Project 2.1: Data Cleanup

Step 1: Business and Data Understanding

Pawdacity is a leading pet store chain in Wyoming with 13 stores throughout the state. This year, Pawdacity would like to expand and open a 14th store. The manager has asked you to perform an analysis to recommend the city for Pawdacity's newest store, based on predicted yearly sales.

The manager has given you the following information to work with:

1. The monthly sales data for all of the Pawdacity stores for the year 2010.
2. NAICS data on the most current sales of all competitor stores where total sales is equal to 12 months of sales.
3. A partially parsed data file that can be used for population numbers.
4. Demographic data (Households with individuals under 18, Land Area, Population Density, and Total Families) for each city and county in the state of Wyoming.

The data required for the analysis are:

- **City-** The name of the city.
- **2010 Census Population**- The value of the census population.
- **Total Pawdacity Sales-** The total sales of the pet stores.
- **Household with Under 18-** Household with individual under the age 18.
- **Land Area-** The area of the land of the city.
- **Population Density-** The population density of the city.
- **Total Families-** Number of families.

Step 2: Building the Training Set

After getting the raw data from 4 different sources, the data needs to be first cleaned in order to remove the dirty data- incorrect, duplicate, missing data, etc. Now, the clean data needs to be formatted to get it in a presentable format. This formatted data from different sources are then joined together to form a single data source.

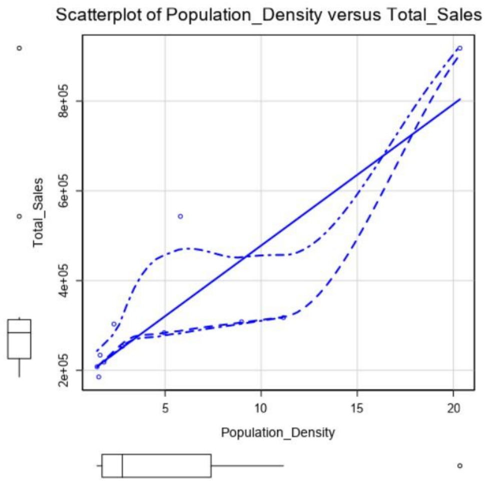
After working with the training set, we find the sum and average of the data given in the table below:

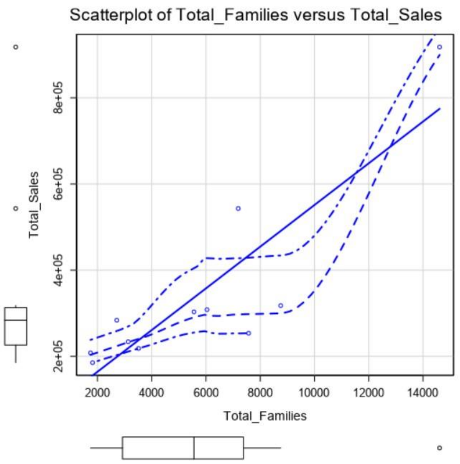
Column	**Sum**	**Average**
Census Population	*213,862*	*19,442*
Total Pawdacity Sales	*3,773,304*	*343,027.63*
Households with Under 18	*34,064*	*3096.72*

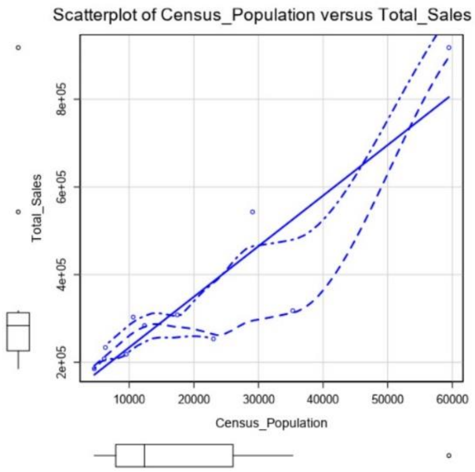
Land Area	*33,071*	*3006.48*
Population Density	*63*	*5.709*
Total Families	*62,653*	*5695.70*

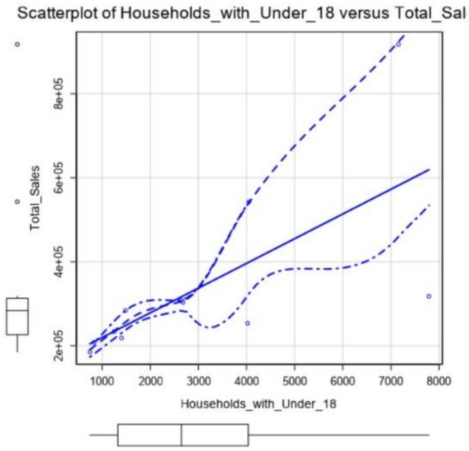
Step 3: Dealing with Outliers

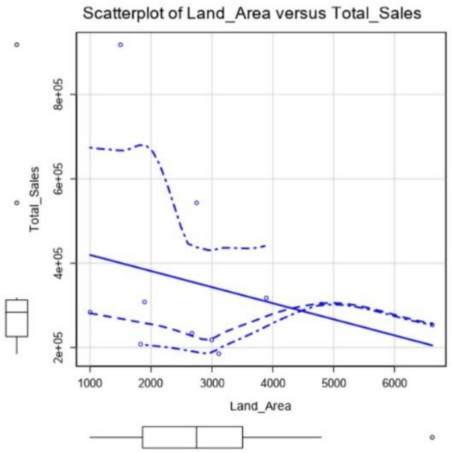
The scatterplots and the boxplots are found between the target variable and the predictor variables.











After creating the dataset, we need to identify the outliers. The IQR method is used here to find the outliers. In this method we need to find the upper fence and the lower fence,

Upper fence= Q3(3rd Quartile) + 1.5 x Interquartile Range
Lower fence =Q1(1st Quartile) – 1.5 x Interquartile Range

The values that are above the upper fence or below the lower fence are considered as the outliers.

Our dataset looks like this:

City	Total Sales	Census Population	Land Area	Households with Under 18	Population Density	Total Families
Buffalo	185328	4585	3115.5075	746	1.55	1819.5
Casper	317736	35316	3894.3091	7788	11.16	8756.32

Cheyenne	917892	59466	1500.1784	7158	20.34	14612.64
Cody	218376	9520	2998.957	1403	1.82	3515.62
Douglas	208008	6120	1829.4651	832	1.46	1744.08
Evanston	283824	12359	999.4971	1486	4.95	2712.64
Gillette	543132	29087	2748.8529	4052	5.8	7189.43
Powell	233928	6314	2673.5746	1251	1.62	3134.18
Riverton	303264	10615	4796.8598	2680	2.34	5556.49
Rock Springs	253584	23036	6620.2019	4022	2.78	7572.18
Sheridan	308232	17444	1893.977	2646	8.98	6039.71

The upper and lower fence for each data field are:

Data Field	Total Sales	Census Population	Land Area	Household with Under 18	Population Density	Total Families
First Quartile	226152	7917	1861.721074	1327	1.72	2923.41
Third Quartile	312984	26061.5	3504.9083	4037	7.39	7380.805
Inter Quartile Range	86832	18144.5	1643.187226	2710	5.67	4457.395
Upper Fence	443232	53278.25	5969.689139	8102	15.895	14066.898
Lower Fence	95904	-19299.8	-603.059765	-2738	-6.785	-3762.683

If we analyze each data field:

1. For *Total Sales*:

The outliers are Cheyenne and Gillette.

2. For *Census Population*:

Cheyenne is the outlier.

3. For *Land Area*:

Rock Springs is the outlier.

4.For *Population Density*:

Again Cheyenne is the outlier.

5.For *Total_Families*:

Cheyenne is the outlier, but the value is almost nearer to the upper fence.

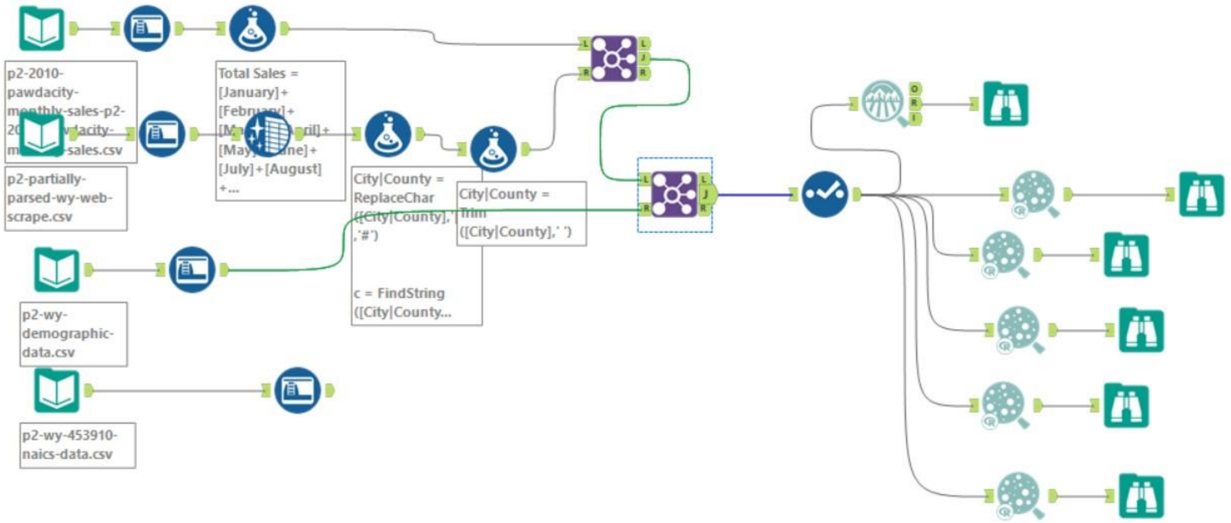
6.There is no outlier for the *Household_Under 18*.

Although Cheyenne looks like the outlier, but if we analyse the data carefully, we find that the population density is very high for Cheyenne. Hence that might be the reason for the high sales. With the increase in the population density, the sales will also increase.

Gillette is to be considered as the outlier here. It has a low population density, but a high sale value. When compared to the other cities of the same population densities , the high sales value looks abnormal.

Hence the outlier here is the city of Gillette.

The Alteryx workflow is mentioned below:


p2-2010-pawdacity-monthly-sales-p2-2010-pawdacity-monthly-sales.csv
Total Sales = [January]+[February]+[March]+[April]+[May]+[June]+[July]+[August]+...
p2-partially-parsed-wy-web-scrape.csv
City|County = ReplaceChar ([City|County],'|' ,'#')
c = FindString ([City|County...
City|County = Trim ([City|County],' ')
p2-wy-demographic-data.csv
p2-wy-453910-naics-data.csv
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