Lab 09

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## 1.AIM

Demonstrate one-way ANOVA.

## INTRODUCTION

The one-way analysis of variance (ANOVA), also known as one-factor ANOVA, is an extension of independent two-samples t-test for comparing means in a situation where there are more than two groups. In one-way ANOVA, the data is organized into several groups base on one single grouping variable (also called factor variable).

# ABOUT DATASET

The data set is collected from various web resources in order to explore the used cars market and try to build a model that effectively predicts the price of the car based on its parameters (both numerical and categorical) The data was scraped in Belarus (western Europe) on the 2nd of December 2019

cars <- read.csv("C:/Users/jyosn/Downloads/archive (6)/cars.csv")  
head(cars)

## manufacturer\_name model\_name transmission color odometer\_value year\_produced  
## 1 Subaru Outback automatic silver 190000 2010  
## 2 Subaru Outback automatic blue 290000 2002  
## 3 Subaru Forester automatic red 402000 2001  
## 4 Subaru Impreza mechanical blue 10000 1999  
## 5 Subaru Legacy automatic black 280000 2001  
## 6 Subaru Outback automatic silver 132449 2011  
## engine\_fuel engine\_has\_gas engine\_type engine\_capacity body\_type has\_warranty  
## 1 gasoline False gasoline 2.5 universal False  
## 2 gasoline False gasoline 3.0 universal False  
## 3 gasoline False gasoline 2.5 suv False  
## 4 gasoline False gasoline 3.0 sedan False  
## 5 gasoline False gasoline 2.5 universal False  
## 6 gasoline False gasoline 2.5 universal False  
## state drivetrain price\_usd is\_exchangeable location\_region number\_of\_photos  
## 1 owned all 10900.00 False Минская обл. 9  
## 2 owned all 5000.00 True Минская обл. 12  
## 3 owned all 2800.00 True Минская обл. 4  
## 4 owned all 9999.00 True Минская обл. 9  
## 5 owned all 2134.11 True Гомельская обл. 14  
## 6 owned all 14700.00 True Минская обл. 20  
## up\_counter feature\_0 feature\_1 feature\_2 feature\_3 feature\_4 feature\_5  
## 1 13 False True True True False True  
## 2 54 False True False False True True  
## 3 72 False True False False False False  
## 4 42 True False False False False False  
## 5 7 False True False True True False  
## 6 56 False True False False False True  
## feature\_6 feature\_7 feature\_8 feature\_9 duration\_listed  
## 1 False True True True 16  
## 2 False False False True 83  
## 3 False False True True 151  
## 4 False False False False 86  
## 5 False False False True 7  
## 6 False True True True 67

unique(cars$engine\_type)

## [1] "gasoline" "diesel" "electric"

Here we will consider the following attributes: engine\_type and price\_usd engine\_type is a categorical value which takes values like “gasoline”, “diesel” and “electric”.

price\_usd is a continuous attribute.

## extract variables

cars$engine\_type <- as.factor(cars$engine\_type)

levels(cars$engine\_type)

## [1] "diesel" "electric" "gasoline"

mean(cars$price\_usd[cars$engine\_type=="diesel"])

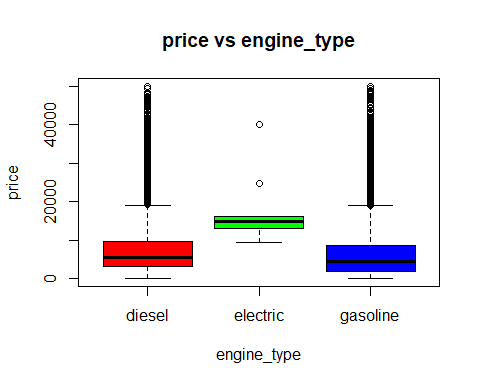
## [1] 7410.971

tapply(cars$price\_usd,cars$engine\_type,mean)

## diesel electric gasoline   
## 7410.971 17464.900 6248.732

## datavisualization

boxplot(cars$price\_usd~cars$engine\_type,main="price vs engine\_type",xlab="engine\_type",ylab="price",col=rainbow(3))



**Defining the null and alternative hypothesis**:  
Ho: The mean price of cars with different engine types are equal  
 = =

H1: The mean price of cars with different engine types are not equal

1. **Setting the level of significance**:  
    = 5% i.e., 0.05
2. **Determining the Test Statistic**:  
   Because there are three groups that are being tested, we will use ANOVA test.

result<-aov(cars$price\_usd~cars$engine\_type,data=cars)  
result

## Call:  
## aov(formula = cars$price\_usd ~ cars$engine\_type, data = cars)  
##   
## Terms:  
## cars$engine\_type Residuals  
## Sum of Squares 1.275034e+10 1.579353e+12  
## Deg. of Freedom 2 38528  
##   
## Residual standard error: 6402.527  
## Estimated effects may be unbalanced

summary(result)

## Df Sum Sq Mean Sq F value Pr(>F)   
## cars$engine\_type 2 1.275e+10 6.375e+09 155.5 <2e-16 \*\*\*  
## Residuals 38528 1.579e+12 4.099e+07   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

**Making Decision**  Our p-value is less than 0.05. This indicates that average price of at least one of the groups are significantly different from another.

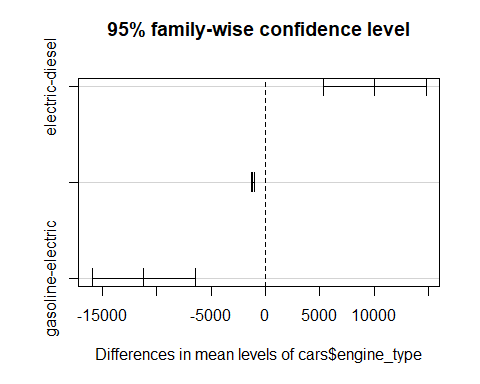
TukeyHSD(result)

## Tukey multiple comparisons of means  
## 95% family-wise confidence level  
##   
## Fit: aov(formula = cars$price\_usd ~ cars$engine\_type, data = cars)  
##   
## $`cars$engine\_type`  
## diff lwr upr p adj  
## electric-diesel 10053.929 5306.898 14800.961 2.1e-06  
## gasoline-diesel -1162.238 -1324.317 -1000.159 0.0e+00  
## gasoline-electric -11216.168 -15962.282 -6470.054 1.0e-07

electric-diesel, gasoline-diesel and gasoline-electric have p-value less than the level of significance, according to the Tukey HSD test. This means that all three group have average price that differ signifcantly from one another..

The graph below visualizes the difference of the same.

plot(TukeyHSD(result, conf.level=.95))

 **Conclusion**:  
We can conclude that the average price of cars with different engine types are not equal to each other.

# 2.AIM

To demonstrate two-way ANOVA Test,: a) without interaction effect. b) with Interaction effect.

# INTRODUCTION

The two-way ANOVA test is used to compare the effects of two grouping variables (A and B) on a response variable at the same time.

Here we will consider the following attributes: engine\_type,body\_type and price\_usd. a)engine\_type is a categorical value which takes values like “gasoline”, “diesel” and “electric”.

b)price\_usd is a continuous attribute.

c) body\_type is a categorical value taking values like “universal”,“suv” ,“sedan” , “hatchback”, “liftback”,“minivan” , “minibus”,“van”, “pickup”,“coupe” ,“cabriolet”,“limousine”.

#extract variables  
engine <- as.factor(cars$engine\_type)  
levels(engine)

## [1] "diesel" "electric" "gasoline"

body<-as.factor(cars$body\_type)  
levels(body)

## [1] "cabriolet" "coupe" "hatchback" "liftback" "limousine" "minibus"   
## [7] "minivan" "pickup" "sedan" "suv" "universal" "van"

price<-cars$price\_usd

# WITHOUT INTERACTION EFFECT

Ha0: There is no significant difference in the price of car with different type of engine. = =

Ha1: There is a significant difference in the price of car with different type of engine.

Hb0: There is no significant difference in the price of car based on different body type = = = ========

Hb1: There is a significant difference in the price of car for different body type.

**Setting the level of significance:** = 5% i.e., 0.05

**Determining the Test Statistic:** As there are two categorical attributes with more than two groups that are being tested, we will use the ANOVA test.

#without interaction  
result<-aov(price~engine+body,data=cars)  
summary(result)

## Df Sum Sq Mean Sq F value Pr(>F)   
## engine 2 1.275e+10 6.375e+09 199.1 <2e-16 \*\*\*  
## body 11 3.457e+11 3.143e+10 981.3 <2e-16 \*\*\*  
## Residuals 38517 1.234e+12 3.203e+07   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

**Decision Making**:  
We see that the P-value is smaller than the level of significance for both engine and body, indicating that the mean price at least one of the groups in both categories are significantly different form another.  
To understand which of these are not equal we use Tukey test (TukeyHSD).

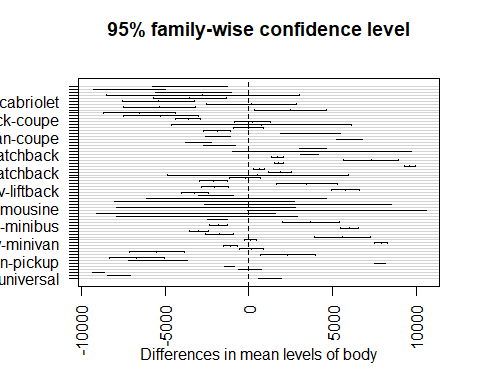
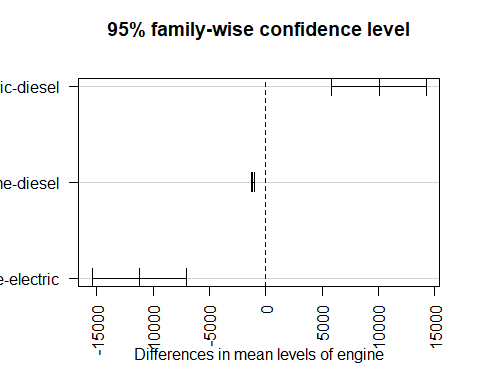
TukeyHSD(result)

## Tukey multiple comparisons of means  
## 95% family-wise confidence level  
##   
## Fit: aov(formula = price ~ engine + body, data = cars)  
##   
## $engine  
## diff lwr upr p adj  
## electric-diesel 10053.929 5857.924 14249.935 1e-07  
## gasoline-diesel -1162.238 -1305.504 -1018.973 0e+00  
## gasoline-electric -11216.168 -15411.362 -7020.974 0e+00  
##   
## $body  
## diff lwr upr p adj  
## coupe-cabriolet -3511.01484 -5766.0879 -1255.9417 0.0000233  
## hatchback-cabriolet -7127.81324 -9273.8512 -4981.7753 0.0000000  
## liftback-cabriolet -3296.76145 -5572.8096 -1020.7133 0.0001396  
## limousine-cabriolet -2759.46129 -8509.7046 2990.7820 0.9205527  
## minibus-cabriolet -3521.61045 -5714.9157 -1328.3052 0.0000100  
## minivan-cabriolet -5412.82842 -7570.4974 -3255.1595 0.0000000  
## pickup-cabriolet 167.95290 -2517.6231 2853.5289 1.0000000  
## sedan-cabriolet -5337.52050 -7479.2535 -3195.7875 0.0000000  
## suv-cabriolet 2480.81932 329.7803 4631.8584 0.0089978  
## universal-cabriolet -6518.40839 -8668.4883 -4368.3285 0.0000000  
## van-cabriolet -5261.71079 -7494.2129 -3029.2086 0.0000000  
## hatchback-coupe -3616.79840 -4371.3659 -2862.2309 0.0000000  
## liftback-coupe 214.25339 -855.4608 1283.9676 0.9999616  
## limousine-coupe 751.55354 -4636.3209 6139.4280 0.9999991  
## minibus-coupe -10.59561 -890.6418 869.4506 1.0000000  
## minivan-coupe -1901.81359 -2688.8514 -1114.7758 0.0000000  
## pickup-coupe 3678.96774 1896.7748 5461.1606 0.0000000  
## sedan-coupe -1826.50566 -2568.7412 -1084.2701 0.0000000  
## suv-coupe 5991.83415 5223.1585 6760.5098 0.0000000  
## universal-coupe -3007.39355 -3773.3809 -2241.4062 0.0000000  
## van-coupe -1750.69595 -2724.3279 -777.0640 0.0000003  
## liftback-hatchback 3831.05179 3015.9367 4646.1669 0.0000000  
## limousine-hatchback 4368.35194 -974.8040 9711.5078 0.2403344  
## minibus-hatchback 3606.20279 3063.4270 4148.9786 0.0000000  
## minivan-hatchback 1714.98482 1341.4173 2088.5523 0.0000000  
## pickup-hatchback 7295.76614 5653.7138 8937.8184 0.0000000  
## sedan-hatchback 1790.29274 1523.7636 2056.8219 0.0000000  
## suv-hatchback 9608.63256 9275.4862 9941.7789 0.0000000  
## universal-hatchback 609.40485 282.5090 936.3007 0.0000001  
## van-hatchback 1866.10245 1181.9363 2550.2686 0.0000000  
## limousine-liftback 537.30015 -4859.3869 5933.9872 1.0000000  
## minibus-liftback -224.84900 -1157.3306 707.6326 0.9997577  
## minivan-liftback -2116.06697 -2961.3297 -1270.8043 0.0000000  
## pickup-liftback 3464.71435 1656.0540 5273.3747 0.0000000  
## sedan-liftback -2040.75905 -2844.4718 -1237.0463 0.0000000  
## suv-liftback 5777.58077 4949.3883 6605.7733 0.0000000  
## universal-liftback -3221.64694 -4047.3450 -2395.9489 0.0000000  
## van-liftback -1964.94934 -2986.2229 -943.6758 0.0000000  
## minibus-limousine -762.14915 -6124.4643 4600.1660 0.9999989  
## minivan-limousine -2653.36713 -8001.2051 2694.4709 0.9016232  
## pickup-limousine 2927.41420 -2654.3556 8509.1840 0.8622786  
## sedan-limousine -2578.05920 -7919.4875 2763.3691 0.9175207  
## suv-limousine 5240.28061 -104.8859 10585.4471 0.0607468  
## universal-limousine -3758.94709 -9103.7277 1585.8335 0.4776511  
## van-limousine -2502.24949 -7880.7160 2876.2170 0.9353515  
## minivan-minibus -1891.21797 -2478.2972 -1304.1388 0.0000000  
## pickup-minibus 3689.56335 1986.2005 5392.9262 0.0000000  
## sedan-minibus -1815.91005 -2341.4070 -1290.4131 0.0000000  
## suv-minibus 6002.42977 5440.2058 6564.6537 0.0000000  
## universal-minibus -2996.79794 -3555.3408 -2438.2551 0.0000000  
## van-minibus -1740.10034 -2560.5835 -919.6172 0.0000000  
## pickup-minivan 5580.78133 3923.5571 7238.0056 0.0000000  
## sedan-minivan 75.30793 -272.6780 423.2939 0.9999165  
## suv-minivan 7893.64774 7492.3462 8294.9492 0.0000000  
## universal-minivan -1105.57997 -1501.7078 -709.4521 0.0000000  
## van-minivan 151.11764 -568.7016 870.9368 0.9999383  
## sedan-pickup -5505.47340 -7141.8955 -3869.0513 0.0000000  
## suv-pickup 2312.86641 664.2834 3961.4494 0.0002842  
## universal-pickup -6686.36129 -8333.6926 -5039.0300 0.0000000  
## van-pickup -5429.66369 -7183.2095 -3676.1179 0.0000000  
## suv-sedan 7818.33981 7514.1557 8122.5240 0.0000000  
## universal-sedan -1180.88789 -1478.2133 -883.5625 0.0000000  
## van-sedan 75.80971 -594.7310 746.3504 0.9999999  
## universal-suv -8999.22771 -9357.4889 -8640.9665 0.0000000  
## van-suv -7742.53010 -8442.2254 -7042.8348 0.0000000  
## van-universal 1256.69760 559.9567 1953.4385 0.0000002

From this test, we obtain all p-values for different engine\_type combinations. They are all less than 0.05. Hence we reject Ha0 and conclude that there is significant difference in price of car by engine\_type.

Also the p-value for limousine-cabriolet, limousine-liftback,pickup-cabriolet,minibus-liftback,liftback-coupe,limousine-coupe, minibus-coupe,limousine-hatchback,minibus-liftback,minibus-limousine,minivan-limousine, pickup-limousine,sedan-limousine,suv-limousine universal-limousine, van-limousine, sedan-minivan,van-sedan, pairs have p-value greater than 0.05. Hence these pairs have mean price which are not significantly different. For the rest of the pairs, the mean price is significantly different. We can reject Hb0 as some of the pairs have shown significant effect on the price due to their body type.

plot(TukeyHSD(result, conf.level=.95), las = 2)



**Conclusion** A two- way anova test was carried out to test the effect of engine and body type on the price of used car. It is revealed that there is a significant effect on the price due to engine type at all levels. It is also shown that there is a significant effect due to certain body types on the price of a used car.

# WITH INTERACTION EFFECT

**Defining the null and alternative hypothesis**:  
Ha0: There is no significant difference in the price of car with different type of engine.

Ha1: There is a significant difference in the price of car with different type of engine.

Hb0: There is no significant difference in the price of car based on different body type.

Hb1: There is a significant difference in the price of car based on different body type.

Hc0: There is no interaction effect

Hc1: There is an interaction effect

**Setting the level of significance**:  
 = 5% i.e., 0.05

**Determining the Test Statistic**:  
As there are two categorical attribute with more than two groups that are being tested, we will use the ANOVA test.

We will now check for difference with interaction effect.

result1<-aov(price~engine\_type\*body\_type,data=cars)  
summary(result1)

## Df Sum Sq Mean Sq F value Pr(>F)   
## engine\_type 2 1.275e+10 6.375e+09 199.69 <2e-16 \*\*\*  
## body\_type 11 3.457e+11 3.143e+10 984.50 <2e-16 \*\*\*  
## engine\_type:body\_type 11 4.326e+09 3.933e+08 12.32 <2e-16 \*\*\*  
## Residuals 38506 1.229e+12 3.192e+07   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

1. **Decision Making**:  
   We see that the P-value is smaller than the level of significance for both engine\_type, body\_type, and the two combined indicating that at least one of the groups in both categories combined have mean prices which are not equal. Hence we can reject all the H0s.  
   To understand which of these are not equal we use Tukey’s test(TukeyHSD).

#multiple pairwise comparison test:  
TukeyHSD(result1)

## Tukey multiple comparisons of means  
## 95% family-wise confidence level  
##   
## Fit: aov(formula = price ~ engine\_type \* body\_type, data = cars)  
##   
## $engine\_type  
## diff lwr upr p adj  
## electric-diesel 10053.929 5864.689 14243.169 1e-07  
## gasoline-diesel -1162.238 -1305.273 -1019.204 0e+00  
## gasoline-electric -11216.168 -15404.598 -7027.737 0e+00  
##   
## $body\_type  
## diff lwr upr p adj  
## coupe-cabriolet -3511.01484 -5762.4521 -1259.5776 0.0000224  
## hatchback-cabriolet -7127.81324 -9270.3911 -4985.2354 0.0000000  
## liftback-cabriolet -3296.76145 -5569.1399 -1024.3830 0.0001345  
## limousine-cabriolet -2759.46129 -8500.4334 2981.5108 0.9197114  
## minibus-cabriolet -3521.61045 -5711.3795 -1331.8414 0.0000096  
## minivan-cabriolet -5412.82842 -7567.0185 -3258.6383 0.0000000  
## pickup-cabriolet 167.95290 -2513.2931 2849.1989 1.0000000  
## sedan-cabriolet -5337.52050 -7475.8004 -3199.2406 0.0000000  
## suv-cabriolet 2480.81932 333.2484 4628.3903 0.0087945  
## universal-cabriolet -6518.40839 -8665.0217 -4371.7951 0.0000000  
## van-cabriolet -5261.71079 -7490.6135 -3032.8081 0.0000000  
## hatchback-coupe -3616.79840 -4370.1493 -2863.4475 0.0000000  
## liftback-coupe 214.25339 -853.7361 1282.2429 0.9999610  
## limousine-coupe 751.55354 -4627.6340 6130.7411 0.9999991  
## minibus-coupe -10.59561 -889.2229 868.0317 1.0000000  
## minivan-coupe -1901.81359 -2687.5824 -1116.0447 0.0000000  
## pickup-coupe 3678.96774 1899.6483 5458.2872 0.0000000  
## sedan-coupe -1826.50566 -2567.5445 -1085.4668 0.0000000  
## suv-coupe 5991.83415 5224.3978 6759.2705 0.0000000  
## universal-coupe -3007.39355 -3772.1459 -2242.6412 0.0000000  
## van-coupe -1750.69595 -2722.7581 -778.6338 0.0000003  
## liftback-hatchback 3831.05179 3017.2509 4644.8527 0.0000000  
## limousine-hatchback 4368.35194 -966.1892 9702.8931 0.2381018  
## minibus-hatchback 3606.20279 3064.3021 4148.1035 0.0000000  
## minivan-hatchback 1714.98482 1342.0196 2087.9500 0.0000000  
## pickup-hatchback 7295.76614 5656.3613 8935.1710 0.0000000  
## sedan-hatchback 1790.29274 1524.1933 2056.3922 0.0000000  
## suv-hatchback 9608.63256 9276.0233 9941.2418 0.0000000  
## universal-hatchback 609.40485 283.0361 935.7736 0.0000001  
## van-hatchback 1866.10245 1183.0394 2549.1655 0.0000000  
## limousine-liftback 537.30015 -4850.6858 5925.2861 1.0000000  
## minibus-liftback -224.84900 -1155.8271 706.1291 0.9997538  
## minivan-liftback -2116.06697 -2959.9669 -1272.1671 0.0000000  
## pickup-liftback 3464.71435 1658.9701 5270.4586 0.0000000  
## sedan-liftback -2040.75905 -2843.1760 -1238.3421 0.0000000  
## suv-liftback 5777.58077 4950.7235 6604.4380 0.0000000  
## universal-liftback -3221.64694 -4046.0137 -2397.2802 0.0000000  
## van-liftback -1964.94934 -2984.5763 -945.3224 0.0000000  
## minibus-limousine -762.14915 -6115.8187 4591.5204 0.9999989  
## minivan-limousine -2653.36713 -7992.5828 2685.8486 0.9006218  
## pickup-limousine 2927.41420 -2645.3561 8500.1845 0.8609758  
## sedan-limousine -2578.05920 -7910.8755 2754.7571 0.9166530  
## suv-limousine 5240.28061 -96.2679 10576.8291 0.0598131  
## universal-limousine -3758.94709 -9095.1103 1577.2161 0.4749705  
## van-limousine -2502.24949 -7872.0443 2867.5453 0.9346431  
## minivan-minibus -1891.21797 -2477.3506 -1305.0853 0.0000000  
## pickup-minibus 3689.56335 1988.9468 5390.1799 0.0000000  
## sedan-minibus -1815.91005 -2340.5598 -1291.2603 0.0000000  
## suv-minibus 6002.42977 5441.1123 6563.7472 0.0000000  
## universal-minibus -2996.79794 -3554.4403 -2439.1556 0.0000000  
## van-minibus -1740.10034 -2559.2606 -920.9401 0.0000000  
## pickup-minivan 5580.78133 3926.2290 7235.3336 0.0000000  
## sedan-minivan 75.30793 -272.1169 422.7328 0.9999151  
## suv-minivan 7893.64774 7492.9933 8294.3022 0.0000000  
## universal-minivan -1105.57997 -1501.0691 -710.0908 0.0000000  
## van-minivan 151.11764 -567.5410 869.7763 0.9999373  
## sedan-pickup -5505.47340 -7139.2571 -3871.6897 0.0000000  
## suv-pickup 2312.86641 666.9414 3958.7914 0.0002745  
## universal-pickup -6686.36129 -8331.0366 -5041.6860 0.0000000  
## van-pickup -5429.66369 -7180.3822 -3678.9452 0.0000000  
## suv-sedan 7818.33981 7514.6461 8122.0335 0.0000000  
## universal-sedan -1180.88789 -1477.7339 -884.0419 0.0000000  
## van-sedan 75.80971 -593.6499 745.2693 0.9999999  
## universal-suv -8999.22771 -9356.9113 -8641.5442 0.0000000  
## van-suv -7742.53010 -8441.0973 -7043.9629 0.0000000  
## van-universal 1256.69760 561.0801 1952.3151 0.0000002  
##   
## $`engine\_type:body\_type`  
## diff lwr upr  
## electric:cabriolet-diesel:cabriolet NA NA NA  
## gasoline:cabriolet-diesel:cabriolet 4886.12394 -6255.70557 16027.953462  
## diesel:coupe-diesel:cabriolet 3770.43194 -7748.39430 15289.258172  
## electric:coupe-diesel:cabriolet NA NA NA  
## gasoline:coupe-diesel:cabriolet 974.87185 -9900.62884 11850.372541  
## diesel:hatchback-diesel:cabriolet -2230.26043 -13084.69582 8624.174972  
## electric:hatchback-diesel:cabriolet 8862.50000 -4414.52219 22139.522193  
## gasoline:hatchback-diesel:cabriolet -2350.01229 -13194.22975 8494.205167  
## diesel:liftback-diesel:cabriolet 1889.10417 -9175.08099 12953.289328  
## electric:liftback-diesel:cabriolet 20124.50000 1347.95515 38901.044854  
## gasoline:liftback-diesel:cabriolet 1347.28749 -9541.00715 12235.582123  
## diesel:limousine-diesel:cabriolet NA NA NA  
## electric:limousine-diesel:cabriolet NA NA NA  
## gasoline:limousine-diesel:cabriolet 1804.08333 -10713.61324 14321.779902  
## diesel:minibus-diesel:cabriolet 2283.80987 -8574.01347 13141.633202  
## electric:minibus-diesel:cabriolet NA NA NA  
## gasoline:minibus-diesel:cabriolet 112.09306 -10927.47765 11151.663759  
## diesel:minivan-diesel:cabriolet 546.59630 -10305.12577 11398.318365  
## electric:minivan-diesel:cabriolet NA NA NA  
## gasoline:minivan-diesel:cabriolet -1125.92030 -11979.67985 9727.839260  
## diesel:pickup-diesel:cabriolet 4353.90041 -6775.87737 15483.678185  
## electric:pickup-diesel:cabriolet NA NA NA  
## gasoline:pickup-diesel:cabriolet 6803.27600 -4424.65442 18031.206423  
## diesel:sedan-diesel:cabriolet -236.46869 -11085.59775 10612.660361  
## electric:sedan-diesel:cabriolet NA NA NA  
## gasoline:sedan-diesel:cabriolet -621.39261 -11464.10902 10221.323788  
## diesel:suv-diesel:cabriolet 8606.17782 -2247.37094 19459.726578  
## electric:suv-diesel:cabriolet NA NA NA  
## gasoline:suv-diesel:cabriolet 6851.85677 -3995.00599 17698.719524  
## diesel:universal-diesel:cabriolet -569.87522 -11417.89806 10278.147611  
## electric:universal-diesel:cabriolet NA NA NA  
## gasoline:universal-diesel:cabriolet -2209.42317 -13058.49941 8639.653077  
## diesel:van-diesel:cabriolet 592.28395 -10278.81058 11463.378483  
## electric:van-diesel:cabriolet NA NA NA  
## gasoline:van-diesel:cabriolet -1637.94608 -12699.84973 9423.957568  
## gasoline:cabriolet-electric:cabriolet NA NA NA  
## diesel:coupe-electric:cabriolet NA NA NA  
NA  
## diesel:coupe-gasoline:cabriolet -1115.69201 -5783.09298 3551.708960  
## electric:coupe-gasoline:cabriolet NA NA NA  
## gasoline:coupe-gasoline:cabriolet -3911.25209 -6627.46069 -1195.043491  
## diesel:hatchback-gasoline:cabriolet -7116.38437 -9746.98159 -4485.787150  
## electric:hatchback-gasoline:cabriolet 3976.37606 -4109.45057 12062.202683  
## gasoline:hatchback-gasoline:cabriolet -7236.13623 -9824.24871 -4648.023760  
## diesel:liftback-gasoline:cabriolet -2997.01978 -6390.75919 396.719635  
## electric:liftback-gasoline:cabriolet 15238.37606 -307.03840 30783.790511  
## gasoline:liftback-gasoline:cabriolet -3538.83645 -6305.82651 -771.846399  
## gasoline:limousine-gasoline:cabriolet -3082.04061 -9849.16713 3685.085908  
## diesel:minibus-gasoline:cabriolet -2602.31408 -5246.85592 42.227759  
## electric:minibus-gasoline:cabriolet NA NA NA  
## gasoline:minibus-gasoline:cabriolet -4774.03089 -8086.64243 -1461.419346  
## diesel:minivan-gasoline:cabriolet -4339.52765 -6958.90653 -1720.148761  
## electric:minivan-gasoline:cabriolet NA NA NA  
## gasoline:minivan-gasoline:cabriolet -6012.04424 -8639.85139 -3384.237089  
## diesel:pickup-gasoline:cabriolet -532.22354 -4134.06020 3069.613123  
## electric:pickup-gasoline:cabriolet NA NA NA  
## gasoline:pickup-gasoline:cabriolet 1917.15206 -1977.42051 5811.724627  
## diesel:sedan-gasoline:cabriolet -5122.59264 -7731.20820 -2513.977076  
## electric:sedan-gasoline:cabriolet NA NA NA  
## gasoline:sedan-gasoline:cabriolet -5507.51656 -8089.33238 -2925.700741  
## diesel:suv-gasoline:cabriolet 3720.05388 1093.11753 6346.990222  
## electric:suv-gasoline:cabriolet NA NA NA  
## gasoline:suv-gasoline:cabriolet 1965.73282 -633.44120 4564.906846  
## diesel:universal-gasoline:cabriolet -5455.99917 -8060.01017 -2851.988159  
## electric:universal-gasoline:cabriolet NA NA NA  
## gasoline:universal-gasoline:cabriolet -7095.54711 -9703.94303 -4487.151193  
## diesel:van-gasoline:cabriolet -4293.83999 -6992.35258 -1595.327398  
## electric:van-gasoline:cabriolet NA NA NA  
## gasoline:van-gasoline:cabriolet -6524.07003 -9910.36391 -3137.776138  
## electric:coupe-diesel:coupe NA NA NA  
## gasoline:coupe-diesel:coupe -2795.56008 -6785.64555 1194.525382  
## diesel:hatchback-diesel:coupe -6000.69236 -9932.99889 -2068.385838  
## electric:hatchback-diesel:coupe 5092.06806 -3505.81453 13689.950659  
## gasoline:hatchback-diesel:coupe -6120.44423 -10024.45742 -2216.431029  
## diesel:liftback-diesel:coupe -1881.32777 -6360.21826 2597.562725  
## electric:liftback-diesel:coupe 16354.06806 536.26470 32171.871433  
## gasoline:liftback-diesel:coupe -2423.14445 -6447.97076 1601.681864  
## gasoline:limousine-diesel:coupe -1966.34860 -9337.71172 5405.014513  
## diesel:minibus-diesel:coupe -1486.62207 -5428.27076 2455.026619  
## electric:minibus-diesel:coupe NA NA NA  
## gasoline:minibus-diesel:coupe -3658.33888 -8076.07451 759.396749  
## diesel:minivan-diesel:coupe -3223.83564 -7148.64628 700.975008  
## electric:minivan-diesel:coupe NA NA NA  
## gasoline:minivan-diesel:coupe -4896.35223 -8826.79283 -965.911635  
## diesel:pickup-diesel:coupe 583.46847 -4055.08952 5222.026457  
## electric:pickup-diesel:coupe NA NA NA  
## gasoline:pickup-diesel:coupe 3032.84406 -1836.51815 7902.206278  
## diesel:sedan-diesel:coupe -4006.90063 -7924.53614 -89.265117  
## electric:sedan-diesel:coupe NA NA NA  
## gasoline:sedan-diesel:coupe -4391.82455 -8291.66631 -491.982787  
## diesel:suv-diesel:coupe 4835.74588 905.88744 8765.604333  
## electric:suv-diesel:coupe NA NA NA  
## gasoline:suv-diesel:coupe 3081.42483 -829.93024 6992.779898  
## diesel:universal-diesel:coupe -4340.30716 -8254.87817 -425.736149  
## electric:universal-diesel:coupe NA NA NA  
## gasoline:universal-diesel:coupe -5979.85510 -9897.34437 -2062.365840  
## diesel:van-diesel:coupe -3178.14798 -7156.20820 799.912232  
## electric:van-diesel:coupe NA NA NA  
## gasoline:van-diesel:coupe -5408.37802 -9881.62954 -935.126499  
  
## diesel:hatchback-gasoline:coupe -3205.13228 -4232.84428 -2177.420273  
## electric:hatchback-gasoline:coupe 7887.62815 172.91866 15602.337635  
## gasoline:hatchback-gasoline:coupe -3324.88414 -4238.38094 -2411.387341  
## diesel:liftback-gasoline:coupe 914.23231 -1463.50136 3291.965990  
## electric:liftback-gasoline:coupe 19149.62815 3793.97574 34505.280553  
## gasoline:liftback-gasoline:coupe 372.41564 -966.38390 1711.215172  
  
## gasoline:limousine-gasoline:coupe 829.21148 -5489.81942 7148.242384  
## diesel:minibus-gasoline:coupe 1308.93801 246.04020 2371.835826  
## electric:minibus-gasoline:coupe NA NA NA  
## gasoline:minibus-gasoline:coupe -862.77880 -3123.20917 1397.651574  
## diesel:minivan-gasoline:coupe -428.27555 -1426.92262 570.371515  
## electric:minivan-gasoline:coupe NA NA NA  
## gasoline:minivan-gasoline:coupe -2100.79215 -3121.34134 -1080.242955  
## diesel:pickup-gasoline:coupe 3379.02855 712.68695 6045.370160  
## electric:pickup-gasoline:coupe NA NA NA  
## gasoline:pickup-gasoline:coupe 5828.40415 2778.18354 8878.624753  
## diesel:sedan-gasoline:coupe -1211.34054 -2181.40516 -241.275924  
## electric:sedan-gasoline:coupe NA NA NA  
## gasoline:sedan-gasoline:coupe -1596.26447 -2491.76608 -700.762851  
## diesel:suv-gasoline:coupe 7631.30597 6613.00111 8649.610830  
## electric:suv-gasoline:coupe NA NA NA  
## gasoline:suv-gasoline:coupe 5876.98491 4932.60372 6821.366105  
## diesel:universal-gasoline:coupe -1544.74707 -2502.36054 -587.133606  
## electric:universal-gasoline:coupe NA NA NA  
## gasoline:universal-gasoline:coupe -3184.29502 -4153.76884 -2214.821195  
## diesel:van-gasoline:coupe -382.58790 -1573.43652 808.260725  
## electric:van-gasoline:coupe NA NA NA  
## gasoline:van-gasoline:coupe -2612.81793 -4979.91247 -245.723402  
## electric:hatchback-diesel:hatchback 11092.76043 3407.77539 18777.745465  
## gasoline:hatchback-diesel:hatchback -119.75186 -733.53438 494.030651  
## diesel:liftback-diesel:hatchback 4119.36459 1839.91949 6398.809701  
## electric:liftback-diesel:hatchback 22354.76043 7014.02011 37695.500740  
## gasoline:liftback-diesel:hatchback 3577.54792 2422.28311 4732.812719  
  
## gasoline:limousine-diesel:hatchback 4034.34376 -2248.36299 10317.050511  
## diesel:minibus-diesel:hatchback 4514.07029 3694.31159 5333.828995  
## electric:minibus-diesel:hatchback NA NA NA  
## gasoline:minibus-diesel:hatchback 2342.35348 185.55075 4499.156215  
## diesel:minivan-diesel:hatchback 2776.85673 2042.31705 3511.396402  
## electric:minivan-diesel:hatchback NA NA NA  
## gasoline:minivan-diesel:hatchback 1104.34013 340.28959 1868.390668  
## diesel:pickup-diesel:hatchback 6584.16083 4005.08539 9163.236274  
## electric:pickup-diesel:hatchback NA NA NA  
## gasoline:pickup-diesel:hatchback 9033.53643 6059.29731 12007.775540  
## diesel:sedan-diesel:hatchback 1993.79173 1298.60979 2688.973680  
## electric:sedan-diesel:hatchback NA NA NA  
## gasoline:sedan-diesel:hatchback 1608.86781 1022.20290 2195.532719  
## diesel:suv-diesel:hatchback 10836.43825 10075.38808 11597.488416  
## electric:suv-diesel:hatchback NA NA NA  
## gasoline:suv-diesel:hatchback 9082.11719 8423.24816 9740.986226  
## diesel:universal-diesel:hatchback 1660.38520 982.68606 2338.084345  
## electric:universal-diesel:hatchback NA NA NA  
## gasoline:universal-diesel:hatchback 20.83726 -673.52005 715.194563  
## diesel:van-diesel:hatchback 2822.54438 1842.55815 3802.530611  
## electric:van-diesel:hatchback NA NA NA  
## gasoline:van-diesel:hatchback 592.31434 -1676.03067 2860.659356  
## gasoline:hatchback-electric:hatchback -11212.51229 -18883.05852 -3541.966059  
## diesel:liftback-electric:hatchback -6973.39583 -14951.89322 1005.101550  
## electric:liftback-electric:hatchback 11262.00000 -5878.56195 28402.561947  
## gasoline:liftback-electric:hatchback -7515.21251 -15247.94730 217.522275  
  
## gasoline:limousine-electric:hatchback -7058.41667 -16954.52472 2837.691388  
## diesel:minibus-electric:hatchback -6578.69013 -14268.45963 1111.079357  
## electric:minibus-electric:hatchback NA NA NA  
## gasoline:minibus-electric:hatchback -8750.40694 -16694.73502 -806.078871  
## diesel:minivan-electric:hatchback -8315.90370 -15997.05590 -634.751507  
## electric:minivan-electric:hatchback NA NA NA  
## gasoline:minivan-electric:hatchback -9988.42030 -17672.45073 -2304.389861  
## diesel:pickup-electric:hatchback -4508.59959 -12577.81149 3560.612302  
## electric:pickup-electric:hatchback NA NA NA  
## gasoline:pickup-electric:hatchback -2059.22400 -10263.28695 6144.838945  
## diesel:sedan-electric:hatchback -9098.96869 -16776.45711 -1421.480272  
## electric:sedan-electric:hatchback NA NA NA  
## gasoline:sedan-electric:hatchback -9483.89261 -17152.31659 -1815.468642  
## diesel:suv-electric:hatchback -256.32218 -7940.05486 7427.410498  
## electric:suv-electric:hatchback NA NA NA  
## gasoline:suv-electric:hatchback -2010.64323 -9684.92880 5663.642330  
## diesel:universal-electric:hatchback -9432.37522 -17108.30035 -1756.450091  
## electric:universal-electric:hatchback NA NA NA  
## gasoline:universal-electric:hatchback -11071.92317 -18749.33696 -3394.509373  
## diesel:van-electric:hatchback -8270.21605 -15978.71289 -561.719209  
## electric:van-electric:hatchback NA NA NA  
## gasoline:van-electric:hatchback -10500.44608 -18475.77928 -2525.112886  
## diesel:liftback-gasoline:hatchback 4239.11646 2008.83521 6469.397703  
## electric:liftback-gasoline:hatchback 22474.51229 7141.00004 37808.024536  
## gasoline:liftback-gasoline:hatchback 3697.29978 2642.34897 4752.250587  
  
## gasoline:limousine-gasoline:hatchback 4154.09562 -2110.94137 10419.132619  
## diesel:minibus-gasoline:hatchback 4633.82216 3962.78656 5304.857752  
## electric:minibus-gasoline:hatchback NA NA NA  
## gasoline:minibus-gasoline:hatchback 2462.10535 357.32924 4566.881455  
## diesel:minivan-gasoline:hatchback 2896.60859 2332.84181 3460.375364  
## electric:minivan-gasoline:hatchback NA NA NA  
## gasoline:minivan-gasoline:hatchback 1224.09199 622.37972 1825.804272  
## diesel:pickup-gasoline:hatchback 6703.91270 4168.18507 9239.640318  
## electric:pickup-gasoline:hatchback NA NA NA  
## gasoline:pickup-gasoline:hatchback 9153.28829 6216.55835 12090.018231  
## diesel:sedan-gasoline:hatchback 2113.54360 1602.11190 2624.975292  
## electric:sedan-gasoline:hatchback NA NA NA  
## gasoline:sedan-gasoline:hatchback 1728.61968 1378.67660 2078.562747  
## diesel:suv-gasoline:hatchback 10956.19011 10358.29229 11554.087929  
## electric:suv-gasoline:hatchback NA NA NA  
## gasoline:suv-gasoline:hatchback 9201.86906 8741.00808 9662.730037  
## diesel:universal-gasoline:hatchback 1780.13707 1292.73521 2267.538920  
## electric:universal-gasoline:hatchback NA NA NA  
## gasoline:universal-gasoline:hatchback 140.58912 -369.72108 650.899329  
## diesel:van-gasoline:hatchback 2942.29624 2082.84441 3801.748077  
## electric:van-gasoline:hatchback NA NA NA  
## gasoline:van-gasoline:hatchback 712.06621 -1506.86902 2931.001433  
## electric:liftback-diesel:liftback 18235.39583 2745.53661 33725.255059  
## gasoline:liftback-diesel:liftback -541.81668 -2977.39920 1893.765846  
## gasoline:limousine-diesel:liftback -85.02083 -6723.53193 6553.490263  
## diesel:minibus-diesel:liftback 394.70570 -1900.81816 2690.229559  
## electric:minibus-diesel:liftback NA NA NA  
## gasoline:minibus-diesel:liftback -1777.01111 -4818.26472 1264.242494  
## diesel:minivan-diesel:liftback -1342.50787 -3608.99722 923.981488  
## electric:minivan-diesel:liftback NA NA NA  
## gasoline:minivan-diesel:liftback -3015.02446 -5291.24912 -738.799806  
## diesel:pickup-diesel:liftback 2464.79624 -889.16494 5818.757419  
## electric:pickup-diesel:liftback NA NA NA  
## gasoline:pickup-diesel:liftback 4914.17183 1247.63072 8580.712951  
## diesel:sedan-diesel:liftback -2125.57286 -4379.61443 128.468712  
## electric:sedan-diesel:liftback NA NA NA  
## gasoline:sedan-diesel:liftback -2510.49678 -4733.46803 -287.525532  
## diesel:suv-diesel:liftback 6717.07365 4441.85436 8992.292945  
## electric:suv-diesel:liftback NA NA NA  
## gasoline:suv-diesel:liftback 4962.75260 2719.64452 7205.860681  
## diesel:universal-diesel:liftback -2458.97939 -4707.69048 -210.268295  
## electric:universal-diesel:liftback NA NA NA  
## gasoline:universal-diesel:liftback -4098.52733 -6352.31471 -1844.739959  
## diesel:van-diesel:liftback -1296.82021 -3654.31857 1060.678137  
## electric:van-diesel:liftback NA NA NA  
## gasoline:van-diesel:liftback -3527.05025 -6648.39844 -405.702054  
## gasoline:liftback-electric:liftback -18777.21251 -34141.92877 -3412.496256  
## gasoline:limousine-electric:liftback -18320.41667 -34879.77272 -1761.060612  
## diesel:minibus-electric:liftback -17840.69013 -33183.82779 -2497.552478  
## electric:minibus-electric:liftback NA NA NA  
## gasoline:minibus-electric:liftback -20012.40694 -35484.69400 -4540.119885  
## diesel:minivan-electric:liftback -19577.90370 -34916.72430 -4239.083103  
## electric:minivan-electric:liftback NA NA NA  
## gasoline:minivan-electric:liftback -21250.42030 -36590.68242 -5910.158172  
## diesel:pickup-electric:liftback -15770.59959 -31307.37851 -233.820683  
## electric:pickup-electric:liftback NA NA NA  
## gasoline:pickup-electric:liftback -13321.22400 -28928.46486 2286.016856  
## diesel:sedan-electric:liftback -20360.96869 -35697.95493 -5023.982458  
## electric:sedan-electric:liftback NA NA NA  
## gasoline:sedan-electric:liftback -20745.89261 -36078.34332 -5413.441912  
## diesel:suv-electric:liftback -11518.32218 -26858.43516 3821.790798  
## electric:suv-electric:liftback NA NA NA  
## gasoline:suv-electric:liftback -13272.64323 -28608.02641 2062.739944  
## diesel:universal-electric:liftback -20694.37522 -36030.57896 -5358.171490  
## electric:universal-electric:liftback NA NA NA  
## gasoline:universal-electric:liftback -22333.92317 -37670.87205 -6996.974289  
## diesel:van-electric:liftback -19532.21605 -34884.74815 -4179.683949  
## electric:van-electric:liftback NA NA NA  
## gasoline:van-electric:liftback -21762.44608 -37250.67574 -6274.216425  
## gasoline:limousine-gasoline:liftback 456.79584 -5884.22902 6797.820710  
## diesel:minibus-gasoline:liftback 936.52238 -250.15221 2123.196957  
## electric:minibus-gasoline:liftback NA NA NA  
## gasoline:minibus-gasoline:liftback -1235.19443 -3556.39892 1086.010051  
## diesel:minivan-gasoline:liftback -800.69119 -1930.17814 328.795758  
## electric:minivan-gasoline:liftback NA NA NA  
## gasoline:minivan-gasoline:liftback -2473.20779 -3622.10528 -1324.310290  
## diesel:pickup-gasoline:liftback 3006.61292 288.55803 5724.667803  
## electric:pickup-gasoline:liftback NA NA NA  
## gasoline:pickup-gasoline:liftback 5455.98851 2360.46101 8551.516017  
## diesel:sedan-gasoline:liftback -1583.75618 -2688.05241 -479.459949  
## electric:sedan-gasoline:liftback NA NA NA  
## gasoline:sedan-gasoline:liftback -1968.68010 -3008.08760 -929.272607  
## diesel:suv-gasoline:liftback 7258.89033 6111.98598 8405.794683  
## electric:suv-gasoline:liftback NA NA NA  
## gasoline:suv-gasoline:liftback 5504.56928 4422.76494 6586.373619  
## diesel:universal-gasoline:liftback -1917.16271 -3010.53747 -823.787956  
## electric:universal-gasoline:liftback NA NA NA  
## gasoline:universal-gasoline:liftback -3556.71066 -4660.48794 -2452.933370  
## diesel:van-gasoline:liftback -755.00354 -2057.52618 547.519110  
## electric:van-gasoline:liftback NA NA NA  
## gasoline:van-gasoline:liftback -2985.23357 -5410.43074 -560.036399  
## diesel:minibus-gasoline:limousine 479.72653 -5808.83164 6768.284706  
## electric:minibus-gasoline:limousine NA NA NA  
## gasoline:minibus-gasoline:limousine -1691.99028 -8289.39565 4905.415092  
## diesel:minivan-gasoline:limousine -1257.48703 -7535.50488 5020.530815  
## electric:minivan-gasoline:limousine NA NA NA  
## gasoline:minivan-gasoline:limousine -2930.00363 -9211.54268 3351.535418  
## diesel:pickup-gasoline:limousine 2549.81707 -4197.44828 9297.082423  
## electric:pickup-gasoline:limousine NA NA NA  
## gasoline:pickup-gasoline:limousine 4999.19267 -1908.77794 11907.163272  
## diesel:sedan-gasoline:limousine -2040.55203 -8314.08672 4232.982665  
## electric:sedan-gasoline:limousine NA NA NA  
## gasoline:sedan-gasoline:limousine -2425.47595 -8687.91439 3836.962498  
## diesel:suv-gasoline:limousine 6802.09449 520.91968 13083.269293  
## electric:suv-gasoline:limousine NA NA NA  
## gasoline:suv-gasoline:limousine 5047.77343 -1221.84123 11317.388093  
## diesel:universal-gasoline:limousine -2373.95856 -8645.58001 3897.662901  
## electric:universal-gasoline:limousine NA NA NA  
## gasoline:universal-gasoline:limousine -4013.50650 -10286.94987 2259.936864  
## diesel:van-gasoline:limousine -1211.79938 -7523.24395 5099.645192  
## electric:van-gasoline:limousine NA NA NA  
## gasoline:van-gasoline:limousine -3442.02942 -10076.73730 3192.678466  
## electric:minibus-diesel:minibus NA NA NA  
## gasoline:minibus-diesel:minibus -2171.71681 -4345.50563 2.072008  
## diesel:minivan-diesel:minibus -1737.21357 -2520.22591 -954.201222  
## electric:minivan-diesel:minibus NA NA NA  
## gasoline:minivan-diesel:minibus -3409.73016 -4220.49093 -2598.969395  
## diesel:pickup-diesel:minibus 2070.09054 -523.20658 4663.387656  
## electric:pickup-diesel:minibus NA NA NA  
## gasoline:pickup-diesel:minibus 4519.46613 1532.88647 7506.045801  
## diesel:sedan-diesel:minibus -2520.27856 -3266.49417 -1774.062949  
## electric:sedan-diesel:minibus NA NA NA  
## gasoline:sedan-diesel:minibus -2905.20248 -3551.52710 -2258.877864  
## diesel:suv-diesel:minibus 6322.36795 5514.43407 7130.301837  
## electric:suv-diesel:minibus NA NA NA  
## gasoline:suv-diesel:minibus 4568.04690 3855.53852 5280.555286  
## diesel:universal-diesel:minibus -2853.68509 -3583.64120 -2123.728979  
## electric:universal-diesel:minibus NA NA NA  
## gasoline:universal-diesel:minibus -4493.23303 -5238.68046 -3747.785608  
## diesel:van-diesel:minibus -1691.52591 -2708.35078 -674.701045  
## electric:van-diesel:minibus NA NA NA  
## gasoline:van-diesel:minibus -3921.75595 -6206.25784 -1637.254057  
## diesel:minivan-gasoline:minibus 434.50324 -1708.60245 2577.608940  
## electric:minivan-gasoline:minibus NA NA NA  
## gasoline:minivan-gasoline:minibus -1238.01335 -3391.41223 915.385524  
## diesel:pickup-gasoline:minibus 4241.80735 969.96022 7513.654478  
## electric:pickup-gasoline:minibus NA NA NA  
## gasoline:pickup-gasoline:minibus 6691.18294 3099.60226 10282.763627  
## diesel:sedan-gasoline:minibus -348.56175 -2478.49870 1781.375207  
## electric:sedan-gasoline:minibus NA NA NA  
## gasoline:sedan-gasoline:minibus -733.48567 -2830.51433 1363.542991  
## diesel:suv-gasoline:minibus 8494.08476 6341.74863 10646.420903  
## electric:suv-gasoline:minibus NA NA NA  
## gasoline:suv-gasoline:minibus 6739.76371 4621.40069 8858.126733  
## diesel:universal-gasoline:minibus -681.96828 -2806.26337 1442.326809  
## electric:universal-gasoline:minibus NA NA NA  
## gasoline:universal-gasoline:minibus -2321.51622 -4451.18417 -191.848277  
## diesel:van-gasoline:minibus 480.19090 -1758.94432 2719.326111  
## electric:van-gasoline:minibus NA NA NA  
## gasoline:van-gasoline:minibus -1750.03914 -4782.98203 1282.903754  
## electric:minivan-diesel:minivan NA NA NA  
## gasoline:minivan-diesel:minivan -1672.51660 -2397.00071 -948.032484  
## diesel:pickup-diesel:minivan 3807.30411 1239.67210 6374.936116  
## electric:pickup-diesel:minivan NA NA NA  
## gasoline:pickup-diesel:minivan 6256.67970 3292.35814 9221.001261  
## diesel:sedan-diesel:minivan -783.06499 -1434.51103 -131.618954  
## electric:sedan-diesel:minivan NA NA NA  
## gasoline:sedan-diesel:minivan -1167.98891 -1702.10474 -633.873088  
## diesel:suv-diesel:minivan 8059.58152 7338.26234 8780.900704  
## electric:suv-diesel:minivan NA NA NA  
## gasoline:suv-diesel:minivan 6305.26047 5692.71463 6917.806306  
## diesel:universal-diesel:minivan -1116.47152 -1749.22750 -483.715544  
## electric:universal-diesel:minivan NA NA NA  
## gasoline:universal-diesel:minivan -2756.01947 -3406.58543 -2105.453506  
## diesel:van-diesel:minivan 45.68765 -903.77378 995.149089  
## electric:van-diesel:minivan NA NA NA  
## gasoline:van-diesel:minivan -2184.54238 -4439.86788 70.783116  
## gasoline:van-electric:minivan NA NA NA  
## diesel:pickup-gasoline:minivan 5479.82070 2903.59113 8056.050277  
## electric:pickup-gasoline:minivan NA NA NA  
## gasoline:pickup-gasoline:minivan 7929.19630 4957.42460 10900.967990  
## diesel:sedan-gasoline:minivan 889.45160 204.90312 1574.000089  
## electric:sedan-gasoline:minivan NA NA NA  
## gasoline:sedan-gasoline:minivan 504.52768 -69.49706 1078.552423  
## diesel:suv-gasoline:minivan 9732.09812 8980.74863 10483.447604  
## electric:suv-gasoline:minivan NA NA NA  
## gasoline:suv-gasoline:minivan 7977.77706 7330.13743 8625.416695  
## diesel:universal-gasoline:minivan 556.04507 -110.74186 1222.832008  
## electric:universal-gasoline:minivan NA NA NA  
## gasoline:universal-gasoline:minivan -1083.50287 -1767.21389 -399.791853  
## diesel:van-gasoline:minivan 1718.20425 745.73229 2690.676205  
## electric:van-gasoline:minivan NA NA NA  
## gasoline:van-gasoline:minivan -512.02579 -2777.13457 1753.082994  
## electric:pickup-diesel:pickup NA NA NA  
## gasoline:pickup-diesel:pickup 2449.37559 -1410.58346 6309.334650  
## diesel:sedan-diesel:pickup -4590.36910 -7147.01994 -2033.718254  
## electric:sedan-diesel:pickup NA NA NA  
## gasoline:sedan-diesel:pickup -4975.29302 -7504.59358 -2445.992462  
## diesel:suv-diesel:pickup 4252.27741 1676.93609 6827.618744  
## electric:suv-diesel:pickup NA NA NA  
## gasoline:suv-diesel:pickup 2497.95636 -49.06033 5044.973048  
## diesel:universal-diesel:pickup -4923.77563 -7475.72816 -2371.823096  
## electric:universal-diesel:pickup NA NA NA  
## gasoline:universal-diesel:pickup -6563.32357 -9119.75031 -4006.896835  
## diesel:van-diesel:pickup -3761.61645 -6409.92886 -1113.304044  
## electric:van-diesel:pickup NA NA NA  
## gasoline:van-diesel:pickup -5991.84649 -9338.27364 -2645.419334  
## diesel:sedan-gasoline:pickup -7039.74469 -9994.55970 -4084.929688  
## electric:sedan-gasoline:pickup NA NA NA  
## gasoline:sedan-gasoline:pickup -7424.66861 -10355.85088 -4493.486347  
## diesel:suv-gasoline:pickup 1802.90182 -1168.09989 4773.903525  
## electric:suv-gasoline:pickup NA NA NA  
## gasoline:suv-gasoline:pickup 48.58077 -2897.90225 2995.063784  
## diesel:universal-gasoline:pickup -7373.15122 -10323.90196 -4422.400488  
## electric:universal-gasoline:pickup NA NA NA  
## gasoline:universal-gasoline:pickup -9012.69917 -11967.32027 -6058.078068  
## diesel:van-gasoline:pickup -6210.99205 -9245.46511 -3176.518982  
## electric:van-gasoline:pickup NA NA NA  
## gasoline:van-gasoline:pickup -8441.22208 -12100.87273 -4781.571434  
## electric:sedan-diesel:sedan NA NA NA  
## gasoline:sedan-diesel:sedan -384.92392 -863.47289 93.625047  
## diesel:suv-diesel:sedan 8842.64651 8161.44848 9523.844548  
## electric:suv-diesel:sedan NA NA NA  
## gasoline:suv-diesel:sedan 7088.32546 6523.57613 7653.074789  
## diesel:universal-diesel:sedan -333.40653 -920.01503 253.201966  
## electric:universal-diesel:sedan NA NA NA  
## gasoline:universal-diesel:sedan -1972.95448 -2578.73122 -1367.177727  
## diesel:van-diesel:sedan 828.75264 -90.59844 1748.103730  
## electric:van-diesel:sedan NA NA NA  
## gasoline:van-diesel:sedan -1401.47739 -3644.29314 841.338362  
## diesel:suv-gasoline:sedan 9227.57043 8657.54540 9797.595469  
## electric:suv-gasoline:sedan NA NA NA  
## gasoline:suv-gasoline:sedan 7473.24938 7049.17441 7897.324352  
## diesel:universal-gasoline:sedan 51.51739 -401.25993 504.294714  
## electric:universal-gasoline:sedan NA NA NA  
## gasoline:universal-gasoline:sedan -1588.03055 -2065.38079 -1110.680321  
## diesel:van-gasoline:sedan 1213.67657 373.37650 2053.976629  
## electric:van-gasoline:sedan NA NA NA  
## gasoline:van-gasoline:sedan -1016.55347 -3228.14119 1195.034259  
## gasoline:suv-diesel:suv -1754.32105 -2398.41827 -1110.223834  
## diesel:universal-diesel:suv -9176.05304 -9839.39982 -8512.706262  
## gasoline:universal-diesel:suv -10815.60099 -11495.95743 -10135.244543  
## diesel:van-diesel:suv -8013.89387 -8984.01027 -7043.777461  
## gasoline:van-diesel:suv -10244.12390 -12508.22238 -7980.025424  
## diesel:universal-gasoline:suv -7421.73199 -7964.81577 -6878.648207  
## gasoline:universal-gasoline:suv -9061.27993 -9625.01385 -8497.546012  
## diesel:van-gasoline:suv -6259.57281 -7151.78181 -5367.363823

## gasoline:van-gasoline:suv -8489.80285 -10721.63012 -6257.975579  
## electric:universal-diesel:universal NA NA NA  
## gasoline:universal-diesel:universal -1639.54794 -2225.17893 -1053.916954  
## diesel:van-diesel:universal 1162.15918 255.95577 2068.362578  
## electric:van-diesel:universal NA NA NA  
## gasoline:van-diesel:universal -1068.07086 -3305.52939 1169.387673  
## diesel:van-gasoline:universal 2801.70712 1882.97944 3720.434798  
## electric:van-gasoline:universal NA NA NA  
## gasoline:van-gasoline:universal 571.47708 -1671.08320 2814.037368  
## electric:van-diesel:van NA NA NA  
## gasoline:van-diesel:van -2230.23003 -4576.99751 116.537439  
## p adj  
## electric:cabriolet-diesel:cabriolet NA  
## gasoline:cabriolet-diesel:cabriolet 0.9996584  
## diesel:coupe-diesel:cabriolet 0.9999997  
## electric:coupe-diesel:cabriolet NA  
## gasoline:coupe-diesel:cabriolet 1.0000000  
## diesel:hatchback-diesel:cabriolet 1.0000000  
## electric:hatchback-diesel:cabriolet 0.8171022  
## gasoline:hatchback-diesel:cabriolet 1.0000000  
## diesel:liftback-diesel:cabriolet 1.0000000  
## electric:liftback-diesel:cabriolet 0.0181155  
## gasoline:liftback-diesel:cabriolet 1.0000000  
## diesel:limousine-diesel:cabriolet NA  
## electric:limousine-diesel:cabriolet NA  
## gasoline:limousine-diesel:cabriolet 1.0000000  
## diesel:minibus-diesel:cabriolet 1.0000000  
## electric:minibus-diesel:cabriolet NA  
## gasoline:minibus-diesel:cabriolet 1.0000000  
## diesel:minivan-diesel:cabriolet 1.0000000  
## electric:minivan-diesel:cabriolet NA  
## gasoline:minivan-diesel:cabriolet 1.0000000  
## diesel:pickup-diesel:cabriolet 0.9999717  
## electric:pickup-diesel:cabriolet NA  
## gasoline:pickup-diesel:cabriolet 0.9329526  
## diesel:sedan-diesel:cabriolet 1.0000000  
## electric:sedan-diesel:cabriolet NA  
## gasoline:sedan-diesel:cabriolet 1.0000000  
## diesel:suv-diesel:cabriolet 0.4325927  
## electric:suv-diesel:cabriolet NA  
## gasoline:suv-diesel:cabriolet 0.8932100  
## diesel:universal-diesel:cabriolet 1.0000000  
## electric:universal-diesel:cabriolet NA  
## gasoline:universal-diesel:cabriolet 1.0000000  
## diesel:van-diesel:cabriolet 1.0000000  
## electric:van-diesel:cabriolet NA  
## gasoline:van-diesel:cabriolet 1.0000000  
  
## diesel:coupe-gasoline:cabriolet 1.0000000  
## electric:coupe-gasoline:cabriolet NA  
## gasoline:coupe-gasoline:cabriolet 0.0000201  
## diesel:hatchback-gasoline:cabriolet 0.0000000  
## electric:hatchback-gasoline:cabriolet 0.9969412  
## gasoline:hatchback-gasoline:cabriolet 0.0000000  
## diesel:liftback-gasoline:cabriolet 0.1976001  
## electric:liftback-gasoline:cabriolet 0.0646980  
## gasoline:liftback-gasoline:cabriolet 0.0005300  
## gasoline:limousine-gasoline:cabriolet 0.9992699  
## diesel:minibus-gasoline:cabriolet 0.0616285  
## electric:minibus-gasoline:cabriolet NA  
## gasoline:minibus-gasoline:cabriolet 0.0000196  
## diesel:minivan-gasoline:cabriolet 0.0000001  
## electric:minivan-gasoline:cabriolet NA  
## gasoline:minivan-gasoline:cabriolet 0.0000000  
## diesel:pickup-gasoline:cabriolet 1.0000000  
## electric:pickup-gasoline:cabriolet NA  
## gasoline:pickup-gasoline:cabriolet 0.9968867  
## diesel:sedan-gasoline:cabriolet 0.0000000  
## electric:sedan-gasoline:cabriolet NA  
## gasoline:sedan-gasoline:cabriolet 0.0000000  
## diesel:suv-gasoline:cabriolet 0.0000335  
## electric:suv-gasoline:cabriolet NA  
## gasoline:suv-gasoline:cabriolet 0.5506137  
## diesel:universal-gasoline:cabriolet 0.0000000  
## electric:universal-gasoline:cabriolet NA  
## gasoline:universal-gasoline:cabriolet 0.0000000  
## diesel:van-gasoline:cabriolet 0.0000006  
## electric:van-gasoline:cabriolet NA  
## gasoline:van-gasoline:cabriolet 0.0000000  
## electric:coupe-diesel:coupe NA  
## gasoline:coupe-diesel:coupe 0.7271713  
## diesel:hatchback-diesel:coupe 0.0000029  
## electric:hatchback-diesel:coupe 0.9491668  
## gasoline:hatchback-diesel:coupe 0.0000011  
## diesel:liftback-diesel:coupe 0.9998620  
## electric:liftback-diesel:coupe 0.0314213  
## gasoline:liftback-diesel:coupe 0.9378746  
## gasoline:limousine-diesel:coupe 1.0000000  
## diesel:minibus-diesel:coupe 0.9999880  
## electric:minibus-diesel:coupe NA  
## gasoline:minibus-diesel:coupe 0.3288128  
## diesel:minivan-diesel:coupe 0.3475646  
## electric:minivan-diesel:coupe NA  
## gasoline:minivan-diesel:coupe 0.0009856  
## diesel:pickup-diesel:coupe 1.0000000  
## electric:pickup-diesel:coupe NA  
## gasoline:pickup-diesel:coupe 0.9082638  
## diesel:sedan-diesel:coupe 0.0367020  
## electric:sedan-diesel:coupe NA  
## gasoline:sedan-diesel:coupe 0.0077818  
## diesel:suv-diesel:coupe 0.0013017  
## electric:suv-diesel:coupe NA  
## gasoline:suv-diesel:coupe 0.4486658  
## diesel:universal-diesel:coupe 0.0102674  
## electric:universal-diesel:coupe NA  
## gasoline:universal-diesel:coupe 0.0000029  
## diesel:van-diesel:coupe 0.4140793  
## electric:van-diesel:coupe NA  
## gasoline:van-diesel:coupe 0.0019125  
## diesel:hatchback-gasoline:coupe 0.0000000  
## electric:hatchback-gasoline:coupe 0.0368911  
## gasoline:hatchback-gasoline:coupe 0.0000000  
## diesel:liftback-gasoline:coupe 0.9999811  
## electric:liftback-gasoline:coupe 0.0009619  
## gasoline:liftback-gasoline:coupe 1.0000000  
## gasoline:limousine-gasoline:coupe 1.0000000  
## diesel:minibus-gasoline:coupe 0.0012791  
## electric:minibus-gasoline:coupe NA  
## gasoline:minibus-gasoline:coupe 0.9999841  
## diesel:minivan-gasoline:coupe 0.9997853  
## electric:minivan-gasoline:coupe NA  
## gasoline:minivan-gasoline:coupe 0.0000000  
## diesel:pickup-gasoline:coupe 0.0006605  
## electric:pickup-gasoline:coupe NA  
## gasoline:pickup-gasoline:coupe 0.0000000  
## diesel:sedan-gasoline:coupe 0.0009332  
## electric:sedan-gasoline:coupe NA  
## gasoline:sedan-gasoline:coupe 0.0000000  
## diesel:suv-gasoline:coupe 0.0000000  
## electric:suv-gasoline:coupe NA  
## gasoline:suv-gasoline:coupe 0.0000000  
## diesel:universal-gasoline:coupe 0.0000004  
## electric:universal-gasoline:coupe NA  
## gasoline:universal-gasoline:coupe 0.0000000  
## diesel:van-gasoline:coupe 0.9999998  
## electric:van-gasoline:coupe NA  
## gasoline:van-gasoline:coupe 0.0110969  
## electric:hatchback-diesel:hatchback 0.0000186  
## gasoline:hatchback-diesel:hatchback 1.0000000  
## diesel:liftback-diesel:hatchback 0.0000000  
## electric:liftback-diesel:hatchback 0.0000138  
## gasoline:liftback-diesel:hatchback 0.0000000  
## gasoline:limousine-diesel:hatchback 0.8735109  
## diesel:minibus-diesel:hatchback 0.0000000  
## electric:minibus-diesel:hatchback NA  
## gasoline:minibus-diesel:hatchback 0.0146070  
## diesel:minivan-diesel:hatchback 0.0000000  
## electric:minivan-diesel:hatchback NA  
## gasoline:minivan-diesel:hatchback 0.0000178  
## diesel:pickup-diesel:hatchback 0.0000000  
## electric:pickup-diesel:hatchback NA  
## gasoline:pickup-diesel:hatchback 0.0000000  
## diesel:sedan-diesel:hatchback 0.0000000  
## electric:sedan-diesel:hatchback NA  
## gasoline:sedan-diesel:hatchback 0.0000000  
## diesel:suv-diesel:hatchback 0.0000000  
## electric:suv-diesel:hatchback NA  
## gasoline:suv-diesel:hatchback 0.0000000  
## diesel:universal-diesel:hatchback 0.0000000  
## electric:universal-diesel:hatchback NA  
## gasoline:universal-diesel:hatchback 1.0000000  
## diesel:van-diesel:hatchback 0.0000000  
## electric:van-diesel:hatchback NA  
## gasoline:van-diesel:hatchback 1.0000000  
## gasoline:hatchback-electric:hatchback 0.0000125  
## diesel:liftback-electric:hatchback 0.2163275  
## electric:liftback-electric:hatchback 0.8418121  
## gasoline:liftback-electric:hatchback 0.0719579  
## gasoline:limousine-electric:hatchback 0.6890547  
## diesel:minibus-electric:hatchback 0.2581618  
## electric:minibus-electric:hatchback NA  
## gasoline:minibus-electric:hatchback 0.0115105  
## diesel:minivan-electric:hatchback 0.0153819  
## electric:minivan-electric:hatchback NA  
## gasoline:minivan-electric:hatchback 0.0003548  
## diesel:pickup-electric:hatchback 0.9765838  
## electric:pickup-electric:hatchback NA  
## gasoline:pickup-electric:hatchback 1.0000000  
## diesel:sedan-electric:hatchback 0.0029056  
## electric:sedan-electric:hatchback NA  
## gasoline:sedan-electric:hatchback 0.0011623  
## diesel:suv-electric:hatchback 1.0000000  
## electric:suv-electric:hatchback NA  
## gasoline:suv-electric:hatchback 1.0000000  
## diesel:universal-electric:hatchback 0.0013421  
## electric:universal-electric:hatchback NA  
## gasoline:universal-electric:hatchback 0.0000191  
## diesel:van-electric:hatchback 0.0178247  
## electric:van-electric:hatchback NA  
## gasoline:van-electric:hatchback 0.0002561  
## diesel:liftback-gasoline:hatchback 0.0000000  
## electric:liftback-gasoline:hatchback 0.0000114  
## gasoline:liftback-gasoline:hatchback 0.0000000  
## gasoline:limousine-gasoline:hatchback 0.8278368  
## diesel:minibus-gasoline:hatchback 0.0000000  
## electric:minibus-gasoline:hatchback NA  
## gasoline:minibus-gasoline:hatchback 0.0037811  
## diesel:minivan-gasoline:hatchback 0.0000000  
## electric:minivan-gasoline:hatchback NA  
## gasoline:minivan-gasoline:hatchback 0.0000000  
## diesel:pickup-gasoline:hatchback 0.0000000  
## electric:pickup-gasoline:hatchback NA  
## gasoline:pickup-gasoline:hatchback 0.0000000  
## diesel:sedan-gasoline:hatchback 0.0000000  
## electric:sedan-gasoline:hatchback NA  
## gasoline:sedan-gasoline:hatchback 0.0000000  
## diesel:suv-gasoline:hatchback 0.0000000  
## electric:suv-gasoline:hatchback NA  
## gasoline:suv-gasoline:hatchback 0.0000000  
## diesel:universal-gasoline:hatchback 0.0000000  
## electric:universal-gasoline:hatchback NA  
## gasoline:universal-gasoline:hatchback 1.0000000  
## diesel:van-gasoline:hatchback 0.0000000  
## electric:van-gasoline:hatchback NA  
## gasoline:van-gasoline:hatchback 0.9999998  
## electric:liftback-diesel:liftback 0.0033285  
## gasoline:liftback-diesel:liftback 1.0000000  
## gasoline:limousine-diesel:liftback 1.0000000  
## diesel:minibus-diesel:liftback 1.0000000  
## electric:minibus-diesel:liftback NA  
## gasoline:minibus-diesel:liftback 0.9571547  
## diesel:minivan-diesel:liftback 0.9490785  
## electric:minivan-diesel:liftback NA  
## gasoline:minivan-diesel:liftback 0.0002190  
## diesel:pickup-diesel:liftback 0.6204872  
## electric:pickup-diesel:liftback NA  
## gasoline:pickup-diesel:liftback 0.0001602  
## diesel:sedan-diesel:liftback 0.1023534  
## electric:sedan-diesel:liftback NA  
## gasoline:sedan-diesel:liftback 0.0073914  
## diesel:suv-diesel:liftback 0.0000000  
## electric:suv-diesel:liftback NA  
## gasoline:suv-diesel:liftback 0.0000000  
## diesel:universal-diesel:liftback 0.0130234  
## electric:universal-diesel:liftback NA  
## gasoline:universal-diesel:liftback 0.0000000  
## diesel:van-diesel:liftback 0.9812927  
## electric:van-diesel:liftback NA  
## gasoline:van-diesel:liftback 0.0073160  
## gasoline:liftback-electric:liftback 0.0015152  
## gasoline:limousine-electric:liftback 0.0106637  
## diesel:minibus-electric:liftback 0.0042556  
## electric:minibus-electric:liftback NA  
## gasoline:minibus-electric:liftback 0.0004018  
## diesel:minivan-electric:liftback 0.0005566  
## electric:minivan-electric:liftback NA  
## gasoline:minivan-electric:liftback 0.0000640  
## diesel:pickup-electric:liftback 0.0408215  
## electric:pickup-electric:liftback NA  
## gasoline:pickup-electric:liftback 0.2629324  
## diesel:sedan-electric:liftback 0.0002064  
## electric:sedan-electric:liftback NA  
## gasoline:sedan-electric:liftback 0.0001238  
## diesel:suv-electric:liftback 0.5684057  
## electric:suv-electric:liftback NA  
## gasoline:suv-electric:liftback 0.2350029  
## diesel:universal-electric:liftback 0.0001334  
## electric:universal-electric:liftback NA  
## gasoline:universal-electric:liftback 0.0000141  
## diesel:van-electric:liftback 0.0006017  
## electric:van-electric:liftback NA  
## gasoline:van-electric:liftback 0.0000423  
## diesel:limousine-gasoline:liftback NA  
## electric:limousine-gasoline:liftback NA  
## gasoline:limousine-gasoline:liftback 1.0000000  
## diesel:minibus-gasoline:liftback 0.4443041  
## electric:minibus-gasoline:liftback NA  
## gasoline:minibus-gasoline:liftback 0.9886522  
## diesel:minivan-gasoline:liftback 0.7023903  
## electric:minivan-gasoline:liftback NA  
## gasoline:minivan-gasoline:liftback 0.0000000  
## diesel:pickup-gasoline:liftback 0.0106947  
## electric:pickup-gasoline:liftback NA  
## gasoline:pickup-gasoline:liftback 0.0000000  
## diesel:sedan-gasoline:liftback 0.0000227  
## electric:sedan-gasoline:liftback NA  
## gasoline:sedan-gasoline:liftback 0.0000000  
## diesel:suv-gasoline:liftback 0.0000000  
## electric:suv-gasoline:liftback NA  
## gasoline:suv-gasoline:liftback 0.0000000  
## diesel:universal-gasoline:liftback 0.0000000  
## electric:universal-gasoline:liftback NA  
## gasoline:universal-gasoline:liftback 0.0000000  
## diesel:van-gasoline:liftback 0.9613777  
## electric:van-gasoline:liftback NA  
## gasoline:van-gasoline:liftback 0.0012921  
## electric:limousine-diesel:limousine NA  
## diesel:minibus-gasoline:limousine 1.0000000  
## electric:minibus-gasoline:limousine NA  
## gasoline:minibus-gasoline:limousine 1.0000000  
## diesel:minivan-gasoline:limousine 1.0000000  
## electric:minivan-gasoline:limousine NA  
## gasoline:minivan-gasoline:limousine 0.9988416  
## diesel:pickup-gasoline:limousine 0.9999874  
## electric:pickup-gasoline:limousine NA  
## gasoline:pickup-gasoline:limousine 0.6564059  
## diesel:sedan-gasoline:limousine 0.9999997  
## electric:sedan-gasoline:limousine NA  
## gasoline:sedan-gasoline:limousine 0.9999776  
## diesel:suv-gasoline:limousine 0.0153128  
## electric:suv-gasoline:limousine NA  
## gasoline:suv-gasoline:limousine 0.3952293  
## diesel:universal-gasoline:limousine 0.9999869  
## electric:universal-gasoline:limousine NA  
## gasoline:universal-gasoline:limousine 0.8781707  
## diesel:van-gasoline:limousine 1.0000000  
## electric:van-gasoline:limousine NA  
## gasoline:van-gasoline:limousine 0.9924201  
## electric:minibus-diesel:minibus NA  
## gasoline:minibus-diesel:minibus 0.0506370  
## diesel:minivan-diesel:minibus 0.0000000  
## electric:minivan-diesel:minibus NA  
## gasoline:minivan-diesel:minibus 0.0000000  
## diesel:pickup-diesel:minibus 0.4161453  
## electric:pickup-diesel:minibus NA  
## gasoline:pickup-diesel:minibus 0.0000039  
## diesel:sedan-diesel:minibus 0.0000000  
## electric:sedan-diesel:minibus NA  
## gasoline:sedan-diesel:minibus 0.0000000  
## diesel:suv-diesel:minibus 0.0000000  
## electric:suv-diesel:minibus NA  
## gasoline:suv-diesel:minibus 0.0000000  
## diesel:universal-diesel:minibus 0.0000000  
## electric:universal-diesel:minibus NA  
## gasoline:universal-diesel:minibus 0.0000000  
## diesel:van-diesel:minibus 0.0000001  
## electric:van-diesel:minibus NA  
## gasoline:van-diesel:minibus 0.0000000  
## diesel:minivan-gasoline:minibus 1.0000000  
## electric:minivan-gasoline:minibus NA  
## gasoline:minivan-gasoline:minibus 0.9653441  
## diesel:pickup-gasoline:minibus 0.0003791  
## electric:pickup-gasoline:minibus NA  
## gasoline:pickup-gasoline:minibus 0.0000000  
## diesel:sedan-gasoline:minibus 1.0000000  
## electric:sedan-gasoline:minibus NA  
## gasoline:sedan-gasoline:minibus 0.9999981  
## diesel:suv-gasoline:minibus 0.0000000  
## electric:suv-gasoline:minibus NA  
## gasoline:suv-gasoline:minibus 0.0000000  
## diesel:universal-gasoline:minibus 0.9999998  
## electric:universal-gasoline:minibus NA  
## gasoline:universal-gasoline:minibus 0.0137280  
## diesel:van-gasoline:minibus 1.0000000  
## electric:van-gasoline:minibus NA  
## gasoline:van-gasoline:minibus 0.9636263  
## electric:minivan-diesel:minivan NA  
## gasoline:minivan-diesel:minivan 0.0000000  
## diesel:pickup-diesel:minivan 0.0000078  
## electric:pickup-diesel:minivan NA  
## gasoline:pickup-diesel:minivan 0.0000000  
## diesel:sedan-diesel:minivan 0.0021644  
## electric:sedan-diesel:minivan NA  
## gasoline:sedan-diesel:minivan 0.0000000  
## diesel:suv-diesel:minivan 0.0000000  
## electric:suv-diesel:minivan NA  
## gasoline:suv-diesel:minivan 0.0000000  
## diesel:universal-diesel:minivan 0.0000000  
## electric:universal-diesel:minivan NA  
## gasoline:universal-diesel:minivan 0.0000000  
## diesel:van-diesel:minivan 1.0000000  
## gasoline:van-diesel:minivan 0.0749564  
## diesel:pickup-gasoline:minivan 0.0000000  
## gasoline:pickup-gasoline:minivan 0.0000000  
## diesel:sedan-gasoline:minivan 0.0003587  
## gasoline:sedan-gasoline:minivan 0.2060601  
## diesel:suv-gasoline:minivan 0.0000000  
## gasoline:suv-gasoline:minivan 0.0000000  
## diesel:universal-gasoline:minivan 0.3129971  
## gasoline:universal-gasoline:minivan 0.0000007  
## diesel:van-gasoline:minivan 0.0000000  
## gasoline:van-gasoline:minivan 1.0000000  
## gasoline:pickup-diesel:pickup 0.8880058  
## diesel:sedan-diesel:pickup 0.0000000  
## gasoline:sedan-diesel:pickup 0.0000000  
## diesel:suv-diesel:pickup 0.0000001  
## gasoline:suv-diesel:pickup 0.0642939  
## diesel:universal-diesel:pickup 0.0000000  
## gasoline:universal-diesel:pickup 0.0000000  
## diesel:van-diesel:pickup 0.0000306  
## gasoline:van-diesel:pickup 0.0000000  
## diesel:sedan-gasoline:pickup 0.0000000  
## gasoline:sedan-gasoline:pickup 0.0000000  
## diesel:suv-gasoline:pickup 0.9317597  
## gasoline:suv-gasoline:pickup 1.0000000  
## diesel:universal-gasoline:pickup 0.0000000  
## gasoline:universal-gasoline:pickup 0.0000000  
## diesel:van-gasoline:pickup 0.0000000  
## gasoline:van-gasoline:pickup 0.0000000  
## gasoline:sedan-diesel:sedan 0.3975233  
## diesel:suv-diesel:sedan 0.0000000  
## gasoline:suv-diesel:sedan 0.0000000  
## diesel:universal-diesel:sedan 0.9703079  
## gasoline:universal-diesel:sedan 0.0000000  
## diesel:van-diesel:sedan 0.1633160  
## gasoline:van-diesel:sedan 0.9049388  
## diesel:suv-gasoline:sedan 0.0000000  
## gasoline:suv-gasoline:sedan 0.0000000  
## diesel:universal-gasoline:sedan 1.0000000  
## gasoline:universal-gasoline:sedan 0.0000000  
## diesel:van-gasoline:sedan 0.0000183  
## gasoline:van-gasoline:sedan 0.9991264  
## gasoline:suv-diesel:suv 0.0000000  
## diesel:universal-diesel:suv 0.0000000  
## gasoline:universal-diesel:suv 0.0000000  
## diesel:van-diesel:suv 0.0000000  
## gasoline:van-diesel:suv 0.0000000  
## diesel:universal-gasoline:suv 0.0000000  
## gasoline:universal-gasoline:suv 0.0000000  
## diesel:van-gasoline:suv 0.0000000  
## gasoline:van-gasoline:suv 0.0000000  
## gasoline:universal-diesel:universal 0.0000000  
## diesel:van-diesel:universal 0.0004959  
  
## gasoline:van-diesel:universal 0.9982129  
## diesel:van-gasoline:universal 0.0000000  
## gasoline:van-gasoline:universal 1.0000000  
## gasoline:van-diesel:van 0.0937823

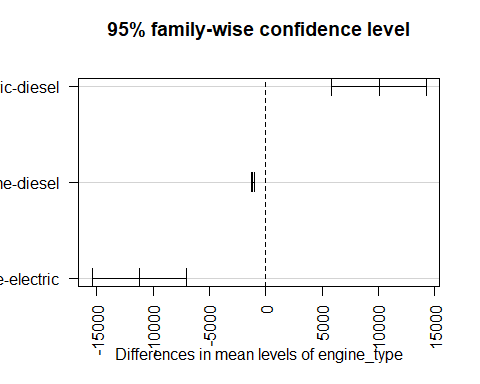
Among engine types, the p-value for each combination is less than 0.05. Hence Ha0 is rejected for all combinations.

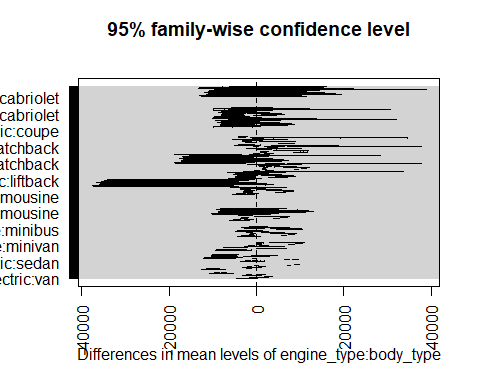
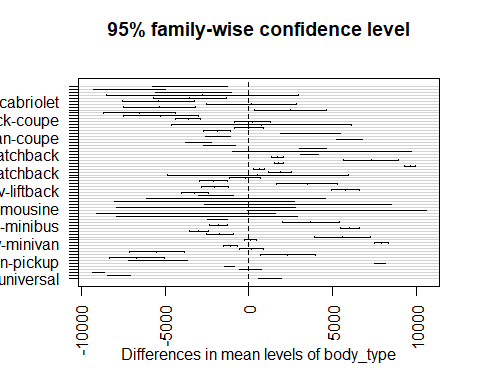
Among body\_type, the p-value for limousine-cabriolet, limousine-liftback,pickup-cabriolet,minibus-liftback,liftback-coupe,limousine-coupe, minibus-coupe,limousine-hatchback,minibus-liftback,minibus-limousine,minivan-limousine, pickup-limousine,sedan-limousine,suv-limousine universal-limousine, van-limousine, sedan-minivan,van-sedan, pairs have p-value greater than 0.05. For all other pairs, it less than 0.05.

Hence we can reject Hb0 for all these pairs.

Among the combined categories, we can see that p-value for pairs like electric:liftback-diesel:cabriolet,diesel:van-electric:hatchback,gasoline:universal-electric:hatchback,diesel:universal-electric:hatchback ,diesel:sedan-electric:hatchback ,gasoline:minivan-electric:hatchback and others have p-value less than 0.05. Hence we reject Hc0 for these pairs and conclude that there is an interaction effect of body type and engine type on the price of cars in these cases.

plot(TukeyHSD(result1, conf.level=.95), las = 2)





#las indicates the orientation of tickmarks wrt axis. here 2 indicates -always perpendicular to axis.

1. **Conclusion**: Two way anova test with and without interaction effect were done to check the effect of body type and engine type on the price of used cars. results show that there is a significant effect on price of cars due to engine type on all levels. A significant effect on price due to the bosy type is shown only in certain combinations. similarly an interaction effect of body and engine type on the price is also seen in only a certain combinations of the features.