

Example p. 27 / Beispiel S. 27

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automatic

Working directory

```
> setwd("D:/kronthafranz/Documents/01Lehre/06Quantitative Forschungsmethoden  
dt en")
```

Load data

```
> load("D:/kronthafranz/Documents/01Lehre/06Quantitative Forschungsmethoden  
dt en/06Regression/reg_sales.RData")
```

Descriptive statistics

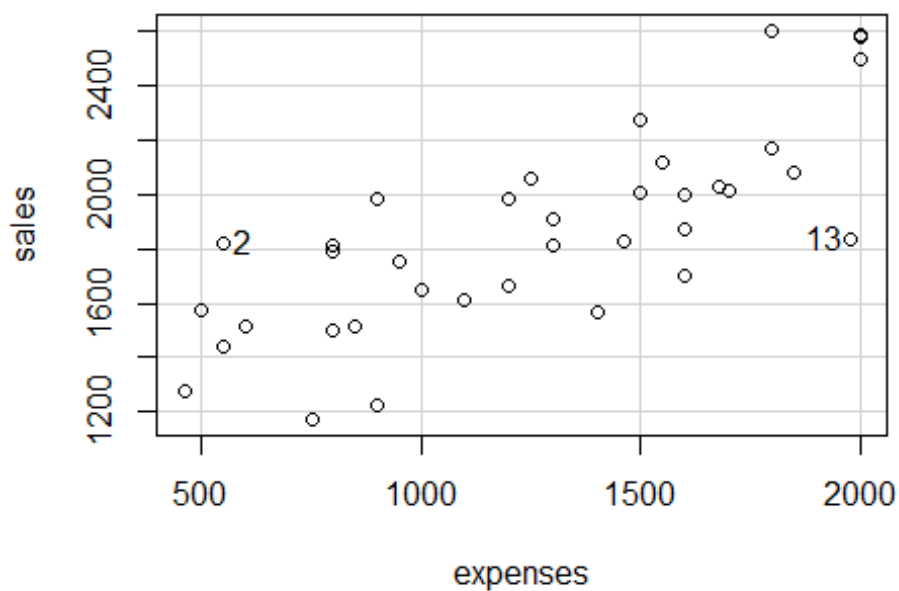
```
> summary(reg_sales)
```

	id	sales	price	expenses
Min.	: 1	Min. :1172	Min. : 7.00	Min. : 460
1st Qu.:	10	1st Qu.:1612	1st Qu.: 9.00	1st Qu.: 850
Median :	19	Median :1824	Median :10.00	Median :1300
Mean :	19	Mean :1860	Mean :10.43	Mean :1264
3rd Qu.:	28	3rd Qu.:2026	3rd Qu.:12.00	3rd Qu.:1600
Max.	:37	Max. :2604	Max. :13.00	Max. :2000

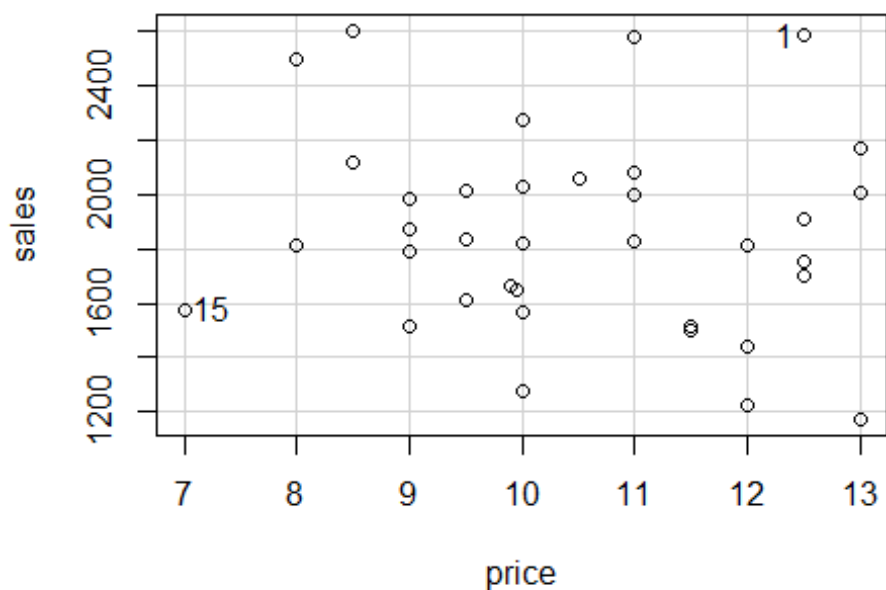
	visits
Min.	: 60.00
1st Qu.:	79.00
Median :	90.00
Mean :	89.95
3rd Qu.:	100.00
Max.	:125.00

Scatterplots

```
> scatterplot(sales~expenses, reg.line=FALSE, smooth=FALSE, spread=FALSE,  
+ id.method='mahal', id.n= 2, boxplots=FALSE, span=0.5, data=reg_sales)
```

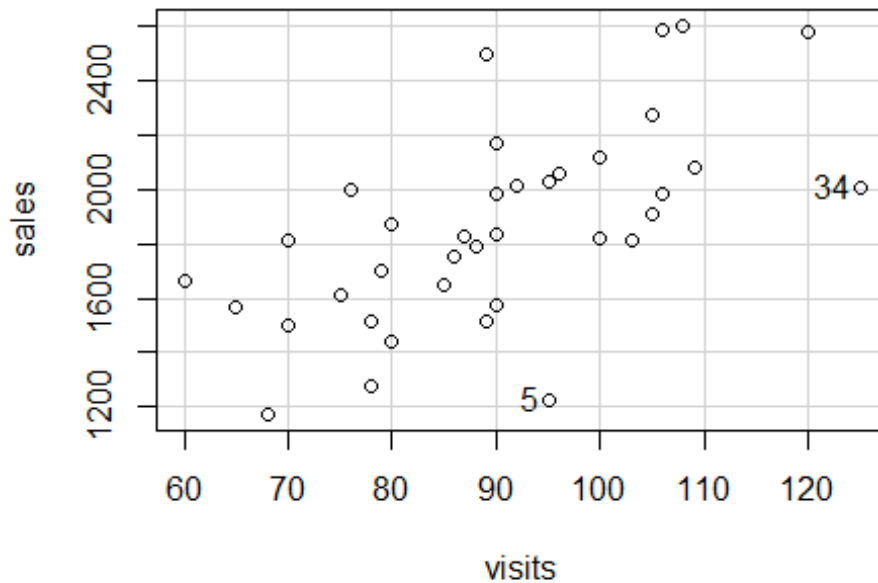


```
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2 13
> scatterplot(sales~price, reg.line=FALSE, smooth=FALSE, spread=FALSE,
+   id.method='mahal', id.n= 2, boxplots=FALSE, span=0.5, data=reg_sales)
```



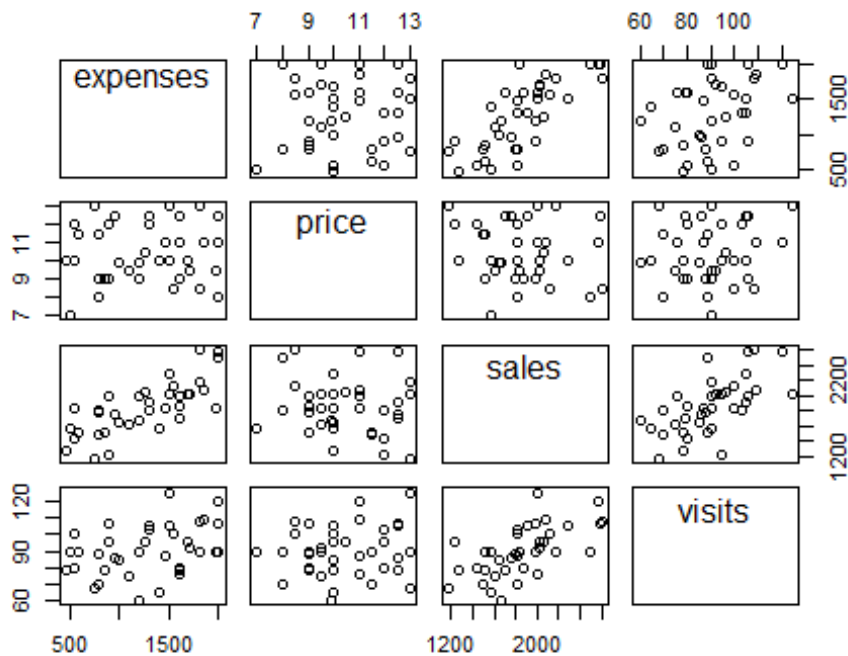
```
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1 15

> scatterplot(sales~visits, reg.line=FALSE, smooth=FALSE, spread=FALSE,
+ id.method='mahal', id.n= 2, boxplots=FALSE, span=0.5, data=reg_sales)
```



```
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> scatterplotMatrix(~expenses+price+sales+visits, reg.line=FALSE,
+ smooth=FALSE, spread=FALSE, span=0.5, ellipse=FALSE, levels=c(.5, .9),
+ id.n=0, diagonal = 'none', data=reg_sales)
```



Correlation coefficients

```
> cor(reg_sales[,c("expenses", "price", "sales", "visits")], use="complete")
```

	expenses	price	sales	visits
expenses	1.00000000	0.06618096	0.7696456	0.3942290
price	0.06618096	1.00000000	-0.1498082	0.1345506
sales	0.76964560	-0.14980816	1.00000000	0.6281175
visits	0.39422895	0.13455058	0.6281175	1.00000000

Regression analysis

```
> RegModel.1 <- lm(sales~expenses+price+visits, data=reg_sales)
> summary(RegModel.1)
```

Call:

```
lm(formula = sales ~ expenses + price + visits, data = reg_sales)
```

Residuals:

Min	1Q	Median	3Q	Max
-428.37	-109.88	0.78	133.52	334.56

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	945.26435	247.61619	3.817	0.000563 ***
expenses	0.46890	0.06744	6.953	0.0000000602 ***

```

price      -55.39382   18.60710  -2.977    0.005417 **
visits      9.99817    2.16386   4.621  0.0000561802 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 178 on 33 degrees of freedom
Multiple R-squared:  0.7771,    Adjusted R-squared:  0.7568
F-statistic: 38.34 on 3 and 33 DF,  p-value: 7.324e-11

```

Interpretation:

F statistics: p-value is smaller than 0.01, we reject H0 for the model

R2 is 77.7%, the model explains 77.7% of the variation of the dependent variable

We reject for all three independent variables H0 at the 1% significance level