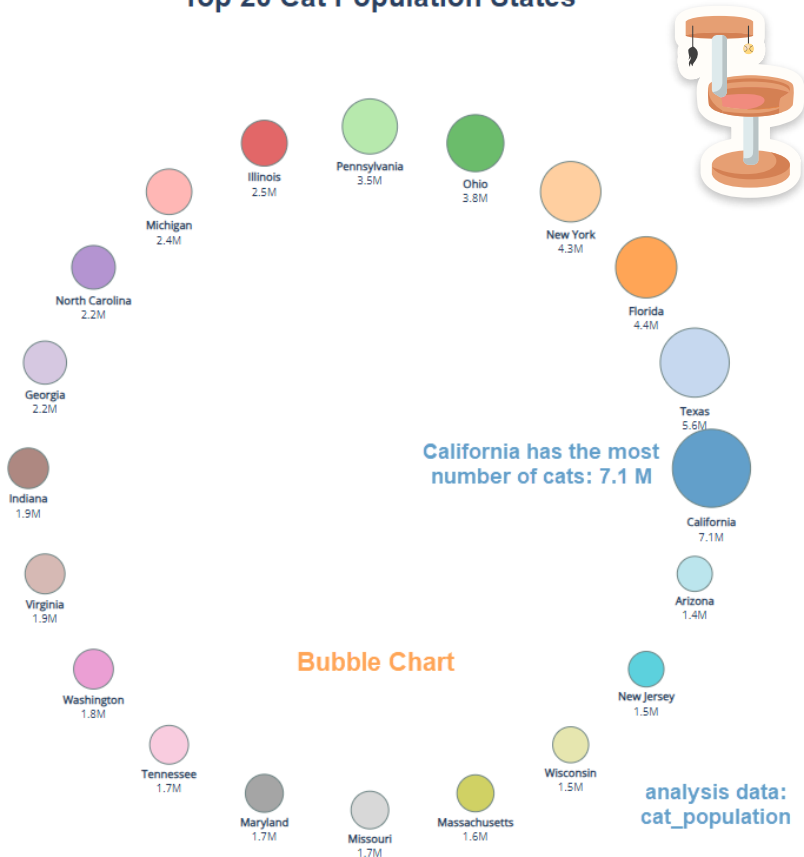
# Top Pet Population States

Bubble chart is a scatter plot with different sizes of data points. This is an ideal plot for displaying three-dimensional data, X value, Y value, and data size.

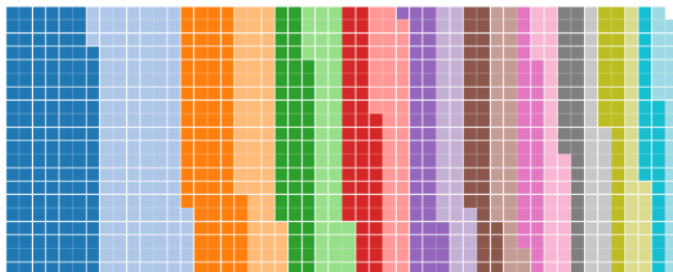
Waffle chart combines multiple small rectangles into a large rectangular graphic. We can use it to show the totals of categorical data.



## Top 20 Cat Population States



## Top 20 Dog Population States



Texas has the most  
number of dogs: 7.2 M

## Waffle Chart

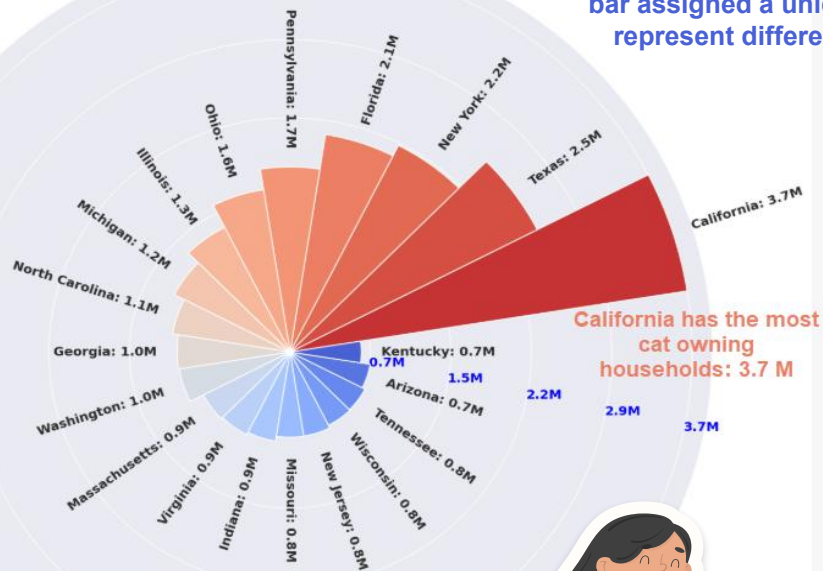


Texas:	7.2M
California:	6.7M
Florida:	4.2M
New York:	3.1M
Ohio:	2.7M
North Carolina:	2.5M
Pennsylvania:	2.5M
Georgia:	2.5M
Illinois:	2.4M
Tennessee:	2.2M
Michigan:	2.0M
Missouri:	2.0M
Arizona:	1.8M
Virginia:	1.7M
Indiana:	1.6M
Washington:	1.6M
Kentucky:	1.5M
Alabama:	1.4M
Colorado:	1.3M
New Jersey:	1.3M

analysis data:  
dog\_population

# Top Pet Household States

## Top 20 Cat Owning States



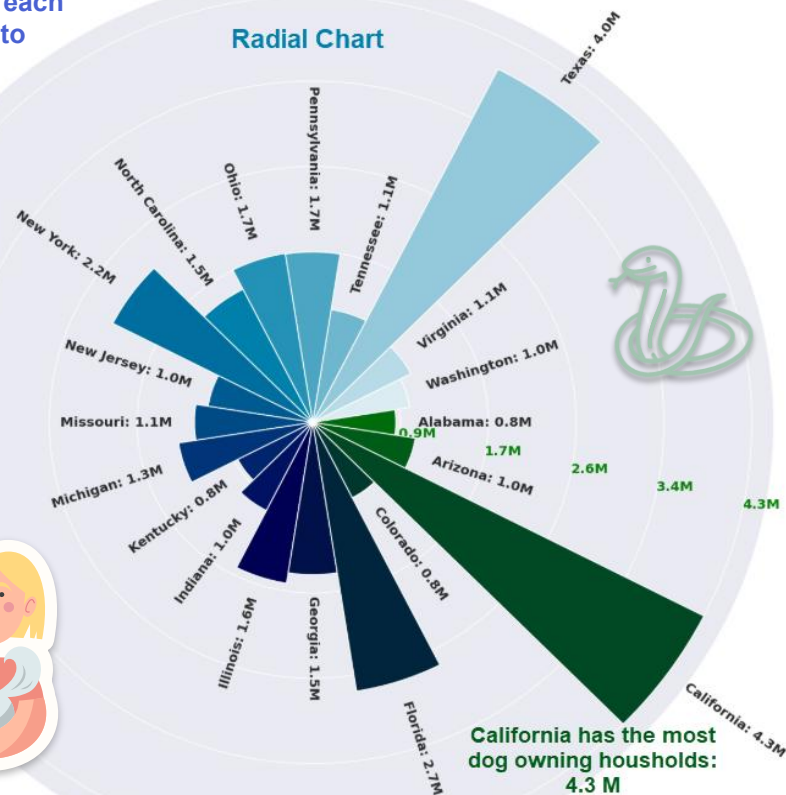
Radial Chart

analysis data:  
total\_cat\_households

Radial bar chart displays data by extending bars outward from a central point toward the circle's edge, with each bar assigned a unique direction to represent different categories.



## Top 20 Dog Owning States



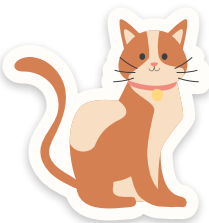
analysis data:  
total\_dog\_households



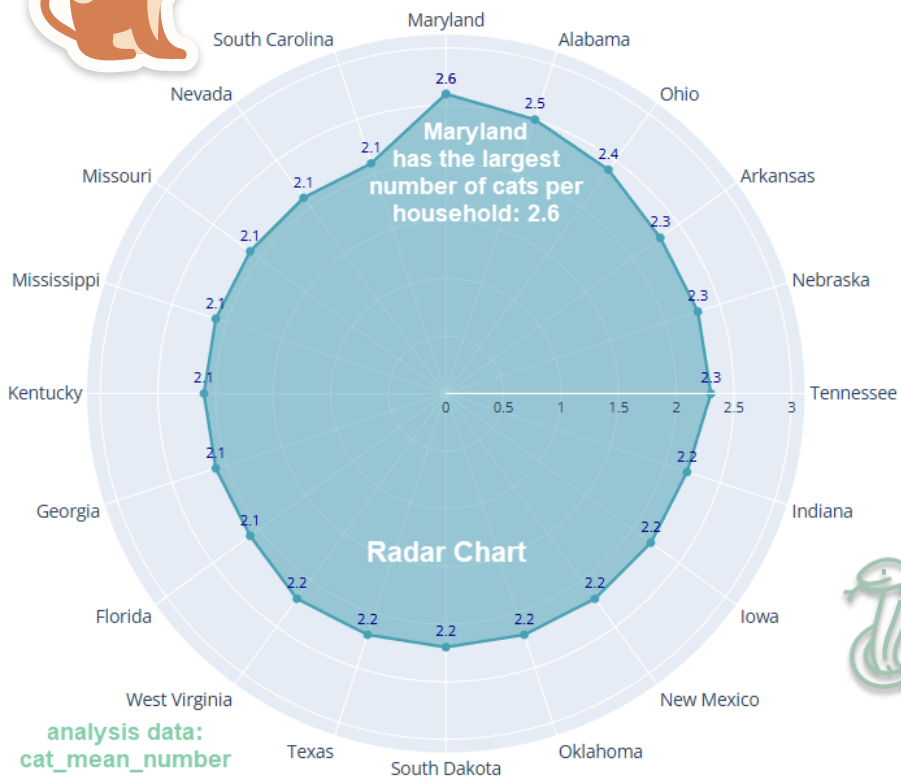


# Top Pet Mean Number States

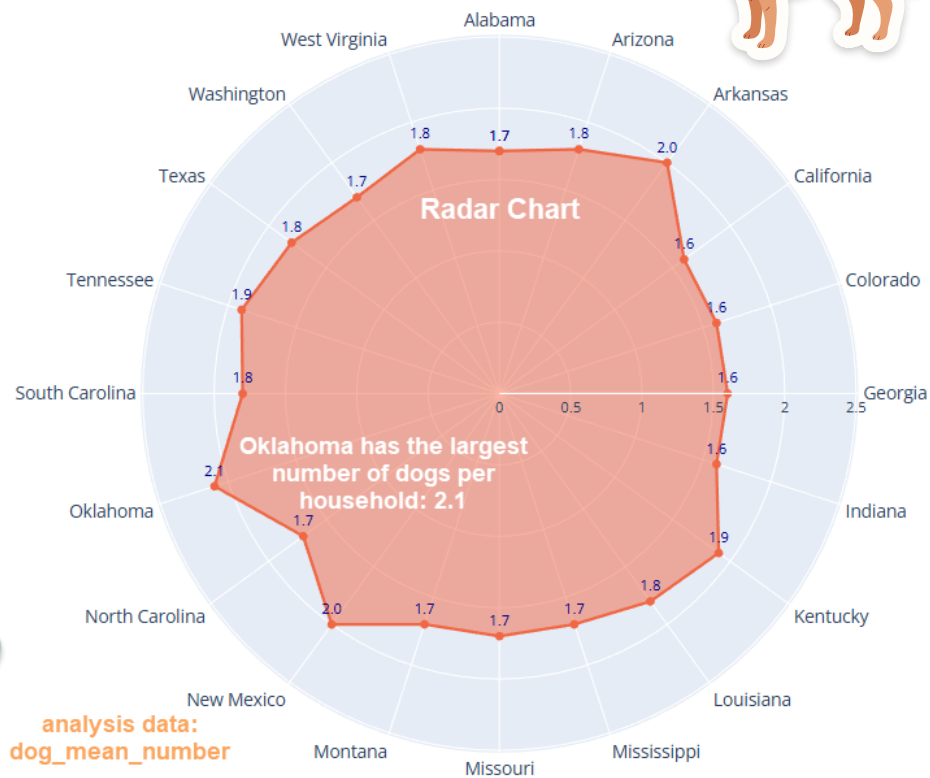
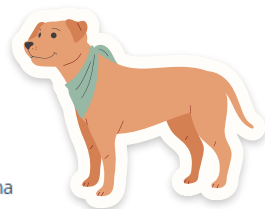
## Top 20 Cat Mean Population by State



A radar chart displays multivariate data by plotting each category as an individual axis radiating from the center, effectively treating categorical data as multiple variables for comparison.



## Top 20 Dog Mean Population by State



# Technology and Tools



## Jupyter Notebook

Python language libraries in Jupyter Notebook environment



## Numpy

Used for chart rotation angles, bar length and width, grid ticks calculations



## Pandas

Reads pet data from excel file, creates Tabulator widget total row, converts data to numeric format



## Matplotlib

Implements radial, dumbbell, pie, and circular bar charts



## Pywaffle

Used to create a waffle chart



## Plotly

Gives a hand in designing radar and bubble charts



## Seaborn

Used for color palette, setting a chart grid style, removing plot lines



## Panel

Helps develop a Tabulator and a Dashboard Template



# Jupyter Code Class Diagram



## Dashboard Manager

Creates a dashboard with all visuals organized in tabs

### pet\_ownership\_analysis.DashboardManager

```
f df
f _chart_manager
m __init__(self, df)
m cache_data(self, df)
m create_dashboard_tabs(self)
m show_dashboard(self, inline=True)
```



### pet\_ownership\_analysis.ChartManager

```
f _df
f fp
m __init__(self, df)
m setup_fonts(self)
m get_color(self, name, number)
m create_cat_mean_radar_chart(self, show=False)
m create_dog_mean_radar_chart(self, show=False)
m create_cat_population_bubble_chart(self, show=False)
m create_dog_population_waffle_chart(self, show=False)
m create_cat_owning_radial_chart(self, show=False)
m create_dog_owning_radial_chart(self, show=False)
m create_pet_ownership_dumbbell_chart(self, show=False)
m create_pet_ownership_density_pie_chart(self, show=False)
m create_pet_households_circular_bar_chart(self, show=False)
m create_households_circular_bar_chart(self, show=False)
m create_data_tabulator_table(self)
```



*#Run dashboard*

```
data_manager = DataManager()
dashboard_manager = DashboardManager(data_manager.data_frame)
dashboard_manager.show_dashboard(inline=False)
```



### pet\_ownership\_analysis.DataManager

```
f data_frame
m __init__(self)
m load_data(self)
m organize_data(self)
```



## Chart Manager

Creates plotly and matplotlib charts, and a panel tabulator widget



## Data Manager

Loads data from pets excel file and renames columns





# Thank You!

## Vlad Koval



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