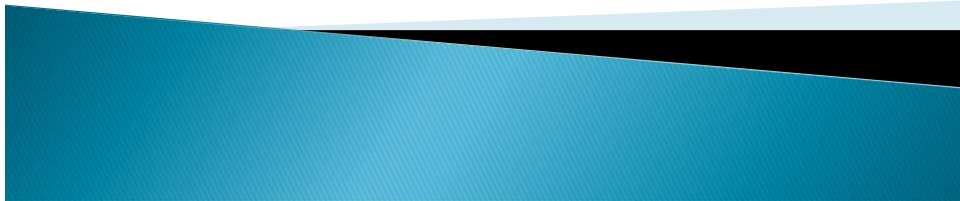


Manheim Auto Auction Sales Analysis



Presented by: Usman Ahmed



What is Manheim?

- ❖ Multiple Locations
- ❖ Facilitates Transactions up to \$46 Billion in Value
- ❖ A Leader in the Auto Auction Industry
- ❖ Huge Amounts of Data



Objective

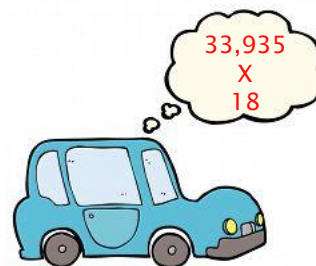
- ▶ Who is the End User?
 - Auto Auction Wholesale/Retail Dealers
- ▶ What are possible questions they might ask?
 1. Which Vehicle Models are the most popular and have the highest amount of sales across the country?
 2. What can I expect to pay for a vehicle based on Model, Year and Odometer provided?
 3. Of these vehicles, where is the best location to get the best price/deal?



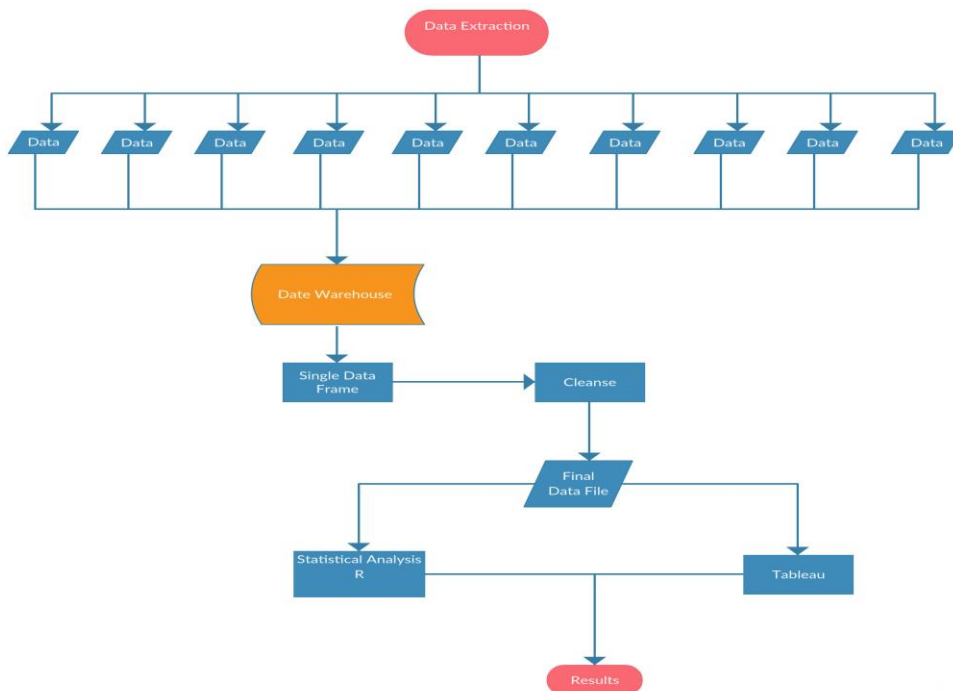
Data Source Info

- ▶ Data retrieved from Manheim.com
 - Post Sale Results – Nov 11–13 & Dec 02–04
- ▶ Auction, Make, Model, Year, Odometer and Price
- ▶ 10 Major Auction Houses Across the Country

Variable	Mean
Year	2010
Odometer	69,950
Sale Price	\$13,662



Tools Utilized



Process Designing & Design © createby 2015

Data Management

- ▶ **Data Scraping – Parsehub**
 - Add-on to Mozilla Firefox
 - 20 individual files generated

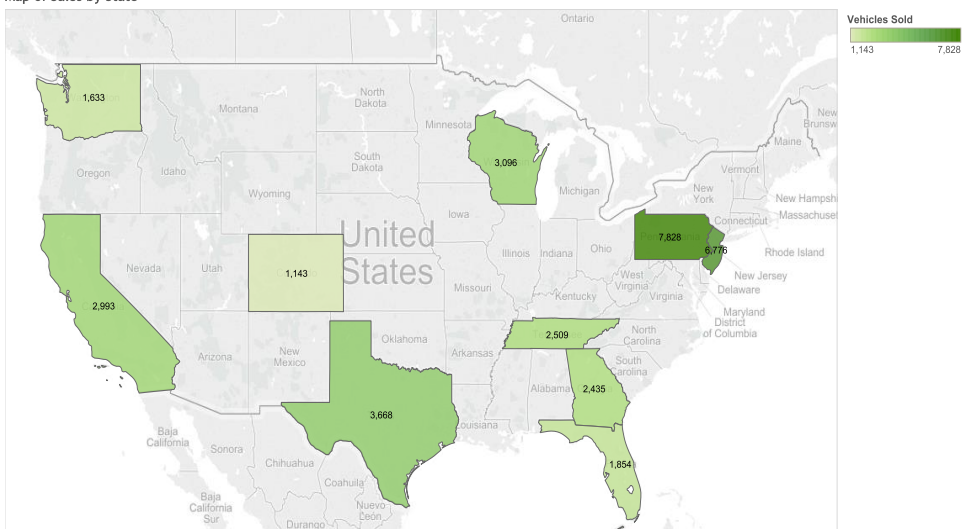
- ▶ **Data Warehousing/Cleanse– MySQL**
 - Combination of files into a single Data frame
 - Ran Queries for:
 - Cleaning up formatted Data
 - Creation of 3 additional Columns (Date, Auction, State)
 - Eliminating Outliers and Data Input Errors

- ▶ **Result:**
 - A single Microsoft Excel File



Count of Sales by State

Map of Sales by State



Map based on Longitude (generated) and Latitude (generated). Color shows sum of Vehicles Sold. The marks are labeled by sum of Vehicles Sold. Details are shown for State.

Sales History (Nov vs. Dec)

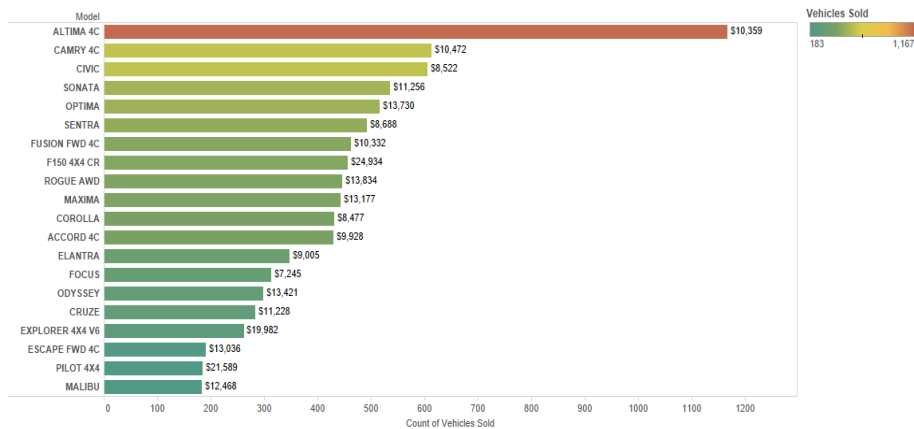
Sales Chart

Auction	Count of Vehicles Sold		Avg. Year		Avg. Odometer		Avg. Price	
	November	December	November	December	November	December	November	December
Manheim PA	3,546	4,282	2011	2011	51,579	55,268	\$16,000	\$15,828
Manheim Dallas	1,791	1,877	2011	2012	66,491	65,765	\$15,528	\$15,969
Manheim Nashville	1,378	1,131	2012	2013	49,620	43,616	\$17,424	\$18,136
Manheim NJ	3,317	3,459	2010	2011	68,540	66,459	\$12,965	\$13,358
Manheim Milwaukee	1,533	1,563	2009	2009	85,929	78,583	\$10,110	\$11,247
Manheim Denver	599	544	2011	2011	67,810	68,770	\$16,389	\$15,920
Manheim Ft. Lauderdale	821	1,033	2009	2009	90,969	86,001	\$9,410	\$11,231
Manheim California	1,418	1,575	2007	2007	108,779	104,643	\$8,402	\$8,990
Manheim Seattle	879	754	2010	2009	66,796	80,369	\$13,994	\$12,856
Manheim Atlanta	1,081	1,354	2009	2010	86,464	80,445	\$11,818	\$11,736

Count of Vehicles Sold, Avg. Year, Avg. Odometer and Avg. Price broken down by Date Month vs. Auction. Color shows Avg. Price. The data is filtered on Make and Model. The Make filter keeps 48 of 48 members. The Model filter keeps 2,061 of 2,061 members.

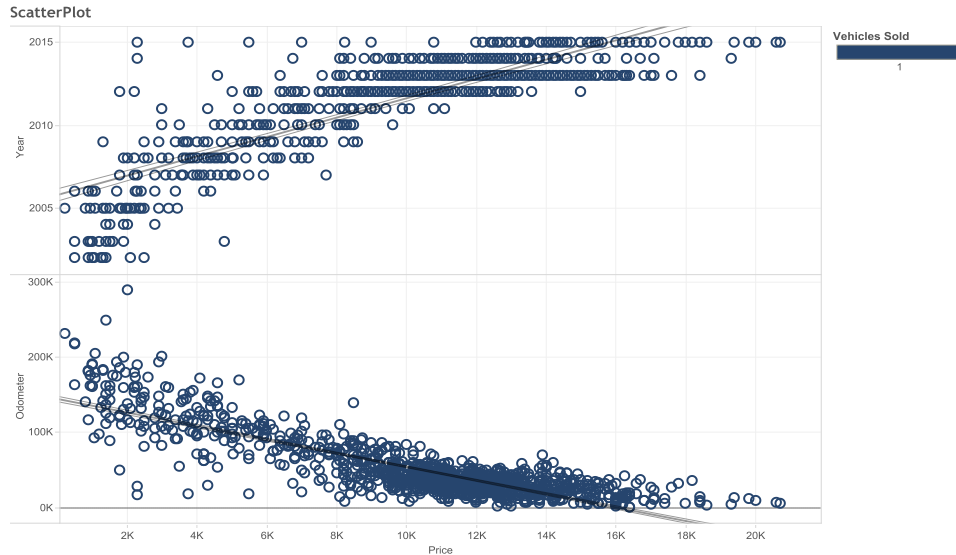
Top Selling Models in U.S

Top Sellers



Count of Vehicles Sold for each Model. Color shows sum of Vehicles Sold. The marks are labeled by average of Price. The view is filtered on Model, which keeps 20 of 2,061 members.

ScatterPlot – Price Vs. Year/Odometer



Price vs. Year and Odometer. Color shows details about Vehicles Sold. For pane Year: Details are shown for Model. The data is filtered on Make, which keeps NISSAN. The view is filtered on Model, which keeps ALTIMA 4C.

Results (R)

► Example: Nissan Altima 4C

- Predict Average Sale Price if **Year = 2014, Odometer= 30,000 Miles**
- Multiple Linear Regression Analysis using R

► Results:

```
Call:
lm(formula = Price ~ Odometer + Year, data = newcar)

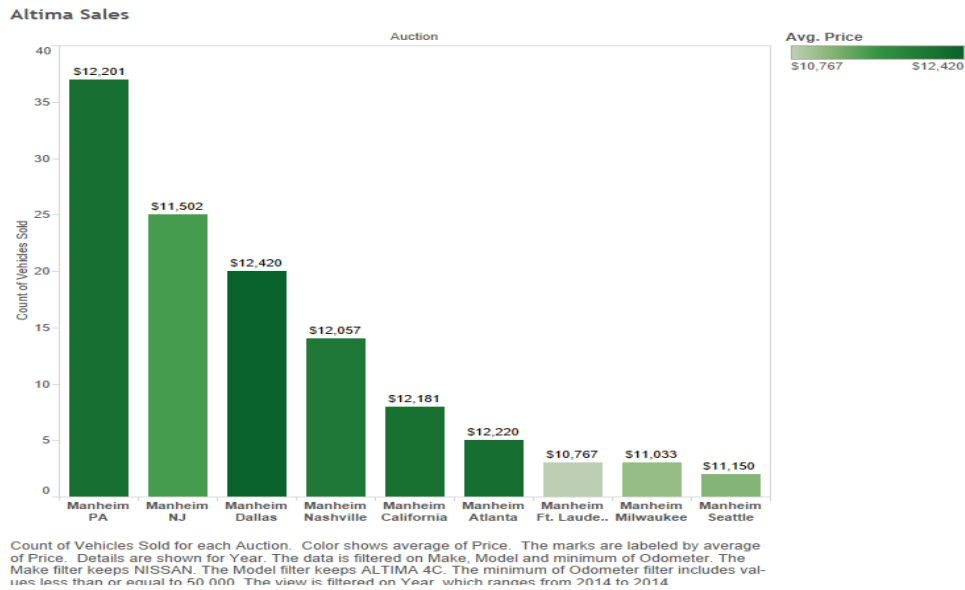
Residuals:
    Min       1Q   Median       3Q      Max
-11596.0 -1010.3  -134.5   871.7  6238.0

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept) -1.286e+06  6.974e+04  -18.44  <2e-16 ***
Odometer     -4.623e-02  2.193e-03  -21.08  <2e-16 ***
Year          6.455e+02  3.462e+01   18.65  <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 1788 on 1164 degrees of freedom
Multiple R-squared:  0.7792, Adjusted R-squared:  0.7788
F-statistic: 2054 on 2 and 1164 DF, p-value: < 2.2e-16

> carpredict= data.frame(Odometer = 30000, Year=2014)
> predict(car.lm, carpredict)
[1] 12669.82
```

Results (Tableau)



Results

► Based on these results we can conclude:

- 1) Altima 4C, Camry 4C and Civic were the top 3 highest selling Models in the United States
- 2) A dealer who wants to buy a 2014 Nissan Altima 4C with 50,000 miles should expect to spend up to \$12,669
- 3) Manheim NJ is the preferred auction house to attend:
 - 1) Average Price is \$11,502
 - 2) Average Odometer is 28,891



Looking Forward

- ▶ With more data, we can get more powerful predictions and analytics
 - ❖ Used only 2 weeks worth of data
 - ❖ Not all auctions used
 - ❖ Limited Variables
- ▶ Powerful tool for Dealers

