Step 1: Business and Data Understanding

The decision that needs to be made is to determine which city is the most suitable for new 14th Pawdacity pet store based on predicted yearly sales.

Key Decisions:

1. What decisions needs to be made?
   Which city is the most suitable for new 14th Pawdacity pet store based on predicted yearly sales.

2. What data is needed to inform those decisions?
   Predicted sales for the new store. The data provided to predict sales:
   - The monthly sales data for all of the Pawdacity stores for the year 2010.
   - NAICS data on the most current sales of all competitor stores where total sales is equal to 12 months of sales.
   - A partially parsed data file that can be used for population numbers.
   - Demographic data (Households with individuals under 18, Land Area, Population Density, and Total Families) for each city and county in the state of Wyoming

Step 2: Building the Training Set

See alteryx file, select-location-of-new-pet-store.yxmd

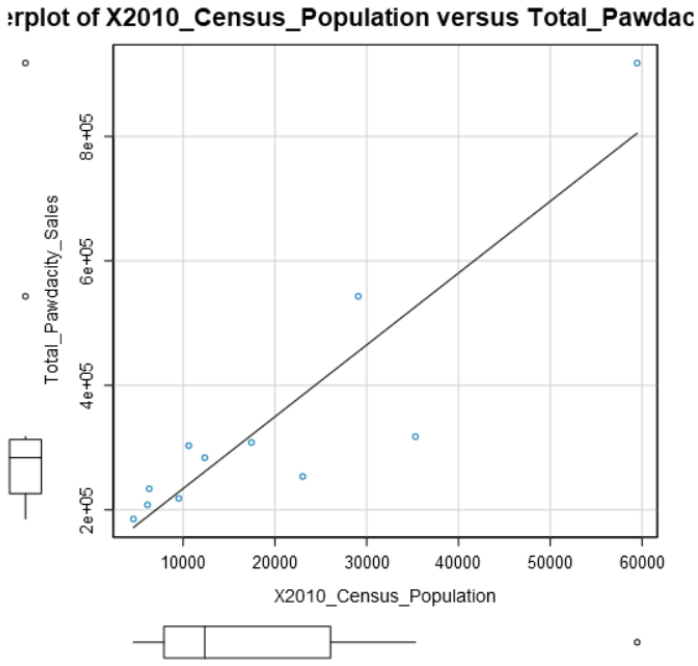
Step 3: Dealing with Outliers

Are there any cities that are outliers in the training set? Which outlier have you chosen to remove or impute? Please explain your reasoning.

I would remove the data for the city Cheyenne. It is the outlier for Census Population, Population Density, and Total Families predictor variables. It is also the outlier for Total Sales target variable. From the data, it seems like it is a bigger and denser city with more people living compare to other cities. Rock Springs is the outlier for Land Area, but I will keep it as it is in line with the trend. Please see below for scatterplots and analysis using IQR steps.

	City	2010 Census Population	Total Pawdacity Sales	Households with Under 18	Land Area	Population Density	Total Families
	Buffalo	4585	185328	746	3116	2	1820
	Casper	35316	317736	7788	3894	11	8756
	Cheyenne	59466	917892	7158	1500	20	14613
	Cody	9520	218376	1403	2999	2	3516
	Douglas	6120	208008	832	1829	1	1744
	Evanston	12359	283824	1486	999	5	2713
	Gillette	29087	543132	4052	2749	6	7189
	Powell	6314	233928	1251	2674	2	3134
	Riverton	10615	303264	2680	4797	2	5556
	Rock Springs	23036	253584	4022	6620	3	7572
	Sheridan	17444	308232	2646	1894	9	6040
Q_1	25th Percentile	7917	226152	1327	1861.5	2	2923.5
Q_3	75th Percentile	26061.5	312984	4037	3505	7.5	7380.5
IQR	Q_3 - Q_1	18144.5	86832	2710	1643.5	5.5	4457
Lower	Q_1 – 1.5×IQR	-19299.75	95904	-2738	-603.75	-6.25	-3762
Upper	Q_3 + 1.5×IQR	53278.25	443232	8102	5970.25	15.75	14066

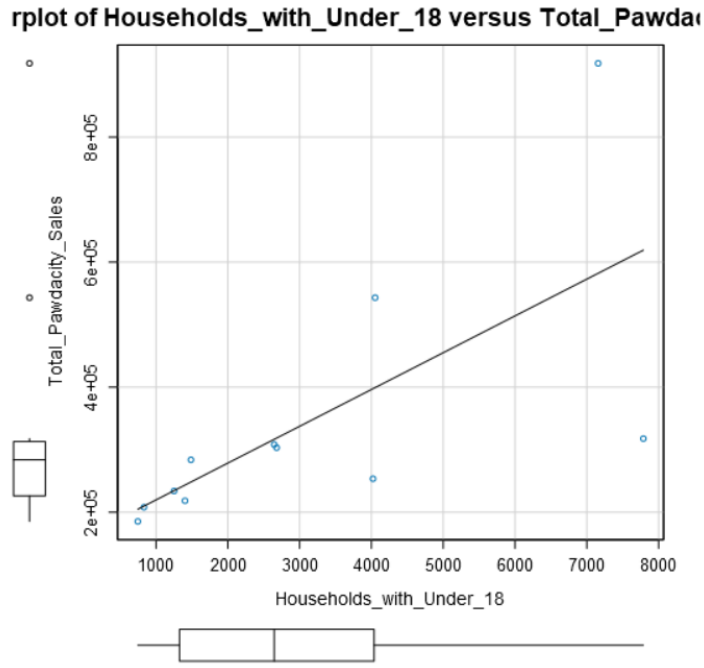
2010 Census Population



Lower	Q_1 – 1.5×IQR	-19299.8
Upper	Q_3 + 1.5×IQR	53278.25

The city Cheyenne has 2010 Census Population of 59466 which is outside of upper fence. The data is probably right, and Cheyenne is probably bigger city with more people. This is also outlier for Total Sales. This makes sense since I'd expect the relationship to behave this way.

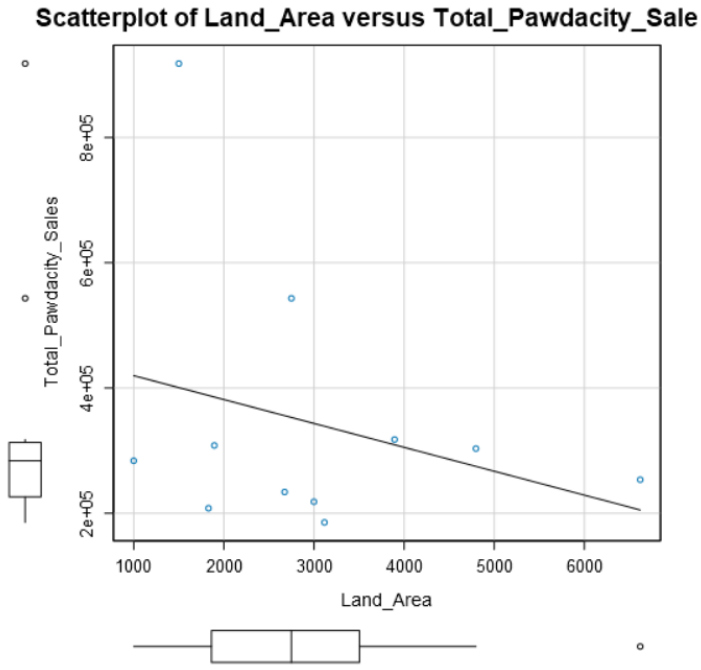
Households with Under 18



Lower	$Q_1 - 1.5 \times IQR$	-2738
Upper	$Q_3 + 1.5 \times IQR$	8102

Everything is between lower fence and upper fence. There doesn't seem to be any outliers for Households with Under 18 predictor variables.

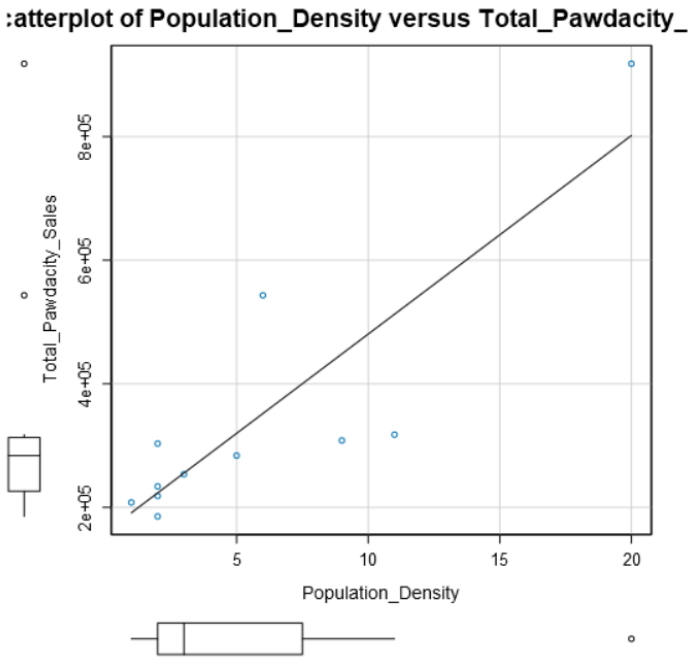
Land Area



Lower	$Q_1 - 1.5 \times IQR$	-603.75
Upper	$Q_3 + 1.5 \times IQR$	5970.25

Rock Springs has a value 6620 which is above upper fence. But it seems to be in line with the trend, and not dramatically different.

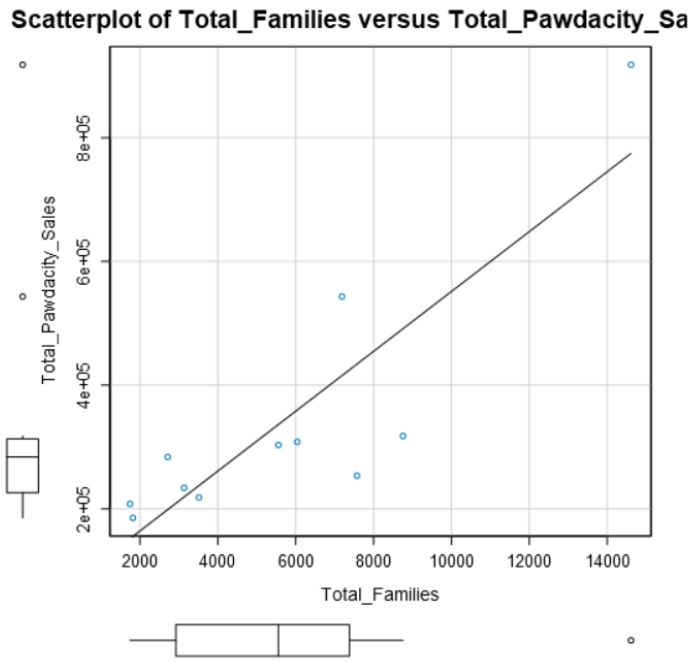
Population Density



Lower	$Q_1 - 1.5 \times IQR$	-6.25
Upper	$Q_3 + 1.5 \times IQR$	15.75

The city Cheyenne has population density of 20 which is outside of upper fence.

Total Families



Lower	$Q_1 - 1.5 \times IQR$	-3762
Upper	$Q_3 + 1.5 \times IQR$	14066

Again, the city Cheyenne has total families of 14613 which is above upper fence.