Test

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```
library(readr)
library(Metrics) # RMSE/RMSLE
```

```
## Warning: package 'Metrics' was built under R version 4.0.5
```

```
library(dplyr)
```

```
## Warning: package 'dplyr' was built under R version 4.0.5
```

```
##
## Attaching package: 'dplyr'
```

```
## The following objects are masked from 'package:stats':
##
##     filter, lag
```

```
## The following objects are masked from 'package:base':
##
##     intersect, setdiff, setequal, union
```

```
library(ggplot2)
library(dgof) #ks.test
```

```
##
## Attaching package: 'dgof'
```

```
## The following object is masked from 'package:stats':
##
##     ks.test
```

```
library(fitdistrplus) #MLE
```

```
## Warning: package 'fitdistrplus' was built under R version 4.0.5
```

```
## Loading required package: MASS
```

```
## Warning: package 'MASS' was built under R version 4.0.4
```

```
##
## Attaching package: 'MASS'
```

```
## The following object is masked from 'package:dplyr':
##
##     select
```

```
## Loading required package: survival
```

```
library(actuar)
```

```
## Warning: package 'actuar' was built under R version 4.0.5
```

```
##
## Attaching package: 'actuar'

## The following object is masked from 'package:grDevices':
##
##     cm
```

```
library(stringr)
```

```
## Warning: package 'stringr' was built under R version 4.0.5
```

```
library(SuppDists)
library(dplyr)
library(splitstackshape)
```

```
## Warning: package 'splitstackshape' was built under R version 4.0.5
```

```
library(EnvStats)
```

```
## Warning: package 'EnvStats' was built under R version 4.0.5

##
## Attaching package: 'EnvStats'

## The following objects are masked from 'package:actuar':
##
##     dpareto, ppareto, qpareto, rpareto

## The following object is masked from 'package:MASS':
##
##     boxcox

## The following objects are masked from 'package:stats':
##
##     predict, predict.lm

## The following object is masked from 'package:base':
##
##     print.default
```

Cleaning

```
data <- read_csv("laptop_price.csv")
```

```
##
## -- Column specification --------------------------------------------------------
## cols(
##   laptop_ID = col_double(),
##   Company = col_character(),
##   Product = col_character(),
##   TypeName = col_character(),
##   Inches = col_double(),
##   ScreenResolution = col_character(),
##   Cpu = col_character(),
##   Ram = col_character(),
##   Memory = col_character(),
##   Gpu = col_character(),
##   OpSys = col_character(),
```

```
##   Weight = col_character(),
##   Price_euros = col_double()
## )
```

```
company <- c('Dell','Lenovo','HP','Asus','Acer', "Apple")
data <- data %>% filter(Company %in% company)
```

Cleanning Screen Resolution

```
data$ScreenType <- ''
for (i in 1:nrow(data)){
  vec <- str_split(data$ScreenResolution[i], ' ', simplify = TRUE)
  n <- length(vec)
  if (n > 2){
    m <- n-1
    temp <- vec[1,1]
    for (j in 2:m){
      temp <- paste(temp,vec[1,j])
  }
    data$ScreenType[i] <- temp
    data$ScreenResolution[i] <- vec[1,n]
  }
  else if (n == 2){
    data$ScreenType[i] <- vec[1,1]
    data$ScreenResolution[i] <- vec[1,2]
  }
}
data %>% count(ScreenResolution, sort = T)
```

```
## # A tibble: 11 x 2
##    ScreenResolution     n
##    <chr>            <int>
##  1 1920x1080          728
##  2 1366x768           288
##  3 3840x2160           37
##  4 3200x1800           27
##  5 1600x900            23
##  6 2560x1440           23
##  7 2304x1440            6
##  8 2560x1600            6
##  9 1440x900             4
## 10 1920x1200            4
## 11 2880x1800            4
```

```
data %>% count(ScreenType, sort = T)
```

```
## # A tibble: 20 x 2
##    ScreenType                              n
##    <chr>                               <int>
##  1 "Full HD"                             436
##  2 ""                                    294
##  3 "IPS Panel Full HD"                   201
##  4 "IPS Panel Full HD / Touchscreen"      49
##  5 "Full HD / Touchscreen"                41
##  6 "Touchscreen"                          23
```

```
##  7 "IPS Panel Retina Display"                16
##  8 "Quad HD+ / Touchscreen"                  15
##  9 "IPS Panel Touchscreen"                   12
## 10 "IPS Panel 4K Ultra HD"                   11
## 11 "IPS Panel"                               10
## 12 "IPS Panel 4K Ultra HD / Touchscreen"     10
## 13 "4K Ultra HD / Touchscreen"                8
## 14 "4K Ultra HD"                              6
## 15 "IPS Panel Quad HD+ / Touchscreen"         6
## 16 "IPS Panel Quad HD+"                       5
## 17 "Quad HD+"                                 3
## 18 "IPS Panel Touchscreen / 4K Ultra HD"      2
## 19 "Touchscreen / Full HD"                    1
## 20 "Touchscreen / Quad HD+"                   1
```

Cleanning CPU Type

```
data$Cpu_Type <- ''
data$Cpu_Series <- ''
data$Cpu_Speed <- ''
for (i in 1:nrow(data)){
  vec <- str_split(data$Cpu[i], ' ',simplify =TRUE)
  n <- length(vec)
  data$Cpu_Type[i] <- vec[1,1]
  data$Cpu_Speed[i] <- vec[1,n]
  n <- n-1
  temp <- vec[1,2]
  for (j in 3:n){
    temp <- paste(temp,vec[1,j])
  }
  data$Cpu_Series[i] <- temp
}
```

Cleanning GPU Type

```
data$Gpu_Type <- ''
data$Gpu_Series <- ''
for (i in 1:nrow(data)){
  data$Gpu_Type[i] <- str_split(data$Gpu[i], ' ', n=2)[[1]][1]
  data$Gpu_Series[i] <- str_split(data$Gpu[i], ' ', n=2)[[1]][2]
}
```

Cleanning Memory

```
data$Memory_1 <- ''
data$Memory_2 <- ''
for (i in 1:nrow(data)){
  data$Memory_1[i] <- sub(' +', '',str_split(data$Memory, ' + ', n=2)[[i]][1],fixed=TRUE)
  data$Memory_2[i] <- str_split(data$Memory, ' + ', n=2)[[i]][2]
}
data$Memory_2[is.na(data$Memory_2)] = 0
data[which(data$Memory_1 =='1.0TB HDD'),]$Memory_1 = '1TB HDD'
```

```
data$Memory_1_Type <- ''
data$Memory_1_Size <- ''
data$Memory_2_Type <- ''
data$Memory_2_Size <- ''

for (i in 1:nrow(data)){
  data$Memory_1_Type[i] <- str_split(data$Memory_1[i],' ', 2, simplify= T)[1,2]
  data$Memory_1_Size[i] <- str_split(data$Memory_1[i],' ', 2, simplify= T)[1,1]

  data$Memory_2_Type[i] <- str_split(data$Memory_2[i],' ', 2, simplify= T)[1,2]
  data$Memory_2_Size[i] <- str_split(data$Memory_2[i],' ', 2, simplify= T)[1,1]
}
data[which(data$Memory_1 =='1.0TB HDD'),]$Memory_1 = '1TB HDD'

data[which(data$Memory_1_Size =='1.0TB'),]$Memory_1_Size = '1TB'
data[which(data$Memory_1_Size =='1TB'),]$Memory_1_Size = '1024GB'
data[which(data$Memory_1_Size =='2TB'),]$Memory_1_Size = '2048GB'

data[which(data$Memory_2_Size =='1.0TB'),]$Memory_2_Size = '1TB'
data[which(data$Memory_2_Size =='1TB'),]$Memory_2_Size = '1024GB'
data[which(data$Memory_2_Size =='2TB'),]$Memory_2_Size = '2048GB'

data$Memory_1_Size <- sub('GB', "", data$Memory_1_Size,fixed = TRUE)
data$Memory_1_Size <- as.numeric(data$Memory_1_Size)
data$Memory_2_Size <- sub('GB', "", data$Memory_2_Size,fixed = TRUE)
data$Memory_2_Size <- as.numeric(data$Memory_2_Size)
```

Cleanning Ram

```
data$Ram <- as.numeric(sub('GB', "", data$Ram,fixed = TRUE))
data$Cpu_Speed <- as.numeric(sub('GHz', '', data$Cpu_Speed, fixed=TRUE))
```

Factoring

```
data$Company <- factor(data$Company)
data$Product <- factor(data$Product)
data$TypeName <- factor(data$TypeName)
data$ScreenType <- factor(data$ScreenType)
data$ScreenResolution <- factor(data$ScreenResolution)
data$ScreenType <- relevel(data$ScreenType, 'Full HD')
data %>% count(ScreenType, sort = T)
```

```
## # A tibble: 20 x 2
##    ScreenType                              n
##    <fct>                               <int>
##  1 "Full HD"                             436
##  2 ""                                    294
##  3 "IPS Panel Full HD"                   201
##  4 "IPS Panel Full HD / Touchscreen"      49
##  5 "Full HD / Touchscreen"                41
##  6 "Touchscreen"                          23
##  7 "IPS Panel Retina Display"             16
```

```
##  8 "Quad HD+ / Touchscreen"                 15
##  9 "IPS Panel Touchscreen"                  12
## 10 "IPS Panel 4K Ultra HD"                  11
## 11 "IPS Panel"                              10
## 12 "IPS Panel 4K Ultra HD / Touchscreen"    10
## 13 "4K Ultra HD / Touchscreen"               8
## 14 "4K Ultra HD"                             6
## 15 "IPS Panel Quad HD+ / Touchscreen"        6
## 16 "IPS Panel Quad HD+"                      5
## 17 "Quad HD+"                                3
## 18 "IPS Panel Touchscreen / 4K Ultra HD"     2
## 19 "Touchscreen / Full HD"                   1
## 20 "Touchscreen / Quad HD+"                  1
```

```
data$Memory <- factor(data$Memory)
data$Gpu <- factor(data$Cpu)
data$OpSys <- factor(data$OpSys)
data$Memory_1 <- factor(data$Memory_1)
data$Memory_2 <- factor(data$Memory_2)
data$Gpu_Type <- factor(data$Gpu_Type)
data$Gpu_Series <- factor(data$Gpu_Series)
data$Weight <-as.numeric(str_remove(data$Weight,'kg'))
```

```
head(data$Weight)
```

```
## [1] 1.37 1.34 1.86 1.83 1.37 2.10
```

Relevelling

```
data %>% count(Company, sort = TRUE)
```

```
## # A tibble: 6 x 2
##   Company     n
##   <fct>   <int>
## 1 Dell      297
## 2 Lenovo    297
## 3 HP        274
## 4 Asus      158
## 5 Acer      103
## 6 Apple      21
```

```
data$Company <- relevel(data$Company, 'Dell')
```

```
data %>% count(Product, sort = TRUE)
```

```
## # A tibble: 506 x 2
##    Product                n
##    <fct>              <int>
##  1 XPS 13                30
##  2 Inspiron 3567         29
##  3 250 G6                21
##  4 Legion Y520-15IKBN    19
##  5 Vostro 3568           19
##  6 Inspiron 5570         18
##  7 ProBook 450           18
##  8 Alienware 17          15
```

```
##  9 Inspiron 5567         14
## 10 Aspire 3              12
## # ... with 496 more rows
```

```
data$Product <- relevel(data$Product, 'XPS 13')
```

```
data %>% count(TypeName, sort = TRUE)
```

```
## # A tibble: 6 x 2
##   TypeName              n
##   <fct>             <int>
## 1 Notebook            672
## 2 Ultrabook           161
## 3 Gaming              146
## 4 2 in 1 Convertible  118
## 5 Workstation          29
## 6 Netbook              24
```

```
data$TypeName <- relevel(data$TypeName, 'Notebook')
```

```
data %>% count(ScreenResolution, sort = TRUE)
```

```
## # A tibble: 11 x 2
##    ScreenResolution     n
##    <fct>            <int>
##  1 1920x1080          728
##  2 1366x768           288
##  3 3840x2160           37
##  4 3200x1800           27
##  5 1600x900            23
##  6 2560x1440           23
##  7 2304x1440            6
##  8 2560x1600            6
##  9 1440x900             4
## 10 1920x1200            4
## 11 2880x1800            4
```

```
data$ScreenResolution <- relevel(data$ScreenResolution, '1920x1080')
```

```
data %>% count(Gpu_Series, sort = TRUE)
```

```
## # A tibble: 102 x 2
##    Gpu_Series           n
##    <fct>            <int>
##  1 HD Graphics 620    250
##  2 HD Graphics 520    160
##  3 UHD Graphics 620    68
##  4 GeForce GTX 1050    53
##  5 GeForce 940MX       41
##  6 Radeon 530          41
##  7 HD Graphics 400     33
##  8 HD Graphics 500     33
##  9 GeForce GTX 1060    31
## 10 GeForce 930MX       25
## # ... with 92 more rows
```

```
data$Gpu_Series <- relevel(data$Gpu_Series, 'HD Graphics 620')
```

```
data %>% count(OpSys, sort = TRUE)
```

```
## # A tibble: 9 x 2
##   OpSys            n
##   <fct>        <int>
## 1 Windows 10     935
## 2 No OS           63
## 3 Linux           62
## 4 Windows 7       43
## 5 Chrome OS       22
## 6 macOS           13
## 7 Mac OS X         8
## 8 Android          2
## 9 Windows 10 S     2
```

```
data$OpSys <- relevel(data$OpSys, 'Windows 10')
```

```
data %>% count(Gpu_Type, sort = TRUE)
```

```
## # A tibble: 3 x 2
##   Gpu_Type     n
##   <fct>    <int>
## 1 Intel      642
## 2 Nvidia     329
## 3 AMD        179
```

```
data$Gpu_Type <- relevel(factor(data$Gpu_Type), 'Intel')
```

```
data %>% count(Gpu_Series, sort = TRUE)
```

```
## # A tibble: 102 x 2
##    Gpu_Series           n
##    <fct>            <int>
##  1 HD Graphics 620    250
##  2 HD Graphics 520    160
##  3 UHD Graphics 620    68
##  4 GeForce GTX 1050    53
##  5 GeForce 940MX       41
##  6 Radeon 530          41
##  7 HD Graphics 400     33
##  8 HD Graphics 500     33
##  9 GeForce GTX 1060    31
## 10 GeForce 930MX       25
## # ... with 92 more rows
```

```
data$Gpu_Series <- relevel(factor(data$Gpu_Series), 'HD Graphics 620')
```

```
data %>% count(Cpu_Type, sort = TRUE)
```

```
## # A tibble: 2 x 2
##   Cpu_Type     n
##   <chr>    <int>
## 1 Intel     1088
## 2 AMD         62
```

```
data$Cpu_Type <- relevel(factor(data$Cpu_Type), 'Intel')
```

```
data %>% count(Cpu_Series, sort = TRUE)
```

```
## # A tibble: 85 x 2
##    Cpu_Series         n
##    <chr>          <int>
##  1 Core i5 7200U    175
##  2 Core i7 7500U    120
##  3 Core i7 7700HQ   113
##  4 Core i3 6006U     80
##  5 Core i5 8250U     71
##  6 Core i7 8550U     71
##  7 Core i5 6200U     51
##  8 Core i7 6500U     42
##  9 Core i3 7100U     35
## 10 Core i7 6700HQ    32
## # ... with 75 more rows
```

```
data$Cpu_Series <- relevel(factor(data$Cpu_Series), 'Core i5 7200U')
```

```
#data %>% count(Cpu_Speed, sort = TRUE)
#data$Cpu_Speed <- relevel(factor(data$Cpu_Speed), '2.5GHz')
```

```
data %>% count(Memory_1_Type, sort = TRUE)
```

```
## # A tibble: 4 x 2
##   Memory_1_Type     n
##   <chr>         <int>
## 1 SSD             713
## 2 HDD             363
## 3 Flash Storage    64
## 4 Hybrid           10
```

```
data$Memory_1_Type <- relevel(factor(data$Memory_1_Type), 'SSD')
```

```
data %>% count(Memory_2_Type, sort = TRUE)
```

```
## # A tibble: 4 x 2
##   Memory_2_Type     n
##   <chr>         <int>
## 1 ""              991
## 2 "HDD"           153
## 3 "SSD"             4
## 4 "Hybrid"          2
```

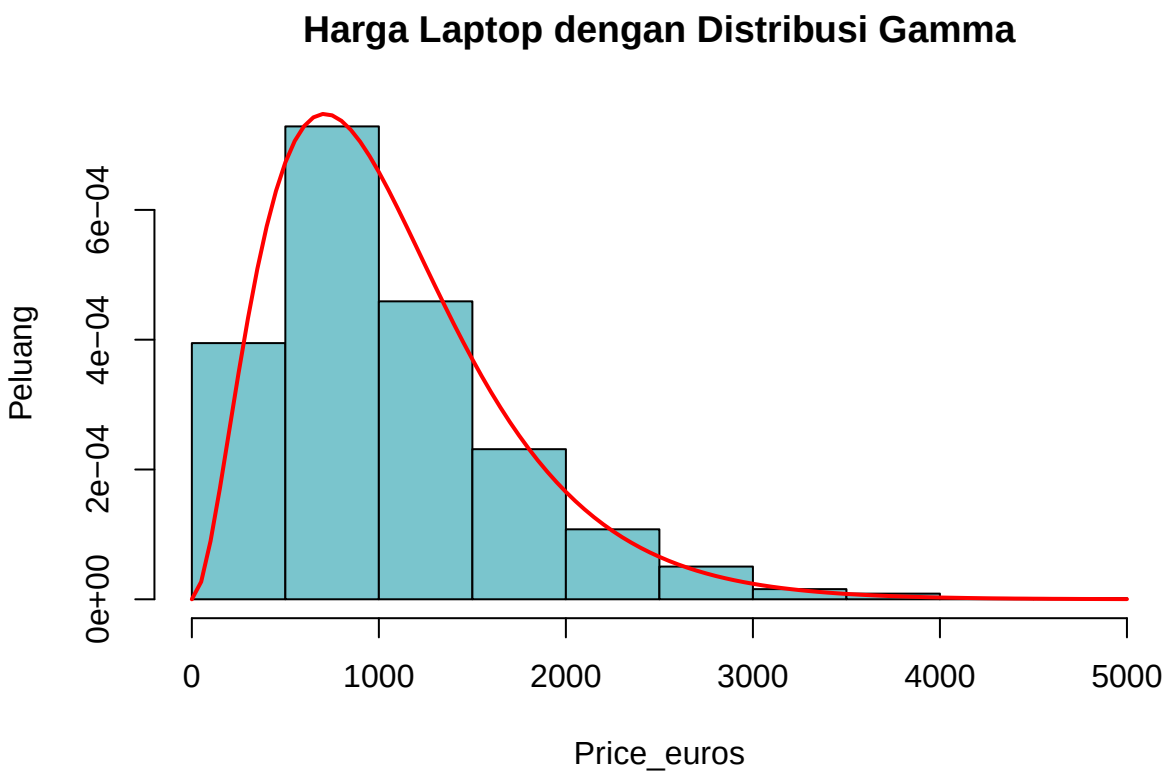
```
data$Memory_2_Type <- relevel(factor(data$Memory_2_Type), '')
```

```
summary(fitdist(data$Price_euros,"gamma"))
```

```
## Fitting of the distribution ' gamma ' by maximum likelihood
## Parameters :
##          estimate   Std. Error
## shape 2.928053153 7.735577e-02
## rate  0.002717365 6.524717e-05
## Loglikelihood:  -8901.67   AIC:  17807.34   BIC:  17817.44
## Correlation matrix:
```

```
##           shape      rate
## shape 1.0000000 0.8014826
## rate  0.8014826 1.0000000
```

```
h = hist(data$Price_euros,probability = T,main = paste("Harga Laptop dengan Distribusi Gamma"),col="cad
curve(dgamma(x,shape = 2.928053153 ,rate = 0.002717365),add=TRUE,lwd=2,col="red")
```



EDA

```
set.seed(10818015)
ks.test(data$Price_euros,rgamma(nrow(data),shape = 2.928053153,rate = 0.002717365),alternative = "two.si
```

```
## Warning in ks.test(data$Price_euros, rgamma(nrow(data), shape = 2.928053153, :
## cannot compute correct p-values with ties
```

```
##
##  Two-sample Kolmogorov-Smirnov test
##
## data:  data$Price_euros and rgamma(nrow(data), shape = 2.928053153, rate = 0.002717365)
## D = 0.051304, p-value = 0.09691
## alternative hypothesis: two-sided
```

```
set.seed(181815)
temp <- stratified(data, group =25, size = 0.8, bothSets = T)
train <- as.data.frame(temp$SAMP1)
test <- as.data.frame(temp$SAMP2)
```

```
model2 =step(glm(Price_euros ~ Company+TypeName+Inches+ScreenResolution+Cpu_Type+Ram+Memory_1_Size+
                   Memory_1_Type+Gpu_Type+ OpSys+Company*OpSys+Company*TypeName ,
                 family = Gamma(link ="log"),
                data=train),direction ="both",trace = F)
model2inv =step(glm(Price_euros ~ Company+TypeName+Inches+ScreenResolution+Cpu_Type+Ram+Memory_1_Size+
                   Memory_1_Type+Gpu_Type+ OpSys+Company*OpSys+Company*TypeName ,
                 family = inverse.gaussian(link ="log"),
                data=train),direction ="both",trace = F)
summary(model2)
```

```
##
## Call:
## glm(formula = Price_euros ~ Company + TypeName + Inches + ScreenResolution +
##     Cpu_Type + Ram + Memory_1_Type + Gpu_Type + OpSys + Company:TypeName,
##     family = Gamma(link = "log"), data = train)
##
## Deviance Residuals:
##      Min        1Q    Median        3Q       Max
## -0.93863  -0.20720  -0.03916   0.13564   1.38454
##
## Coefficients: (8 not defined because of singularities)
##                                          Estimate Std. Error t value Pr(>|t|)
## (Intercept)                             7.1010246  0.1917742  37.028  < 2e-16
## CompanyAcer                            -0.2580828  0.0476975  -5.411 8.12e-08
## CompanyApple                            0.1961141  0.3864554   0.507 0.611955
## CompanyAsus                            -0.1793403  0.0496926  -3.609 0.000325
## CompanyHP                              -0.0001483  0.0384669  -0.004 0.996925
## CompanyLenovo                          -0.1055800  0.0409681  -2.577 0.010127
## TypeName2 in 1 Convertible             -0.0264620  0.0690844  -0.383 0.701786
## TypeNameGaming                          0.0808790  0.0689861   1.172 0.241360
## TypeNameNetbook                        -0.1672070  0.2155236  -0.776 0.438068
## TypeNameUltrabook                       0.1951349  0.0592371   3.294 0.001027
## TypeNameWorkstation                     0.6043577  0.0988309   6.115 1.46e-09
## Inches                                 -0.0333378  0.0128089  -2.603 0.009407
## ScreenResolution1366x768               -0.2721394  0.0302191  -9.006  < 2e-16
## ScreenResolution1440x900                0.0720439  0.4417316   0.163 0.870482
## ScreenResolution1600x900               -0.1229230  0.0797558  -1.541 0.123623
## ScreenResolution1920x1200              -0.2000294  0.2243536  -0.892 0.372865
## ScreenResolution2304x1440              -0.2358647  0.3333932  -0.707 0.479466
## ScreenResolution2560x1440               0.2857001  0.0799308   3.574 0.000370
## ScreenResolution2560x1600              -0.0324345  0.4052223  -0.080 0.936223
## ScreenResolution2880x1800               0.1896524  0.3788177   0.501 0.616750
## ScreenResolution3200x1800               0.1180568  0.0694518   1.700 0.089520
## ScreenResolution3840x2160               0.2599302  0.0610521   4.258 2.29e-05
## Cpu_TypeAMD                            -0.2450812  0.0579625  -4.228 2.61e-05
## Ram                                     0.0457834  0.0029494  15.523  < 2e-16
## Memory_1_TypeFlash Storage             -0.5510247  0.0628022  -8.774  < 2e-16
## Memory_1_TypeHDD                       -0.1612674  0.0274878  -5.867 6.32e-09
## Memory_1_TypeHybrid                    -0.2403084  0.1233700  -1.948 0.051753
## Gpu_TypeAMD                            -0.0576710  0.0396029  -1.456 0.145690
## Gpu_TypeNvidia                          0.0945031  0.0324899   2.909 0.003722
## OpSysAndroid                           -0.2595866  0.2916757  -0.890 0.373722
## OpSysChrome OS                         -0.0380630  0.0854315  -0.446 0.656042
## OpSysLinux                             -0.2094752  0.0457427  -4.579 5.34e-06
```

```
## OpSysMac OS X                                0.4003659  0.2538739   1.577 0.115154
## OpSysmacOS                                          NA         NA      NA       NA
## OpSysNo OS                                  -0.3080577  0.0469916  -6.556 9.51e-11
## OpSysWindows 10 S                           -0.4356126  0.2991915  -1.456 0.145764
## OpSysWindows 7                               0.2788511  0.0574878   4.851 1.46e-06
## CompanyAcer:TypeName2 in 1 Convertible       0.0489957  0.1551678   0.316 0.752261
## CompanyApple:TypeName2 in 1 Convertible             NA         NA      NA       NA
## CompanyAsus:TypeName2 in 1 Convertible       0.2766254  0.1190521   2.324 0.020379
## CompanyHP:TypeName2 in 1 Convertible         0.2812396  0.1041433   2.701 0.007058
## CompanyLenovo:TypeName2 in 1 Convertible     0.2682802  0.0895976   2.994 0.002829
## CompanyAcer:TypeNameGaming                   0.3713918  0.1399805   2.653 0.008120
## CompanyApple:TypeNameGaming                         NA         NA      NA       NA
## CompanyAsus:TypeNameGaming                   0.3338656  0.0867768   3.847 0.000128
## CompanyHP:TypeNameGaming                     0.1327552  0.1156439   1.148 0.251300
## CompanyLenovo:TypeNameGaming                 0.0774491  0.0908103   0.853 0.393968
## CompanyAcer:TypeNameNetbook                 -0.1249357  0.2704503  -0.462 0.644230
## CompanyApple:TypeNameNetbook                        NA         NA      NA       NA
## CompanyAsus:TypeNameNetbook                 -0.1697901  0.2727715  -0.622 0.533801
## CompanyHP:TypeNameNetbook                    0.3073592  0.2374091   1.295 0.195789
## CompanyLenovo:TypeNameNetbook               -0.1127358  0.2578026  -0.437 0.662006
## CompanyAcer:TypeNameUltrabook               -0.1522573  0.1603602  -0.949 0.342646
## CompanyApple:TypeNameUltrabook                      NA         NA      NA       NA
## CompanyAsus:TypeNameUltrabook               -0.0304957  0.0982526  -0.310 0.756346
## CompanyHP:TypeNameUltrabook                  0.0636532  0.0806166   0.790 0.429989
## CompanyLenovo:TypeNameUltrabook              0.2713312  0.0857000   3.166 0.001599
## CompanyAcer:TypeNameWorkstation                     NA         NA      NA       NA
## CompanyApple:TypeNameWorkstation                    NA         NA      NA       NA
## CompanyAsus:TypeNameWorkstation                     NA         NA      NA       NA
## CompanyHP:TypeNameWorkstation                0.0179167  0.1359397   0.132 0.895174
## CompanyLenovo:TypeNameWorkstation           -0.2324637  0.1797343  -1.293 0.196226
##
## (Intercept)                                 ***
## CompanyAcer                                 ***
## CompanyApple
## CompanyAsus                                 ***
## CompanyHP
## CompanyLenovo                               *
## TypeName2 in 1 Convertible
## TypeNameGaming
## TypeNameNetbook
## TypeNameUltrabook                           **
## TypeNameWorkstation                         ***
## Inches                                      **
## ScreenResolution1366x768                    ***
## ScreenResolution1440x900
## ScreenResolution1600x900
## ScreenResolution1920x1200
## ScreenResolution2304x1440
## ScreenResolution2560x1440                   ***
## ScreenResolution2560x1600
## ScreenResolution2880x1800
## ScreenResolution3200x1800                   .
## ScreenResolution3840x2160                   ***
## Cpu_TypeAMD                                 ***
```

```
## Ram                                       ***
## Memory_1_TypeFlash Storage                ***
## Memory_1_TypeHDD                          ***
## Memory_1_TypeHybrid                       .
## Gpu_TypeAMD
## Gpu_TypeNvidia                            **
## OpSysAndroid
## OpSysChrome OS
## OpSysLinux                                ***
## OpSysMac OS X
## OpSysmacOS
## OpSysNo OS                                ***
## OpSysWindows 10 S
## OpSysWindows 7                            ***
## CompanyAcer:TypeName2 in 1 Convertible
## CompanyApple:TypeName2 in 1 Convertible
## CompanyAsus:TypeName2 in 1 Convertible    *
## CompanyHP:TypeName2 in 1 Convertible      **
## CompanyLenovo:TypeName2 in 1 Convertible **
## CompanyAcer:TypeNameGaming                **
## CompanyApple:TypeNameGaming
## CompanyAsus:TypeNameGaming                ***
## CompanyHP:TypeNameGaming
## CompanyLenovo:TypeNameGaming
## CompanyAcer:TypeNameNetbook
## CompanyApple:TypeNameNetbook
## CompanyAsus:TypeNameNetbook
## CompanyHP:TypeNameNetbook
## CompanyLenovo:TypeNameNetbook
## CompanyAcer:TypeNameUltrabook
## CompanyApple:TypeNameUltrabook
## CompanyAsus:TypeNameUltrabook
## CompanyHP:TypeNameUltrabook
## CompanyLenovo:TypeNameUltrabook           **
## CompanyAcer:TypeNameWorkstation
## CompanyApple:TypeNameWorkstation
## CompanyAsus:TypeNameWorkstation
## CompanyHP:TypeNameWorkstation
## CompanyLenovo:TypeNameWorkstation
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for Gamma family taken to be 0.08507471)
##
##     Null deviance: 334.137  on 920  degrees of freedom
## Residual deviance:  67.751  on 867  degrees of freedom
## AIC: 12871
##
## Number of Fisher Scoring iterations: 6
```

```
summary(aov(model2))
```

```
##                   Df    Sum Sq  Mean Sq F value   Pr(>F)
## Company            5  23341631  4668326  44.645  < 2e-16 ***
## TypeName           5 142271599 28454320 272.118  < 2e-16 ***
```

```
## Inches             1   2982821  2982821  28.526 1.18e-07 ***
## ScreenResolution  10  74159163  7415916  70.921  < 2e-16 ***
## Cpu_Type           1   3011692  3011692  28.802 1.03e-07 ***
## Ram                1  56128172 56128172 536.772  < 2e-16 ***
## Memory_1_Type      3   5243497  1747832  16.715 1.46e-10 ***
## Gpu_Type           2   1042209   521104   4.983 0.007048 **
## OpSys              7   7425318  1060760  10.144 3.04e-12 ***
## Company:TypeName  18   5132176   285121   2.727 0.000142 ***
## Residuals        867  90658833   104566
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
confint(model2)
```

```
## Waiting for profiling to be done...
```

```
##                                                2.5 %       97.5 %
## (Intercept)                                6.72977006  7.472591648
## CompanyAcer                               -0.35125350 -0.164205772
## CompanyApple                              -0.54051862  0.998163613
## CompanyAsus                               -0.27602585 -0.081650768
## CompanyHP                                 -0.07530280  0.074921749
## CompanyLenovo                             -0.18557826 -0.025560053
## TypeName2 in 1 Convertible                -0.16106670  0.111373397
## TypeNameGaming                            -0.05332005  0.217237661
## TypeNameNetbook                           -0.56430676  0.280480295
## TypeNameUltrabook                          0.07916220  0.312516840
## TypeNameWorkstation                        0.41428831  0.803804197
## Inches                                    -0.05812959 -0.008541376
## ScreenResolution1366x768                  -0.33172120 -0.212460554
## ScreenResolution1440x900                  -0.82437425  0.929696413
## ScreenResolution1600x900                  -0.27650079  0.036294812
## ScreenResolution1920x1200                 -0.62084608  0.266263457
## ScreenResolution2304x1440                 -0.93330553  0.383492996
## ScreenResolution2560x1440                  0.13341203  0.443703904
## ScreenResolution2560x1600                 -0.86671247  0.744328262
## ScreenResolution2880x1800                 -0.59175533  0.923275225
## ScreenResolution3200x1800                 -0.01619843  0.256599451
## ScreenResolution3840x2160                  0.14244299  0.380479414
## Cpu_TypeAMD                               -0.35882919 -0.130566819
## Ram                                        0.03979626  0.051832669
## Memory_1_TypeFlash Storage                -0.67730863 -0.422041053
## Memory_1_TypeHDD                          -0.21591316 -0.106504781
## Memory_1_TypeHybrid                       -0.47402280  0.010319329
## Gpu_TypeAMD                               -0.13538311  0.020733164
## Gpu_TypeNvidia                             0.03060362  0.158665038
## OpSysAndroid                              -0.83517891  0.316005770
## OpSysChrome OS                            -0.21286907  0.139064820
## OpSysLinux                                -0.29897632 -0.118425063
## OpSysMac OS X                             -0.11508624  0.907320915
## OpSysmacOS                                         NA           NA
## OpSysNo OS                                -0.39987510 -0.214715274
## OpSysWindows 10 S                         -0.97484012  0.208113994
## OpSysWindows 7                             0.16723977  0.393507950
## CompanyAcer:TypeName2 in 1 Convertible    -0.25026658  0.362876550
```

```
## CompanyApple:TypeName2 in 1 Convertible           NA           NA
## CompanyAsus:TypeName2 in 1 Convertible    0.04297012  0.514393756
## CompanyHP:TypeName2 in 1 Convertible      0.07795239  0.486424566
## CompanyLenovo:TypeName2 in 1 Convertible  0.09163741  0.444033637
## CompanyAcer:TypeNameGaming                0.10302484  0.652297978
## CompanyApple:TypeNameGaming                       NA           NA
## CompanyAsus:TypeNameGaming                0.16305503  0.503476422
## CompanyHP:TypeNameGaming                 -0.09138834  0.363005953
## CompanyLenovo:TypeNameGaming             -0.10038938  0.255878928
## CompanyAcer:TypeNameNetbook              -0.66802920  0.400430661
## CompanyApple:TypeNameNetbook                      NA           NA
## CompanyAsus:TypeNameNetbook              -0.71606857  0.358989835
## CompanyHP:TypeNameNetbook                -0.17765830  0.753235647
## CompanyLenovo:TypeNameNetbook            -0.63305125  0.381104222
## CompanyAcer:TypeNameUltrabook            -0.45625615  0.174029001
## CompanyApple:TypeNameUltrabook                    NA           NA
## CompanyAsus:TypeNameUltrabook            -0.22218821  0.163675219
## CompanyHP:TypeNameUltrabook              -0.09456186  0.222718767
## CompanyLenovo:TypeNameUltrabook           0.10449014  0.439278007
## CompanyAcer:TypeNameWorkstation                   NA           NA
## CompanyApple:TypeNameWorkstation                  NA           NA
## CompanyAsus:TypeNameWorkstation                   NA           NA
## CompanyHP:TypeNameWorkstation            -0.25052940  0.285585442
## CompanyLenovo:TypeNameWorkstation        -0.57816582  0.128348196
```

```
summary(model2inv)
```

```
##
## Call:
## glm(formula = Price_euros ~ Company + TypeName + Inches + ScreenResolution +
##     Cpu_Type + Ram + Memory_1_Type + Gpu_Type + OpSys + Company:OpSys +
##     Company:TypeName, family = inverse.gaussian(link = "log"),
##     data = train)
##
## Deviance Residuals:
##       Min         1Q     Median         3Q        Max
## -0.047099  -0.006973  -0.001730   0.003622   0.041251
##
## Coefficients: (38 not defined because of singularities)
##                                      Estimate Std. Error t value Pr(>|t|)
## (Intercept)                          7.240570   0.205288  35.270  < 2e-16
## CompanyAcer                         -0.194988   0.045976  -4.241 2.47e-05
## CompanyApple                         0.157427   0.468652   0.336 0.737017
## CompanyAsus                         -0.134991   0.048164  -2.803 0.005182
## CompanyHP                            0.031333   0.039061   0.802 0.422685
## CompanyLenovo                       -0.113281   0.040855  -2.773 0.005679
## TypeName2 in 1 Convertible          -0.055342   0.075605  -0.732 0.464373
## TypeNameGaming                       0.019667   0.088884   0.221 0.824940
## TypeNameNetbook                     -0.033943   0.279983  -0.121 0.903536
## TypeNameUltrabook                    0.169499   0.071556   2.369 0.018069
## TypeNameWorkstation                  0.706170   0.155902   4.530 6.75e-06
## Inches                              -0.052403   0.013500  -3.882 0.000112
## ScreenResolution1366x768            -0.229518   0.027455  -8.360 2.52e-16
## ScreenResolution1440x900             0.231517   0.520988   0.444 0.656879
## ScreenResolution1600x900            -0.077856   0.069206  -1.125 0.260910
```

```
## ScreenResolution1920x1200              -0.098022   0.190434  -0.515 0.606876
## ScreenResolution2304x1440              -0.233836   0.366877  -0.637 0.524055
## ScreenResolution2560x1440               0.304698   0.130243   2.339 0.019541
## ScreenResolution2560x1600               0.026567   0.498211   0.053 0.957486
## ScreenResolution2880x1800               0.133186   0.482957   0.276 0.782790
## ScreenResolution3200x1800               0.143115   0.094246   1.519 0.129249
## ScreenResolution3840x2160               0.245355   0.095454   2.570 0.010326
## Cpu_TypeAMD                            -0.267421   0.050398  -5.306 1.43e-07
## Ram                                     0.060701   0.004031  15.060  < 2e-16
## Memory_1_TypeFlash Storage             -0.651497   0.047937 -13.591  < 2e-16
## Memory_1_TypeHDD                       -0.141312   0.026323  -5.368 1.02e-07
## Memory_1_TypeHybrid                    -0.177358   0.118105  -1.502 0.133545
## Gpu_TypeAMD                            -0.028164   0.038791  -0.726 0.468014
## Gpu_TypeNvidia                          0.118281   0.033236   3.559 0.000393
## OpSysAndroid                           -0.259587   0.224080  -1.158 0.247002
## OpSysChrome OS                         -0.273569   0.327094  -0.836 0.403185
## OpSysLinux                             -0.154684   0.054167  -2.856 0.004398
## OpSysMac OS X                           0.544478   0.346490   1.571 0.116456
## OpSysmacOS                                    NA         NA      NA       NA
## OpSysNo OS                             -0.264437   0.046770  -5.654 2.14e-08
## OpSysWindows 10 S                      -0.462055   0.176444  -2.619 0.008982
## OpSysWindows 7                          0.284891   0.143621   1.984 0.047616
## CompanyAcer:OpSysAndroid                      NA         NA      NA       NA
## CompanyApple:OpSysAndroid                     NA         NA      NA       NA
## CompanyAsus:OpSysAndroid                      NA         NA      NA       NA
## CompanyHP:OpSysAndroid                        NA         NA      NA       NA
## CompanyLenovo:OpSysAndroid                    NA         NA      NA       NA
## CompanyAcer:OpSysChrome OS              0.327693   0.333573   0.982 0.326193
## CompanyApple:OpSysChrome OS                   NA         NA      NA       NA
## CompanyAsus:OpSysChrome OS              0.623606   0.358597   1.739 0.082391
## CompanyHP:OpSysChrome OS                0.304603   0.361135   0.843 0.399206
## CompanyLenovo:OpSysChrome OS            0.103014   0.352882   0.292 0.770418
## CompanyAcer:OpSysLinux                 -0.094406   0.088943  -1.061 0.288800
## CompanyApple:OpSysLinux                       NA         NA      NA       NA
## CompanyAsus:OpSysLinux                 -0.229854   0.092791  -2.477 0.013437
## CompanyHP:OpSysLinux                          NA         NA      NA       NA
## CompanyLenovo:OpSysLinux                      NA         NA      NA       NA
## CompanyAcer:OpSysMac OS X                     NA         NA      NA       NA
## CompanyApple:OpSysMac OS X                    NA         NA      NA       NA
## CompanyAsus:OpSysMac OS X                     NA         NA      NA       NA
## CompanyHP:OpSysMac OS X                       NA         NA      NA       NA
## CompanyLenovo:OpSysMac OS X                   NA         NA      NA       NA
## CompanyAcer:OpSysmacOS                        NA         NA      NA       NA
## CompanyApple:OpSysmacOS                       NA         NA      NA       NA
## CompanyAsus:OpSysmacOS                        NA         NA      NA       NA
## CompanyHP:OpSysmacOS                          NA         NA      NA       NA
## CompanyLenovo:OpSysmacOS                      NA         NA      NA       NA
## CompanyAcer:OpSysNo OS                        NA         NA      NA       NA
## CompanyApple:OpSysNo OS                       NA         NA      NA       NA
## CompanyAsus:OpSysNo OS                  0.227737   0.160463   1.419 0.156190
## CompanyHP:OpSysNo OS                   -0.177460   0.085065  -2.086 0.037258
## CompanyLenovo:OpSysNo OS                      NA         NA      NA       NA
## CompanyAcer:OpSysWindows 10 S                 NA         NA      NA       NA
## CompanyApple:OpSysWindows 10 S                NA         NA      NA       NA
```

```
## CompanyAsus:OpSysWindows 10 S                   NA         NA      NA       NA
## CompanyHP:OpSysWindows 10 S                     NA         NA      NA       NA
## CompanyLenovo:OpSysWindows 10 S                 NA         NA      NA       NA
## CompanyAcer:OpSysWindows 7                      NA         NA      NA       NA
## CompanyApple:OpSysWindows 7                     NA         NA      NA       NA
## CompanyAsus:OpSysWindows 7                      NA         NA      NA       NA
## CompanyHP:OpSysWindows 7                  0.108808   0.175298   0.621 0.534960
## CompanyLenovo:OpSysWindows 7             -0.151066   0.218732  -0.691 0.489977
## CompanyAcer:TypeName2 in 1 Convertible    0.055646   0.132918   0.419 0.675577
## CompanyApple:TypeName2 in 1 Convertible         NA         NA      NA       NA
## CompanyAsus:TypeName2 in 1 Convertible    0.169119   0.120795   1.400 0.161859
## CompanyHP:TypeName2 in 1 Convertible      0.289494   0.124635   2.323 0.020427
## CompanyLenovo:TypeName2 in 1 Convertible  0.296667   0.102957   2.881 0.004057
## CompanyAcer:TypeNameGaming                0.309637   0.182616   1.696 0.090331
## CompanyApple:TypeNameGaming                     NA         NA      NA       NA
## CompanyAsus:TypeNameGaming                0.364513   0.109899   3.317 0.000949
## CompanyHP:TypeNameGaming                  0.164921   0.151317   1.090 0.276062
## CompanyLenovo:TypeNameGaming              0.127153   0.113484   1.120 0.262838
## CompanyAcer:TypeNameNetbook              -0.219748   0.298022  -0.737 0.461107
## CompanyApple:TypeNameNetbook                    NA         NA      NA       NA
## CompanyAsus:TypeNameNetbook              -0.360724   0.296115  -1.218 0.223487
## CompanyHP:TypeNameNetbook                -0.113864   0.290702  -0.392 0.695389
## CompanyLenovo:TypeNameNetbook            -0.357249   0.302727  -1.180 0.238286
## CompanyAcer:TypeNameUltrabook            -0.186058   0.167708  -1.109 0.267563
## CompanyApple:TypeNameUltrabook                  NA         NA      NA       NA
## CompanyAsus:TypeNameUltrabook            -0.088741   0.114590  -0.774 0.438894
## CompanyHP:TypeNameUltrabook               0.059419   0.100972   0.588 0.556374
## CompanyLenovo:TypeNameUltrabook           0.449797   0.114902   3.915 9.77e-05
## CompanyAcer:TypeNameWorkstation                 NA         NA      NA       NA
## CompanyApple:TypeNameWorkstation                NA         NA      NA       NA
## CompanyAsus:TypeNameWorkstation                 NA         NA      NA       NA
## CompanyHP:TypeNameWorkstation            -0.132594   0.215479  -0.615 0.538489
## CompanyLenovo:TypeNameWorkstation        -0.295485   0.295868  -0.999 0.318219
##
## (Intercept)                              ***
## CompanyAcer                              ***
## CompanyApple
## CompanyAsus                              **
## CompanyHP
## CompanyLenovo                            **
## TypeName2 in 1 Convertible
## TypeNameGaming
## TypeNameNetbook
## TypeNameUltrabook                        *
## TypeNameWorkstation                      ***
## Inches                                   ***
## ScreenResolution1366x768                 ***
## ScreenResolution1440x900
## ScreenResolution1600x900
## ScreenResolution1920x1200
## ScreenResolution2304x1440
## ScreenResolution2560x1440                *
## ScreenResolution2560x1600
## ScreenResolution2880x1800
```

```
## ScreenResolution3200x1800
## ScreenResolution3840x2160                *
## Cpu_TypeAMD                              ***
## Ram                                      ***
## Memory_1_TypeFlash Storage               ***
## Memory_1_TypeHDD                         ***
## Memory_1_TypeHybrid
## Gpu_TypeAMD
## Gpu_TypeNvidia                           ***
## OpSysAndroid
## OpSysChrome OS
## OpSysLinux                               **
## OpSysMac OS X
## OpSysmacOS
## OpSysNo OS                               ***
## OpSysWindows 10 S                        **
## OpSysWindows 7                           *
## CompanyAcer:OpSysAndroid
## CompanyApple:OpSysAndroid
## CompanyAsus:OpSysAndroid
## CompanyHP:OpSysAndroid
## CompanyLenovo:OpSysAndroid
## CompanyAcer:OpSysChrome OS
## CompanyApple:OpSysChrome OS
## CompanyAsus:OpSysChrome OS               .
## CompanyHP:OpSysChrome OS
## CompanyLenovo:OpSysChrome OS
## CompanyAcer:OpSysLinux
## CompanyApple:OpSysLinux
## CompanyAsus:OpSysLinux                   *
## CompanyHP:OpSysLinux
## CompanyLenovo:OpSysLinux
## CompanyAcer:OpSysMac OS X
## CompanyApple:OpSysMac OS X
## CompanyAsus:OpSysMac OS X
## CompanyHP:OpSysMac OS X
## CompanyLenovo:OpSysMac OS X
## CompanyAcer:OpSysmacOS
## CompanyApple:OpSysmacOS
## CompanyAsus:OpSysmacOS
## CompanyHP:OpSysmacOS
## CompanyLenovo:OpSysmacOS
## CompanyAcer:OpSysNo OS
## CompanyApple:OpSysNo OS
## CompanyAsus:OpSysNo OS
## CompanyHP:OpSysNo OS                     *
## CompanyLenovo:OpSysNo OS
## CompanyAcer:OpSysWindows 10 S
## CompanyApple:OpSysWindows 10 S
## CompanyAsus:OpSysWindows 10 S
## CompanyHP:OpSysWindows 10 S
## CompanyLenovo:OpSysWindows 10 S
## CompanyAcer:OpSysWindows 7
## CompanyApple:OpSysWindows 7
```

```
## CompanyAsus:OpSysWindows 7
## CompanyHP:OpSysWindows 7
## CompanyLenovo:OpSysWindows 7
## CompanyAcer:TypeName2 in 1 Convertible
## CompanyApple:TypeName2 in 1 Convertible
## CompanyAsus:TypeName2 in 1 Convertible
## CompanyHP:TypeName2 in 1 Convertible     *
## CompanyLenovo:TypeName2 in 1 Convertible **
## CompanyAcer:TypeNameGaming               .
## CompanyApple:TypeNameGaming
## CompanyAsus:TypeNameGaming               ***
## CompanyHP:TypeNameGaming
## CompanyLenovo:TypeNameGaming
## CompanyAcer:TypeNameNetbook
## CompanyApple:TypeNameNetbook
## CompanyAsus:TypeNameNetbook
## CompanyHP:TypeNameNetbook
## CompanyLenovo:TypeNameNetbook
## CompanyAcer:TypeNameUltrabook
## CompanyApple:TypeNameUltrabook
## CompanyAsus:TypeNameUltrabook
## CompanyHP:TypeNameUltrabook
## CompanyLenovo:TypeNameUltrabook          ***
## CompanyAcer:TypeNameWorkstation
## CompanyApple:TypeNameWorkstation
## CompanyAsus:TypeNameWorkstation
## CompanyHP:TypeNameWorkstation
## CompanyLenovo:TypeNameWorkstation
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for inverse.gaussian family taken to be 0.000100763)
##
##     Null deviance: 0.381322  on 920  degrees of freedom
## Residual deviance: 0.081343  on 857  degrees of freedom
## AIC: 12956
##
## Number of Fisher Scoring iterations: 10
```

```
summary(aov(model2inv))
```

```
##                   Df    Sum Sq  Mean Sq F value   Pr(>F)
## Company            5  23341631  4668326  44.607  < 2e-16 ***
## TypeName           5 142271599 28454320 271.889  < 2e-16 ***
## Inches             1   2982821  2982821  28.502 1.20e-07 ***
## ScreenResolution  10  74159163  7415916  70.861  < 2e-16 ***
## Cpu_Type           1   3011692  3011692  28.778 1.05e-07 ***
## Ram                1  56128172 56128172 536.320  < 2e-16 ***
## Memory_1_Type      3   5243497  1747832  16.701 1.50e-10 ***
## Gpu_Type           2   1042209   521104   4.979 0.007079 **
## OpSys              7   7425318  1060760  10.136 3.16e-12 ***
## Company:OpSys     10   1109806   110981   1.060 0.390461
## Company:TypeName  18   4992577   277365   2.650 0.000222 ***
## Residuals        857  89688626   104654
## ---
```

```
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
confint(model2inv)
```

```
## Waiting for profiling to be done...
```

```
##                                          2.5 %       97.5 %
## (Intercept)                           6.84836543  7.634696106
## CompanyAcer                          -0.28523032 -0.103722830
## CompanyApple                         -0.70471098  1.288582111
## CompanyAsus                          -0.22903662 -0.039248303
## CompanyHP                            -0.04437510  0.106617486
## CompanyLenovo                        -0.19325585 -0.033579469
## TypeName2 in 1 Convertible           -0.19931829  0.101652186
## TypeNameGaming                       -0.14754763  0.203064071
## TypeNameNetbook                      -0.48061363  0.740695953
## TypeNameUltrabook                     0.03268418  0.315458261
## TypeNameWorkstation                   0.43092353  1.067364307
## Inches                               -0.07823817 -0.026617355
## ScreenResolution1366x768             -0.28540929 -0.173798593
## ScreenResolution1440x900             -0.96017234  1.241627780
## ScreenResolution1600x900             -0.20823613  0.063951493
## ScreenResolution1920x1200            -0.44197802  0.334139933
## ScreenResolution2304x1440            -1.21684761  0.433148539
## ScreenResolution2560x1440             0.07125218  0.592876343
## ScreenResolution2560x1600            -1.13869579  0.965514618
## ScreenResolution2880x1800            -0.97009350  1.215264891
## ScreenResolution3200x1800            -0.03416463  0.346250154
## ScreenResolution3840x2160             0.07195775  0.446692214
## Cpu_TypeAMD                          -0.36771832 -0.167050754
## Ram                                   0.05186120  0.069873279
## Memory_1_TypeFlash Storage           -0.75384580 -0.546378449
## Memory_1_TypeHDD                     -0.19491156 -0.087890186
## Memory_1_TypeHybrid                  -0.39195849  0.081060525
## Gpu_TypeAMD                          -0.10447164  0.050238714
## Gpu_TypeNvidia                        0.05308156  0.184513576
## OpSysAndroid                         -0.73169501  0.184941620
## OpSysChrome OS                       -1.09295983  0.331385442
## OpSysLinux                           -0.26039975 -0.043983544
## OpSysMac OS X                        -0.28717018  1.224628183
## OpSysmacOS                                   NA           NA
## OpSysNo OS                           -0.35590622 -0.170158985
## OpSysWindows 10 S                    -0.76882365 -0.052374858
## OpSysWindows 7                        0.03357880  0.611658149
## CompanyAcer:OpSysAndroid                     NA           NA
## CompanyApple:OpSysAndroid                    NA           NA
## CompanyAsus:OpSysAndroid                     NA           NA
## CompanyHP:OpSysAndroid                       NA           NA
## CompanyLenovo:OpSysAndroid                   NA           NA
## CompanyAcer:OpSysChrome OS           -0.28780326  1.152952555
## CompanyApple:OpSysChrome OS                  NA           NA
## CompanyAsus:OpSysChrome OS           -0.04054972  1.479719775
## CompanyHP:OpSysChrome OS             -0.36354237  1.164117901
## CompanyLenovo:OpSysChrome OS         -0.54372059  0.948567440
## CompanyAcer:OpSysLinux               -0.26815769  0.083740450
```

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## CompanyApple:OpSysLinux                          NA           NA
## CompanyAsus:OpSysLinux                   -0.41112926 -0.042498231
## CompanyHP:OpSysLinux                             NA           NA
## CompanyLenovo:OpSysLinux                         NA           NA
## CompanyAcer:OpSysMac OS X                        NA           NA
## CompanyApple:OpSysMac OS X                       NA           NA
## CompanyAsus:OpSysMac OS X                        NA           NA
## CompanyHP:OpSysMac OS X                          NA           NA
## CompanyLenovo:OpSysMac OS X                      NA           NA
## CompanyAcer:OpSysmacOS                           NA           NA
## CompanyApple:OpSysmacOS                          NA           NA
## CompanyAsus:OpSysmacOS                           NA           NA
## CompanyHP:OpSysmacOS                             NA           NA
## CompanyLenovo:OpSysmacOS                         NA           NA
## CompanyAcer:OpSysNo OS                           NA           NA
## CompanyApple:OpSysNo OS                          NA           NA
## CompanyAsus:OpSysNo OS                   -0.05696392  0.591355502
## CompanyHP:OpSysNo OS                     -0.33979895 -0.006204891
## CompanyLenovo:OpSysNo OS                         NA           NA
## CompanyAcer:OpSysWindows 10 S                    NA           NA
## CompanyApple:OpSysWindows 10 S                   NA           NA
## CompanyAsus:OpSysWindows 10 S                    NA           NA
## CompanyHP:OpSysWindows 10 S                      NA           NA
## CompanyLenovo:OpSysWindows 10 S                  NA           NA
## CompanyAcer:OpSysWindows 7                       NA           NA
## CompanyApple:OpSysWindows 7                      NA           NA
## CompanyAsus:OpSysWindows 7                       NA           NA
## CompanyHP:OpSysWindows 7                 -0.26367138  0.440254278
## CompanyLenovo:OpSysWindows 7             -0.58492358  0.301092212
## CompanyAcer:TypeName2 in 1 Convertible   -0.20399359  0.332294229
## CompanyApple:TypeName2 in 1 Convertible          NA           NA
## CompanyAsus:TypeName2 in 1 Convertible   -0.07016316  0.418506369
## CompanyHP:TypeName2 in 1 Convertible      0.04970689  0.542573798
## CompanyLenovo:TypeName2 in 1 Convertible  0.09113445  0.502169995
## CompanyAcer:TypeNameGaming               -0.02150874  0.716157874
## CompanyApple:TypeNameGaming                      NA           NA
## CompanyAsus:TypeNameGaming                0.14391249  0.578420679
## CompanyHP:TypeNameGaming                 -0.12060398  0.483802099
## CompanyLenovo:TypeNameGaming             -0.09790326  0.350586620
## CompanyAcer:TypeNameNetbook              -1.01245107  0.284454397
## CompanyApple:TypeNameNetbook                     NA           NA
## CompanyAsus:TypeNameNetbook              -1.15049177  0.132997977
## CompanyHP:TypeNameNetbook                -0.89817973  0.363802076
## CompanyLenovo:TypeNameNetbook            -1.15070980  0.152482311
## CompanyAcer:TypeNameUltrabook            -0.48852250  0.186832789
## CompanyApple:TypeNameUltrabook                   NA           NA
## CompanyAsus:TypeNameUltrabook            -0.30967029  0.143908577
## CompanyHP:TypeNameUltrabook              -0.13784783  0.261908893
## CompanyLenovo:TypeNameUltrabook           0.22798742  0.686514234
## CompanyAcer:TypeNameWorkstation                  NA           NA
## CompanyApple:TypeNameWorkstation                 NA           NA
## CompanyAsus:TypeNameWorkstation                  NA           NA
## CompanyHP:TypeNameWorkstation            -0.57501538  0.301822827
## CompanyLenovo:TypeNameWorkstation        -0.83702356  0.415861515
```