

## 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

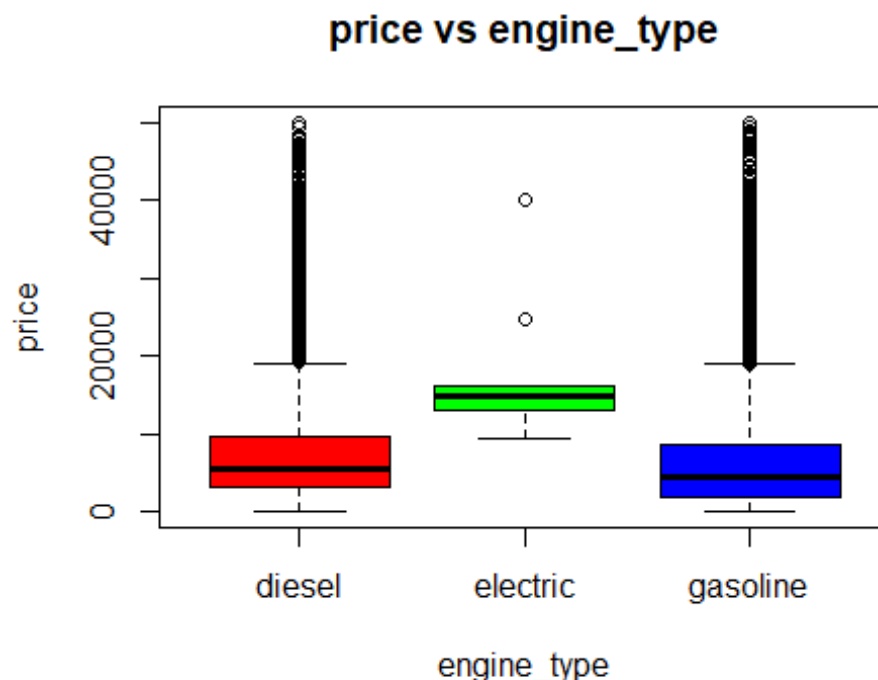
```
cars$engine_type <- as.factor(cars$engine_type)
```

```
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

$$\mu_1 = \mu_2 = \mu_3$$

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

### 2. Setting the level of significance:

$\alpha = 5\%$  i.e., 0.05

### 3. 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

```

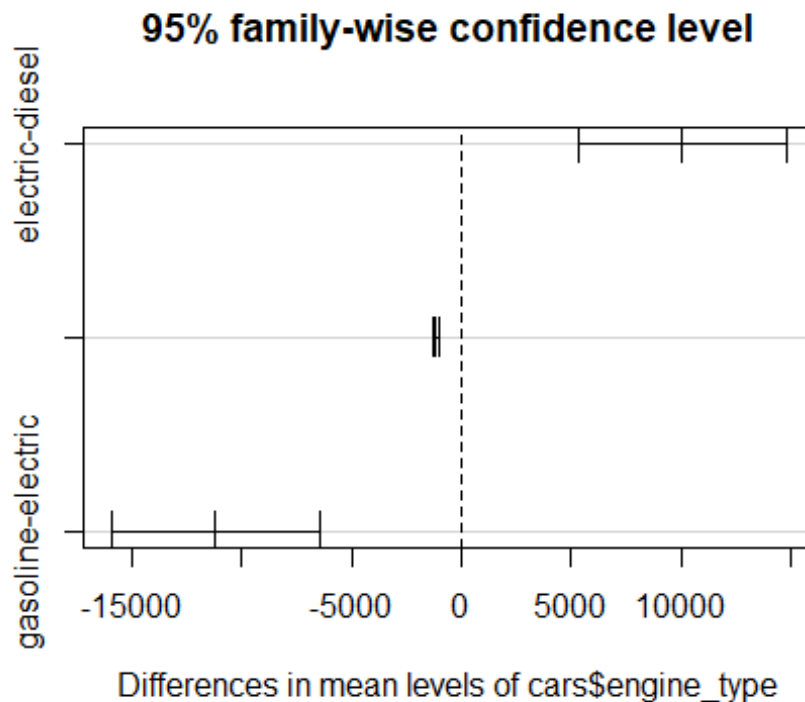
electric-diesel, gasoline-diesel and gasoline-electric have p-value less than the level of significance, according to the Tukey HSD test. This means that all three group have average price that differ significantly from one another..

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.  $\mu_1 = \mu_2 = \mu_3$

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  $\mu_1 = \mu_2 = \mu_3 = \mu_4 = \mu_5 = \mu_6 = \mu_7 = \mu_8 = \mu_9 = \mu_{10} = \mu_{11} = \mu_{12}$

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

**Setting the level of significance:**  $\alpha = 5\%$  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 from 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

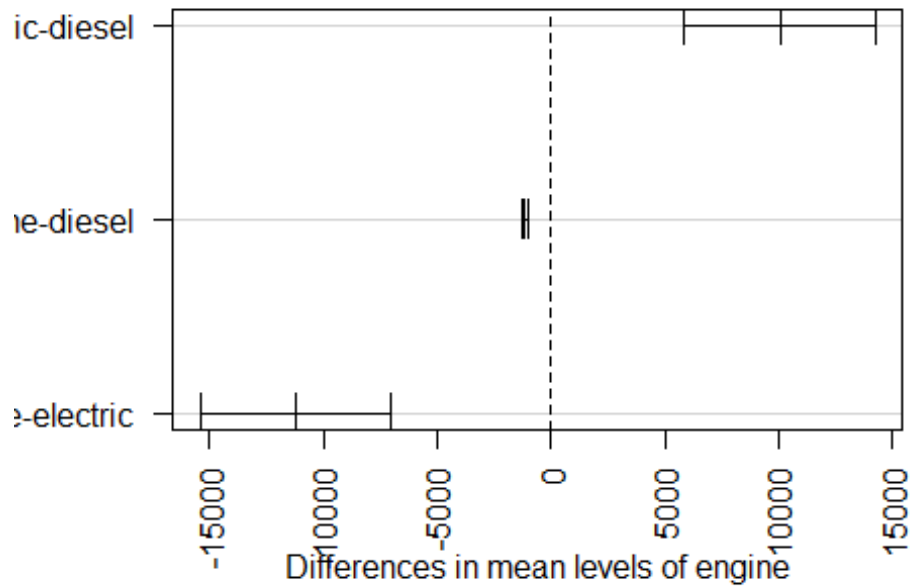
From this test, we obtain all p-values for different engine\_type combinations. They are all less than 0.05. Hence we reject  $H_{a0}$  and conclude that there is significant difference in price of car by engine\_type.

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  $H_{b0}$  as some of the pairs have shown significant effect on the price due to their body type.

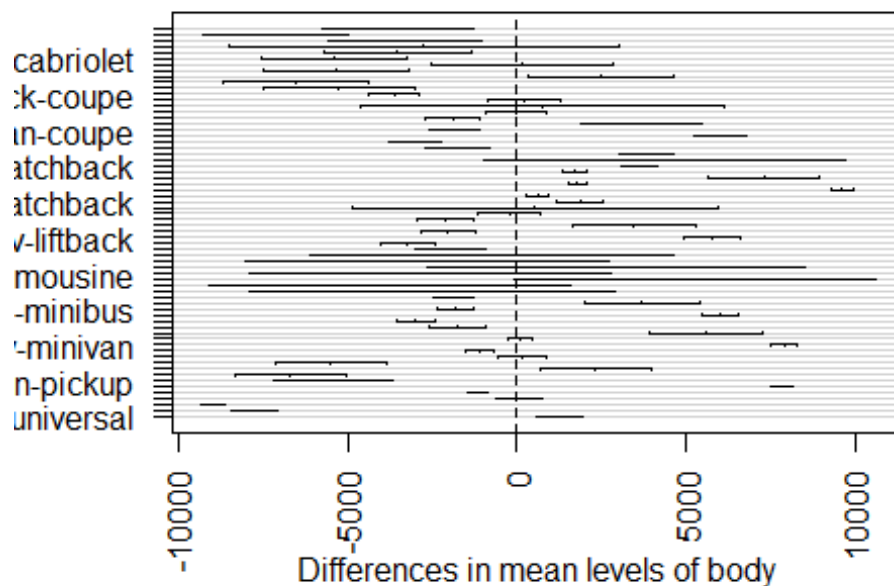
```
plot(TukeyHSD(result, conf.level=.95), las = 2)
```



### 95% family-wise confidence level



### 95% family-wise confidence level



**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:

$\alpha = 5\%$  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
```

#### 4. 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 14321.779902	1804.08333	-10713.61324
## diesel:minibus-diesel:cabriolet 13141.633202	2283.80987	-8574.01347
## electric:minibus-diesel:cabriolet NA	NA	NA
## gasoline:minibus-diesel:cabriolet 11151.663759	112.09306	-10927.47765
## diesel:minivan-diesel:cabriolet 11398.318365	546.59630	-10305.12577
## electric:minivan-diesel:cabriolet NA	NA	NA
## gasoline:minivan-diesel:cabriolet 9727.839260	-1125.92030	-11979.67985
## diesel:pickup-diesel:cabriolet 15483.678185	4353.90041	-6775.87737
## electric:pickup-diesel:cabriolet NA	NA	NA
## gasoline:pickup-diesel:cabriolet 18031.206423	6803.27600	-4424.65442
## diesel:sedan-diesel:cabriolet 10612.660361	-236.46869	-11085.59775
## electric:sedan-diesel:cabriolet NA	NA	NA
## gasoline:sedan-diesel:cabriolet 10221.323788	-621.39261	-11464.10902
## diesel:suv-diesel:cabriolet 19459.726578	8606.17782	-2247.37094
## electric:suv-diesel:cabriolet NA	NA	NA
## gasoline:suv-diesel:cabriolet 17698.719524	6851.85677	-3995.00599
## diesel:universal-diesel:cabriolet 10278.147611	-569.87522	-11417.89806
## electric:universal-diesel:cabriolet NA	NA	NA
## gasoline:universal-diesel:cabriolet 8639.653077	-2209.42317	-13058.49941
## diesel:van-diesel:cabriolet 11463.378483	592.28395	-10278.81058
## electric:van-diesel:cabriolet NA	NA	NA
## gasoline:van-diesel:cabriolet 9423.957568	-1637.94608	-12699.84973
## gasoline:cabriolet-electric:cabriolet NA	NA	NA
## diesel:coupe-electric:cabriolet NA	NA	NA

NA			
## diesel:coupe-gasoline:cabriolet 3551.708960	-1115.69201	-5783.09298	
## electric:coupe-gasoline:cabriolet NA	NA	NA	
## gasoline:coupe-gasoline:cabriolet 1195.043491	-3911.25209	-6627.46069	-
## diesel:hatchback-gasoline:cabriolet 4485.787150	-7116.38437	-9746.98159	-
## electric:hatchback-gasoline:cabriolet 12062.202683	3976.37606	-4109.45057	
## gasoline:hatchback-gasoline:cabriolet 4648.023760	-7236.13623	-9824.24871	-
## diesel:liftback-gasoline:cabriolet 396.719635	-2997.01978	-6390.75919	
## electric:liftback-gasoline:cabriolet 30783.790511	15238.37606	-307.03840	
## gasoline:liftback-gasoline:cabriolet 771.846399	-3538.83645	-6305.82651	-
## gasoline:limousine-gasoline:cabriolet 3685.085908	-3082.04061	-9849.16713	
## diesel:minibus-gasoline:cabriolet 42.227759	-2602.31408	-5246.85592	
## electric:minibus-gasoline:cabriolet NA	NA	NA	
## gasoline:minibus-gasoline:cabriolet 1461.419346	-4774.03089	-8086.64243	-
## diesel:minivan-gasoline:cabriolet 1720.148761	-4339.52765	-6958.90653	-
## electric:minivan-gasoline:cabriolet NA	NA	NA	
## gasoline:minivan-gasoline:cabriolet 3384.237089	-6012.04424	-8639.85139	-
## diesel:pickup-gasoline:cabriolet 3069.613123	-532.22354	-4134.06020	
## electric:pickup-gasoline:cabriolet NA	NA	NA	
## gasoline:pickup-gasoline:cabriolet 5811.724627	1917.15206	-1977.42051	
## diesel:sedan-gasoline:cabriolet 2513.977076	-5122.59264	-7731.20820	-
## electric:sedan-gasoline:cabriolet NA	NA	NA	
## gasoline:sedan-gasoline:cabriolet 2925.700741	-5507.51656	-8089.33238	-
## diesel:suv-gasoline:cabriolet 6346.990222	3720.05388	1093.11753	
## 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 3511.396402	2776.85673	2042.31705	
## electric:minivan-diesel:hatchback NA	NA	NA	
## gasoline:minivan-diesel:hatchback 1868.390668	1104.34013	340.28959	
## diesel:pickup-diesel:hatchback 9163.236274	6584.16083	4005.08539	
## electric:pickup-diesel:hatchback NA	NA	NA	
## gasoline:pickup-diesel:hatchback 12007.775540	9033.53643	6059.29731	
## diesel:sedan-diesel:hatchback 2688.973680	1993.79173	1298.60979	
## electric:sedan-diesel:hatchback NA	NA	NA	
## gasoline:sedan-diesel:hatchback 2195.532719	1608.86781	1022.20290	
## diesel:suv-diesel:hatchback 11597.488416	10836.43825	10075.38808	
## electric:suv-diesel:hatchback NA	NA	NA	
## gasoline:suv-diesel:hatchback 9740.986226	9082.11719	8423.24816	
## diesel:universal-diesel:hatchback 2338.084345	1660.38520	982.68606	
## electric:universal-diesel:hatchback NA	NA	NA	
## gasoline:universal-diesel:hatchback 715.194563	20.83726	-673.52005	
## diesel:van-diesel:hatchback 3802.530611	2822.54438	1842.55815	
## electric:van-diesel:hatchback NA	NA	NA	
## gasoline:van-diesel:hatchback 2860.659356	592.31434	-1676.03067	
## gasoline:hatchback-electric:hatchback 3541.966059	-11212.51229	-18883.05852	-
## diesel:liftback-electric:hatchback 1005.101550	-6973.39583	-14951.89322	
## electric:liftback-electric:hatchback 28402.561947	11262.00000	-5878.56195	
## gasoline:liftback-electric:hatchback 217.522275	-7515.21251	-15247.94730	
## gasoline:limousine-electric:hatchback 2837.691388	-7058.41667	-16954.52472	
## diesel:minibus-electric:hatchback 1111.079357	-6578.69013	-14268.45963	
## electric:minibus-electric:hatchback	NA	NA	

NA			
## gasoline:minibus-electric:hatchback 806.078871	-8750.40694	-16694.73502	-
## diesel:minivan-electric:hatchback 634.751507	-8315.90370	-15997.05590	-
## electric:minivan-electric:hatchback NA	NA	NA	
## gasoline:minivan-electric:hatchback 2304.389861	-9988.42030	-17672.45073	-
## diesel:pickup-electric:hatchback 3560.612302	-4508.59959	-12577.81149	
## electric:pickup-electric:hatchback NA	NA	NA	
## gasoline:pickup-electric:hatchback 6144.838945	-2059.22400	-10263.28695	
## diesel:sedan-electric:hatchback 1421.480272	-9098.96869	-16776.45711	-
## electric:sedan-electric:hatchback NA	NA	NA	
## gasoline:sedan-electric:hatchback 1815.468642	-9483.89261	-17152.31659	-
## diesel:suv-electric:hatchback 7427.410498	-256.32218	-7940.05486	
## electric:suv-electric:hatchback NA	NA	NA	
## gasoline:suv-electric:hatchback 5663.642330	-2010.64323	-9684.92880	
## diesel:universal-electric:hatchback 1756.450091	-9432.37522	-17108.30035	-
## electric:universal-electric:hatchback NA	NA	NA	
## gasoline:universal-electric:hatchback 3394.509373	-11071.92317	-18749.33696	-
## diesel:van-electric:hatchback 561.719209	-8270.21605	-15978.71289	-
## electric:van-electric:hatchback NA	NA	NA	
## gasoline:van-electric:hatchback 2525.112886	-10500.44608	-18475.77928	-
## diesel:liftback-gasoline:hatchback 6469.397703	4239.11646	2008.83521	
## electric:liftback-gasoline:hatchback 37808.024536	22474.51229	7141.00004	
## gasoline:liftback-gasoline:hatchback 4752.250587	3697.29978	2642.34897	
## gasoline:limousine-gasoline:hatchback 10419.132619	4154.09562	-2110.94137	
## diesel:minibus-gasoline:hatchback 5304.857752	4633.82216	3962.78656	

## electric:minibus-gasoline:hatchback NA	NA	NA
## gasoline:minibus-gasoline:hatchback 4566.881455	2462.10535	357.32924
## diesel:minivan-gasoline:hatchback 3460.375364	2896.60859	2332.84181
## electric:minivan-gasoline:hatchback NA	NA	NA
## gasoline:minivan-gasoline:hatchback 1825.804272	1224.09199	622.37972
## diesel:pickup-gasoline:hatchback 9239.640318	6703.91270	4168.18507
## electric:pickup-gasoline:hatchback NA	NA	NA
## gasoline:pickup-gasoline:hatchback 12090.018231	9153.28829	6216.55835
## diesel:sedan-gasoline:hatchback 2624.975292	2113.54360	1602.11190
## electric:sedan-gasoline:hatchback NA	NA	NA
## gasoline:sedan-gasoline:hatchback 2078.562747	1728.61968	1378.67660
## diesel:suv-gasoline:hatchback 11554.087929	10956.19011	10358.29229
## electric:suv-gasoline:hatchback NA	NA	NA
## gasoline:suv-gasoline:hatchback 9662.730037	9201.86906	8741.00808
## diesel:universal-gasoline:hatchback 2267.538920	1780.13707	1292.73521
## electric:universal-gasoline:hatchback NA	NA	NA
## gasoline:universal-gasoline:hatchback 650.899329	140.58912	-369.72108
## diesel:van-gasoline:hatchback 3801.748077	2942.29624	2082.84441
## electric:van-gasoline:hatchback NA	NA	NA
## gasoline:van-gasoline:hatchback 2931.001433	712.06621	-1506.86902
## electric:liftback-diesel:liftback 33725.255059	18235.39583	2745.53661
## gasoline:liftback-diesel:liftback 1893.765846	-541.81668	-2977.39920
## gasoline:limousine-diesel:liftback 6553.490263	-85.02083	-6723.53193
## diesel:minibus-diesel:liftback 2690.229559	394.70570	-1900.81816
## electric:minibus-diesel:liftback NA	NA	NA

## gasoline:minibus-diesel:liftback 1264.242494	-1777.01111	-4818.26472	
## diesel:minivan-diesel:liftback 923.981488	-1342.50787	-3608.99722	
## electric:minivan-diesel:liftback NA	NA	NA	
## gasoline:minivan-diesel:liftback 738.799806	-3015.02446	-5291.24912	-
## diesel:pickup-diesel:liftback 5818.757419	2464.79624	-889.16494	
## electric:pickup-diesel:liftback NA	NA	NA	
## gasoline:pickup-diesel:liftback 8580.712951	4914.17183	1247.63072	
## diesel:sedan-diesel:liftback 128.468712	-2125.57286	-4379.61443	
## electric:sedan-diesel:liftback NA	NA	NA	
## gasoline:sedan-diesel:liftback 287.525532	-2510.49678	-4733.46803	-
## diesel:suv-diesel:liftback 8992.292945	6717.07365	4441.85436	
## electric:suv-diesel:liftback NA	NA	NA	
## gasoline:suv-diesel:liftback 7205.860681	4962.75260	2719.64452	
## diesel:universal-diesel:liftback 210.268295	-2458.97939	-4707.69048	-
## electric:universal-diesel:liftback NA	NA	NA	
## gasoline:universal-diesel:liftback 1844.739959	-4098.52733	-6352.31471	-
## diesel:van-diesel:liftback 1060.678137	-1296.82021	-3654.31857	
## electric:van-diesel:liftback NA	NA	NA	
## gasoline:van-diesel:liftback 405.702054	-3527.05025	-6648.39844	-
## gasoline:liftback-electric:liftback 3412.496256	-18777.21251	-34141.92877	-
## gasoline:limousine-electric:liftback 1761.060612	-18320.41667	-34879.77272	-
## diesel:minibus-electric:liftback 2497.552478	-17840.69013	-33183.82779	-
## electric:minibus-electric:liftback NA	NA	NA	
## gasoline:minibus-electric:liftback 4540.119885	-20012.40694	-35484.69400	-
## diesel:minivan-electric:liftback 4239.083103	-19577.90370	-34916.72430	-

## electric:minivan-electric:liftback NA	NA	NA	
## gasoline:minivan-electric:liftback 5910.158172	-21250.42030	-36590.68242	-
## diesel:pickup-electric:liftback 233.820683	-15770.59959	-31307.37851	-
## electric:pickup-electric:liftback NA	NA	NA	
## gasoline:pickup-electric:liftback 2286.016856	-13321.22400	-28928.46486	
## diesel:sedan-electric:liftback 5023.982458	-20360.96869	-35697.95493	-
## electric:sedan-electric:liftback NA	NA	NA	
## gasoline:sedan-electric:liftback 5413.441912	-20745.89261	-36078.34332	-
## diesel:suv-electric:liftback 3821.790798	-11518.32218	-26858.43516	
## electric:suv-electric:liftback NA	NA	NA	
## gasoline:suv-electric:liftback 2062.739944	-13272.64323	-28608.02641	
## diesel:universal-electric:liftback 5358.171490	-20694.37522	-36030.57896	-
## electric:universal-electric:liftback NA	NA	NA	
## gasoline:universal-electric:liftback 6996.974289	-22333.92317	-37670.87205	-
## diesel:van-electric:liftback 4179.683949	-19532.21605	-34884.74815	-
## electric:van-electric:liftback NA	NA	NA	
## gasoline:van-electric:liftback 6274.216425	-21762.44608	-37250.67574	-
## gasoline:limousine-gasoline:liftback 6797.820710	456.79584	-5884.22902	
## diesel:minibus-gasoline:liftback 2123.196957	936.52238	-250.15221	
## electric:minibus-gasoline:liftback NA	NA	NA	
## gasoline:minibus-gasoline:liftback 1086.010051	-1235.19443	-3556.39892	
## diesel:minivan-gasoline:liftback 328.795758	-800.69119	-1930.17814	
## electric:minivan-gasoline:liftback NA	NA	NA	
## gasoline:minivan-gasoline:liftback 1324.310290	-2473.20779	-3622.10528	-
## diesel:pickup-gasoline:liftback 5724.667803	3006.61292	288.55803	

## electric:pickup-gasoline:liftback NA	NA	NA	
## gasoline:pickup-gasoline:liftback 8551.516017	5455.98851	2360.46101	
## diesel:sedan-gasoline:liftback 479.459949	-1583.75618	-2688.05241	-
## electric:sedan-gasoline:liftback NA	NA	NA	
## gasoline:sedan-gasoline:liftback 929.272607	-1968.68010	-3008.08760	-
## diesel:suv-gasoline:liftback 8405.794683	7258.89033	6111.98598	
## electric:suv-gasoline:liftback NA	NA	NA	
## gasoline:suv-gasoline:liftback 6586.373619	5504.56928	4422.76494	
## diesel:universal-gasoline:liftback 823.787956	-1917.16271	-3010.53747	-
## electric:universal-gasoline:liftback NA	NA	NA	
## gasoline:universal-gasoline:liftback 2452.933370	-3556.71066	-4660.48794	-
## diesel:van-gasoline:liftback 547.519110	-755.00354	-2057.52618	
## electric:van-gasoline:liftback NA	NA	NA	
## gasoline:van-gasoline:liftback 560.036399	-2985.23357	-5410.43074	-
## diesel:minibus-gasoline:limousine 6768.284706	479.72653	-5808.83164	
## electric:minibus-gasoline:limousine NA	NA	NA	
## gasoline:minibus-gasoline:limousine 4905.415092	-1691.99028	-8289.39565	
## diesel:minivan-gasoline:limousine 5020.530815	-1257.48703	-7535.50488	
## electric:minivan-gasoline:limousine NA	NA	NA	
## gasoline:minivan-gasoline:limousine 3351.535418	-2930.00363	-9211.54268	
## diesel:pickup-gasoline:limousine 9297.082423	2549.81707	-4197.44828	
## electric:pickup-gasoline:limousine NA	NA	NA	
## gasoline:pickup-gasoline:limousine 11907.163272	4999.19267	-1908.77794	
## diesel:sedan-gasoline:limousine 4232.982665	-2040.55203	-8314.08672	
## electric:sedan-gasoline:limousine NA	NA	NA	

## gasoline:sedan-gasoline:limousine 3836.962498	-2425.47595	-8687.91439	
## diesel:suv-gasoline:limousine 13083.269293	6802.09449	520.91968	
## electric:suv-gasoline:limousine NA	NA	NA	
## gasoline:suv-gasoline:limousine 11317.388093	5047.77343	-1221.84123	
## diesel:universal-gasoline:limousine 3897.662901	-2373.95856	-8645.58001	
## electric:universal-gasoline:limousine NA	NA	NA	
## gasoline:universal-gasoline:limousine 2259.936864	-4013.50650	-10286.94987	
## diesel:van-gasoline:limousine 5099.645192	-1211.79938	-7523.24395	
## electric:van-gasoline:limousine NA	NA	NA	
## gasoline:van-gasoline:limousine 3192.678466	-3442.02942	-10076.73730	
## electric:minibus-diesel:minibus NA	NA	NA	
## gasoline:minibus-diesel:minibus 2.072008	-2171.71681	-4345.50563	
## diesel:minivan-diesel:minibus 954.201222	-1737.21357	-2520.22591	-
## electric:minivan-diesel:minibus NA	NA	NA	
## gasoline:minivan-diesel:minibus 2598.969395	-3409.73016	-4220.49093	-
## diesel:pickup-diesel:minibus 4663.387656	2070.09054	-523.20658	
## electric:pickup-diesel:minibus NA	NA	NA	
## gasoline:pickup-diesel:minibus 7506.045801	4519.46613	1532.88647	
## diesel:sedan-diesel:minibus 1774.062949	-2520.27856	-3266.49417	-
## electric:sedan-diesel:minibus NA	NA	NA	
## gasoline:sedan-diesel:minibus 2258.877864	-2905.20248	-3551.52710	-
## diesel:suv-diesel:minibus 7130.301837	6322.36795	5514.43407	
## electric:suv-diesel:minibus NA	NA	NA	
## gasoline:suv-diesel:minibus 5280.555286	4568.04690	3855.53852	
## diesel:universal-diesel:minibus 2123.728979	-2853.68509	-3583.64120	-



## electric:universal-diesel:minibus NA	NA	NA	
## gasoline:universal-diesel:minibus 3747.785608	-4493.23303	-5238.68046	-
## diesel:van-diesel:minibus 674.701045	-1691.52591	-2708.35078	-
## electric:van-diesel:minibus NA	NA	NA	
## gasoline:van-diesel:minibus 1637.254057	-3921.75595	-6206.25784	-
## diesel:minivan-gasoline:minibus 2577.608940	434.50324	-1708.60245	
## electric:minivan-gasoline:minibus NA	NA	NA	
## gasoline:minivan-gasoline:minibus 915.385524	-1238.01335	-3391.41223	
## diesel:pickup-gasoline:minibus 7513.654478	4241.80735	969.96022	
## electric:pickup-gasoline:minibus NA	NA	NA	
## gasoline:pickup-gasoline:minibus 10282.763627	6691.18294	3099.60226	
## diesel:sedan-gasoline:minibus 1781.375207	-348.56175	-2478.49870	
## electric:sedan-gasoline:minibus NA	NA	NA	
## gasoline:sedan-gasoline:minibus 1363.542991	-733.48567	-2830.51433	
## diesel:suv-gasoline:minibus 10646.420903	8494.08476	6341.74863	
## electric:suv-gasoline:minibus NA	NA	NA	
## gasoline:suv-gasoline:minibus 8858.126733	6739.76371	4621.40069	
## diesel:universal-gasoline:minibus 1442.326809	-681.96828	-2806.26337	
## electric:universal-gasoline:minibus NA	NA	NA	
## gasoline:universal-gasoline:minibus 191.848277	-2321.51622	-4451.18417	-
## diesel:van-gasoline:minibus 2719.326111	480.19090	-1758.94432	
## electric:van-gasoline:minibus NA	NA	NA	
## gasoline:van-gasoline:minibus 1282.903754	-1750.03914	-4782.98203	
## electric:minivan-diesel:minivan NA	NA	NA	
## gasoline:minivan-diesel:minivan 948.032484	-1672.51660	-2397.00071	-

## diesel:pickup-diesel:minivan 6374.936116	3807.30411	1239.67210	
## electric:pickup-diesel:minivan NA	NA	NA	
## gasoline:pickup-diesel:minivan 9221.001261	6256.67970	3292.35814	
## diesel:sedan-diesel:minivan 131.618954	-783.06499	-1434.51103	-
## electric:sedan-diesel:minivan NA	NA	NA	
## gasoline:sedan-diesel:minivan 633.873088	-1167.98891	-1702.10474	-
## diesel:suv-diesel:minivan 8780.900704	8059.58152	7338.26234	
## electric:suv-diesel:minivan NA	NA	NA	
## gasoline:suv-diesel:minivan 6917.806306	6305.26047	5692.71463	
## diesel:universal-diesel:minivan 483.715544	-1116.47152	-1749.22750	-
## electric:universal-diesel:minivan NA	NA	NA	
## gasoline:universal-diesel:minivan 2105.453506	-2756.01947	-3406.58543	-
## diesel:van-diesel:minivan 995.149089	45.68765	-903.77378	
## electric:van-diesel:minivan NA	NA	NA	
## gasoline:van-diesel:minivan 70.783116	-2184.54238	-4439.86788	
## gasoline:van-electric:minivan NA	NA	NA	
## diesel:pickup-gasoline:minivan 8056.050277	5479.82070	2903.59113	
## electric:pickup-gasoline:minivan NA	NA	NA	
## gasoline:pickup-gasoline:minivan 10900.967990	7929.19630	4957.42460	
## diesel:sedan-gasoline:minivan 1574.000089	889.45160	204.90312	
## electric:sedan-gasoline:minivan NA	NA	NA	
## gasoline:sedan-gasoline:minivan 1078.552423	504.52768	-69.49706	
## diesel:suv-gasoline:minivan 10483.447604	9732.09812	8980.74863	
## electric:suv-gasoline:minivan NA	NA	NA	
## gasoline:suv-gasoline:minivan 8625.416695	7977.77706	7330.13743	

## diesel:universal-gasoline:minivan 1222.832008	556.04507	-110.74186	
## electric:universal-gasoline:minivan NA	NA	NA	
## gasoline:universal-gasoline:minivan 399.791853	-1083.50287	-1767.21389	-
## diesel:van-gasoline:minivan 2690.676205	1718.20425	745.73229	
## electric:van-gasoline:minivan NA	NA	NA	
## gasoline:van-gasoline:minivan 1753.082994	-512.02579	-2777.13457	
## electric:pickup-diesel:pickup NA	NA	NA	
## gasoline:pickup-diesel:pickup 6309.334650	2449.37559	-1410.58346	
## diesel:sedan-diesel:pickup 2033.718254	-4590.36910	-7147.01994	-
## electric:sedan-diesel:pickup NA	NA	NA	
## gasoline:sedan-diesel:pickup 2445.992462	-4975.29302	-7504.59358	-
## diesel:suv-diesel:pickup 6827.618744	4252.27741	1676.93609	
## electric:suv-diesel:pickup NA	NA	NA	
## gasoline:suv-diesel:pickup 5044.973048	2497.95636	-49.06033	
## diesel:universal-diesel:pickup 2371.823096	-4923.77563	-7475.72816	-
## electric:universal-diesel:pickup NA	NA	NA	
## gasoline:universal-diesel:pickup 4006.896835	-6563.32357	-9119.75031	-
## diesel:van-diesel:pickup 1113.304044	-3761.61645	-6409.92886	-
## electric:van-diesel:pickup NA	NA	NA	
## gasoline:van-diesel:pickup 2645.419334	-5991.84649	-9338.27364	-
## diesel:sedan-gasoline:pickup 4084.929688	-7039.74469	-9994.55970	-
## electric:sedan-gasoline:pickup NA	NA	NA	
## gasoline:sedan-gasoline:pickup 4493.486347	-7424.66861	-10355.85088	-
## diesel:suv-gasoline:pickup 4773.903525	1802.90182	-1168.09989	
## electric:suv-gasoline:pickup NA	NA	NA	

## gasoline:suv-gasoline:pickup 2995.063784	48.58077	-2897.90225	
## diesel:universal-gasoline:pickup 4422.400488	-7373.15122	-10323.90196	-
## electric:universal-gasoline:pickup NA	NA	NA	
## gasoline:universal-gasoline:pickup 6058.078068	-9012.69917	-11967.32027	-
## diesel:van-gasoline:pickup 3176.518982	-6210.99205	-9245.46511	-
## electric:van-gasoline:pickup NA	NA	NA	
## gasoline:van-gasoline:pickup 4781.571434	-8441.22208	-12100.87273	-
## electric:sedan-diesel:sedan NA	NA	NA	
## gasoline:sedan-diesel:sedan 93.625047	-384.92392	-863.47289	
## diesel:suv-diesel:sedan 9523.844548	8842.64651	8161.44848	
## electric:suv-diesel:sedan NA	NA	NA	
## gasoline:suv-diesel:sedan 7653.074789	7088.32546	6523.57613	
## diesel:universal-diesel:sedan 253.201966	-333.40653	-920.01503	
## electric:universal-diesel:sedan NA	NA	NA	
## gasoline:universal-diesel:sedan 1367.177727	-1972.95448	-2578.73122	-
## diesel:van-diesel:sedan 1748.103730	828.75264	-90.59844	
## electric:van-diesel:sedan NA	NA	NA	
## gasoline:van-diesel:sedan 841.338362	-1401.47739	-3644.29314	
## diesel:suv-gasoline:sedan 9797.595469	9227.57043	8657.54540	
## electric:suv-gasoline:sedan NA	NA	NA	
## gasoline:suv-gasoline:sedan 7897.324352	7473.24938	7049.17441	
## diesel:universal-gasoline:sedan 504.294714	51.51739	-401.25993	
## electric:universal-gasoline:sedan NA	NA	NA	
## gasoline:universal-gasoline:sedan 1110.680321	-1588.03055	-2065.38079	-
## diesel:van-gasoline:sedan 2053.976629	1213.67657	373.37650	

## 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



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## 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

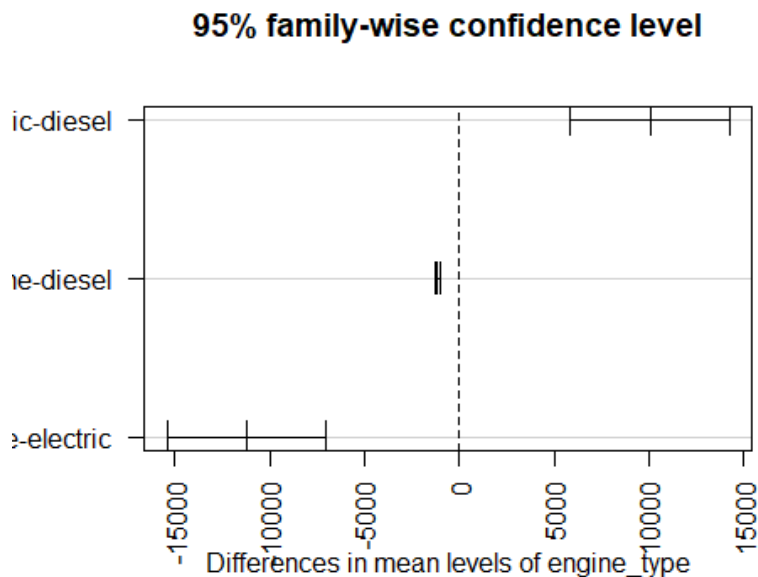
Among engine types, the p-value for each combination is less than 0.05. Hence  $H_{a0}$  is rejected for all combinations.

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.

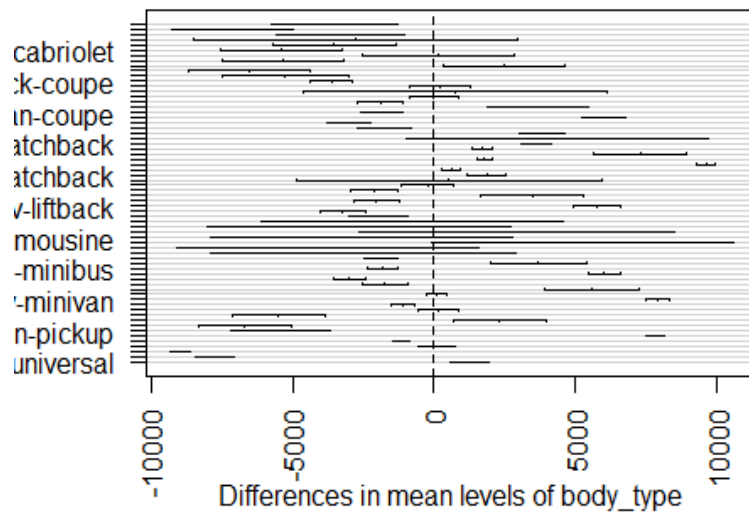
Hence we can reject  $H_{b0}$  for all these pairs.

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  $H_{c0}$  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.

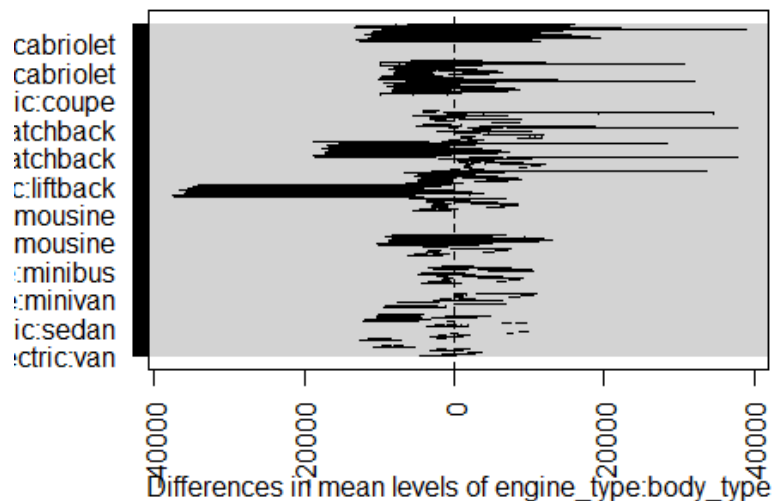
```
plot(TukeyHSD(result1, conf.level=.95), las = 2)
```



### 95% family-wise confidence level



### 95% family-wise confidence level



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

5. **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.