Regressão Linear Simples

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Regressão Linear Simples

- Banco de dados (Disponivel no pacote ISwR)

  library(ISwR)

- Anexando o banco de dados

  attach(thuesen)

- Vendo as Variaveis

  names(thuesen)

```
> library(ISwR)
Warning message:
R graphics engine version 12 is not supported by this version of RStudio.
ll be disabled until a newer version of RStudio is installed.
> attach(thuesen)
> names(thuesen)
[1] "blood.glucose"  "short.velocity"
```

Verificando o modelo linear

lm(short.velocity~blood.glucose)

```
Call:
lm(formula = short.velocity ~ blood.glucose)

Coefficients:
  (Intercept)  blood.glucose
      1.09781         0.02196
```

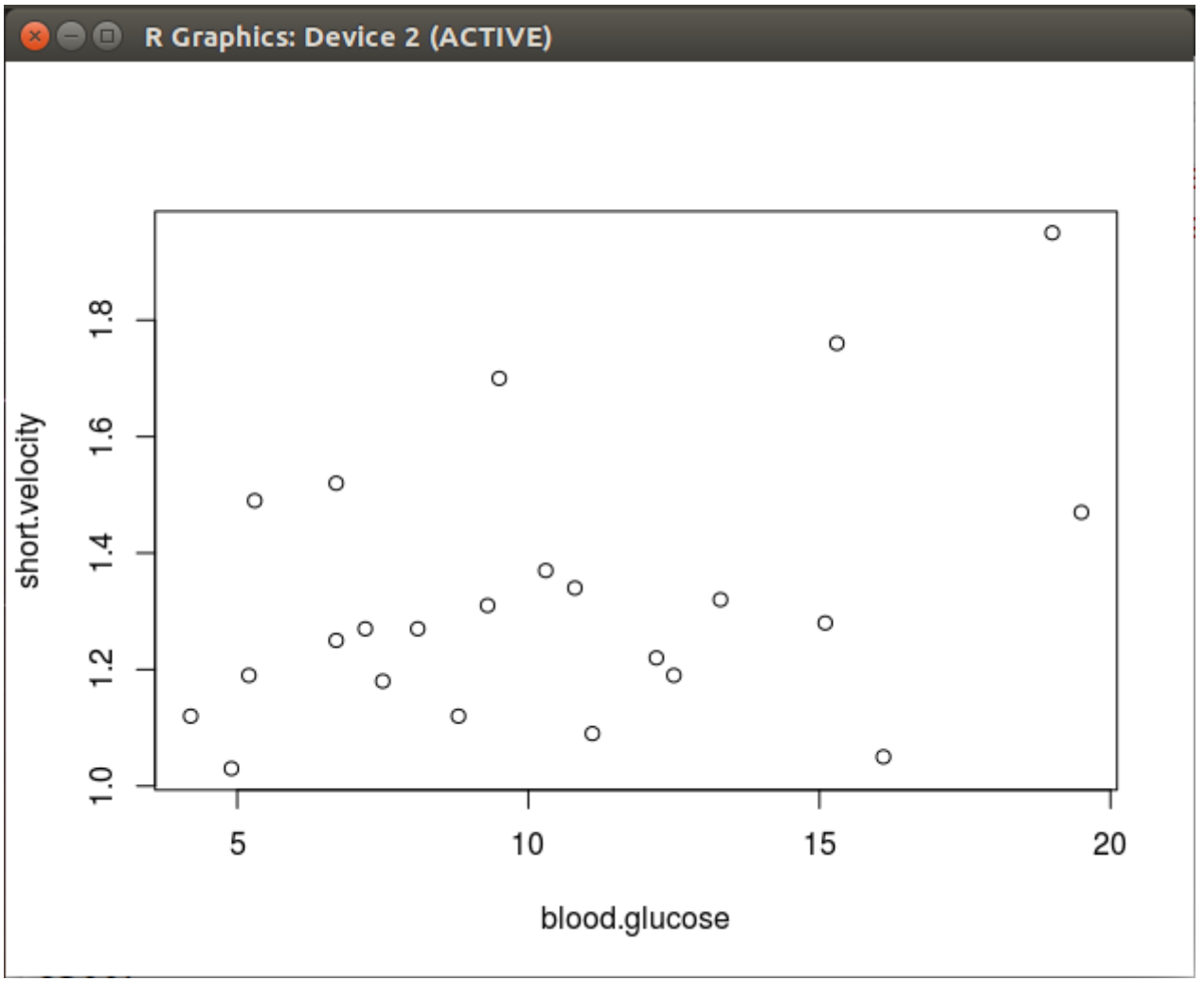
Verificando o modelo linear

summary(lm(short.velocity~blood.glucose))

```
Call:
lm(formula = short.velocity ~ blood.glucose)

Residuals:
     Min       1Q   Median       3Q      Max
-0.40141 -0.14760 -0.02202  0.03001  0.43490

Coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)    1.09781    0.11748   9.345 6.26e-09 ***
blood.glucose  0.02196    0.01045   2.101   0.0479 *
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 0.2167 on 21 degrees of freedom
  (1 observation deleted due to missingness)
Multiple R-squared:  0.1737,    Adjusted R-squared:  0.1343
F-statistic: 4.414 on 1 and 21 DF,  p-value: 0.0479
```

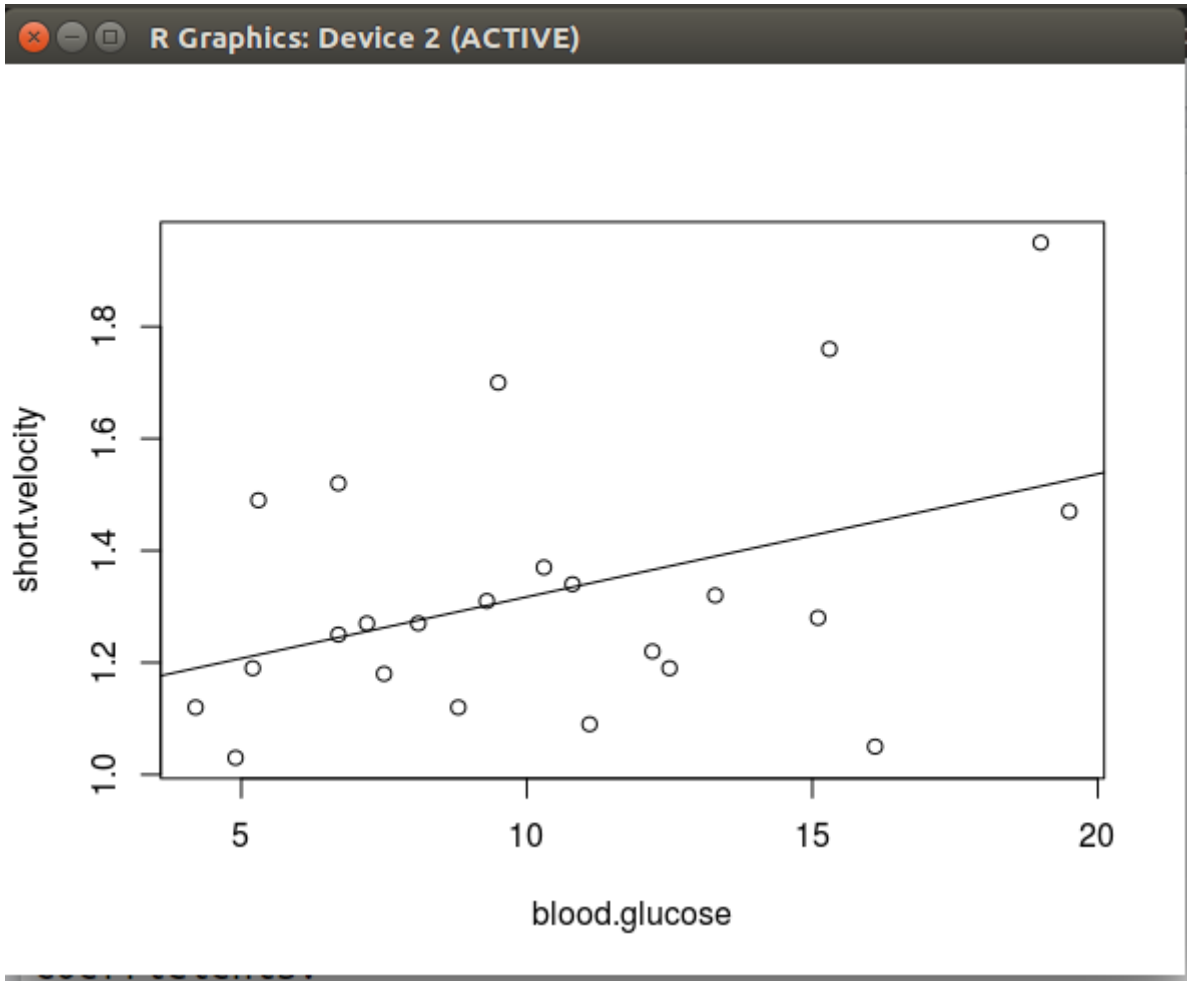
Gráfico de Pontos

plot(blood.glucose,short.velocity)



Reta estimada da Regressão

abline(lm(short.velocity~blood.glucose))



Residuos e valores estimados

```
lm.velo <- lm(short.velocity~blood.glucose)
```

- Diferença entre os valores estimados e observados

```
resid(lm.velo)
```

```
          1           2           3           4           5           6
0.326158532  0.004989882 -0.005711308 -0.056084062  0.014054962  0.275783754
          7           8           9          10          11          12
0.007933665 -0.251598875 -0.082533795 -0.145757649  0.005036223 -0.022019994
         13          14          15          17          18          19
0.434897199 -0.149448964  0.275036223 -0.070057471  0.045971143 -0.182346406
         20          21          22          23          24
-0.401411486 -0.069916424 -0.175431237 -0.171085074  0.393541161
```

Residuos e valores estimados

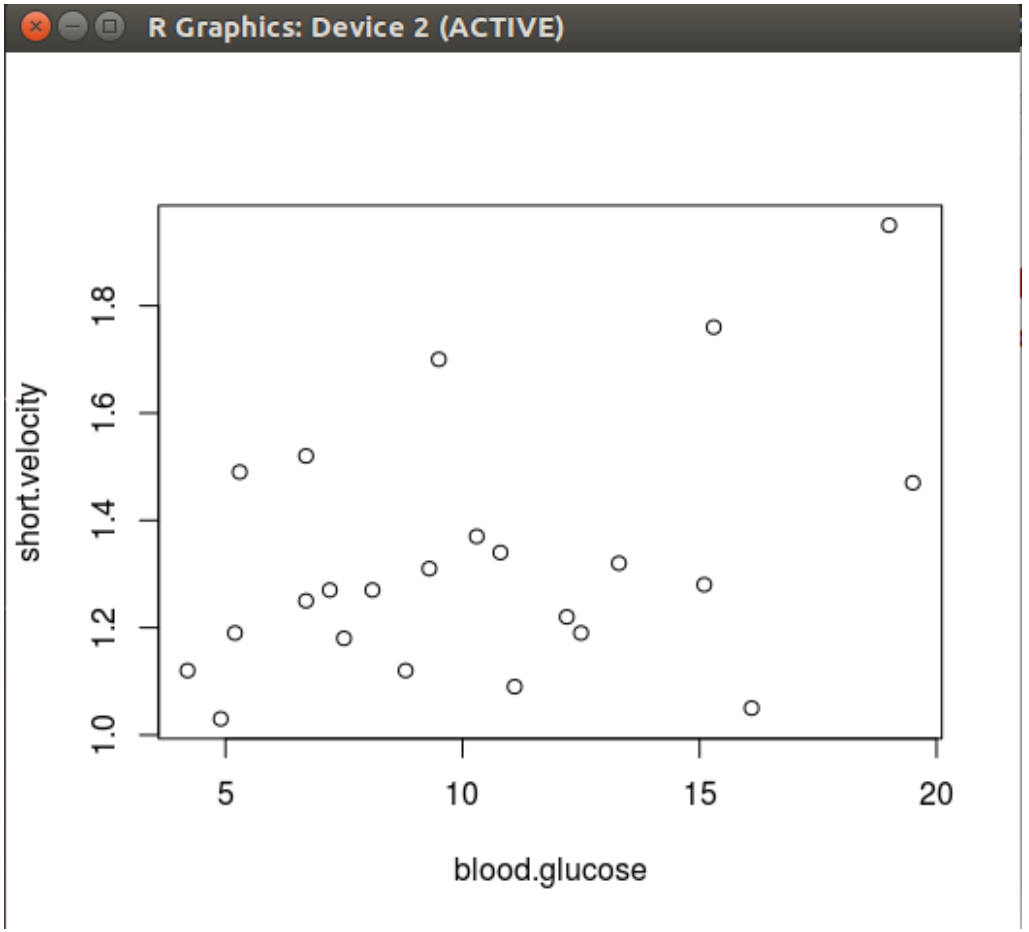
- Analisando os dados

  list(thuesen)

```
[[1]]
   blood.glucose short.velocity
1           15.3            1.76
2           10.8            1.34
3            8.1            1.27
4           19.5            1.47
5            7.2            1.27
6            5.3            1.49
7            9.3            1.31
8           11.1            1.09
9            7.5            1.18
10          12.2            1.22
11           6.7            1.25
12           5.2            1.19
13          19.0            1.95
14          15.1            1.28
15           6.7            1.52
16           8.6              NA
17           4.2            1.12
18          10.3            1.37
19          12.5            1.19
20          16.1            1.05
21          13.3            1.32
22           4.9            1.03
23           8.8            1.12
24           9.5            1.70
```

Gráfico

plot(blood.glucose,short.velocity)



Linha

```
lines(blood.glucose,fitted(lm.velo))
```

```
Error in xy.coords(x, y) : 'x' and 'y' lengths differ
```

Residuos e valores estimados

- Trabalhando sem os dados faltantes

  options(na.action = na.exclude)

- Atualizando os dados para que o R entenda que foi excluido o dado 16

  lm.velo <- lm(short.velocity~blood.glucose)

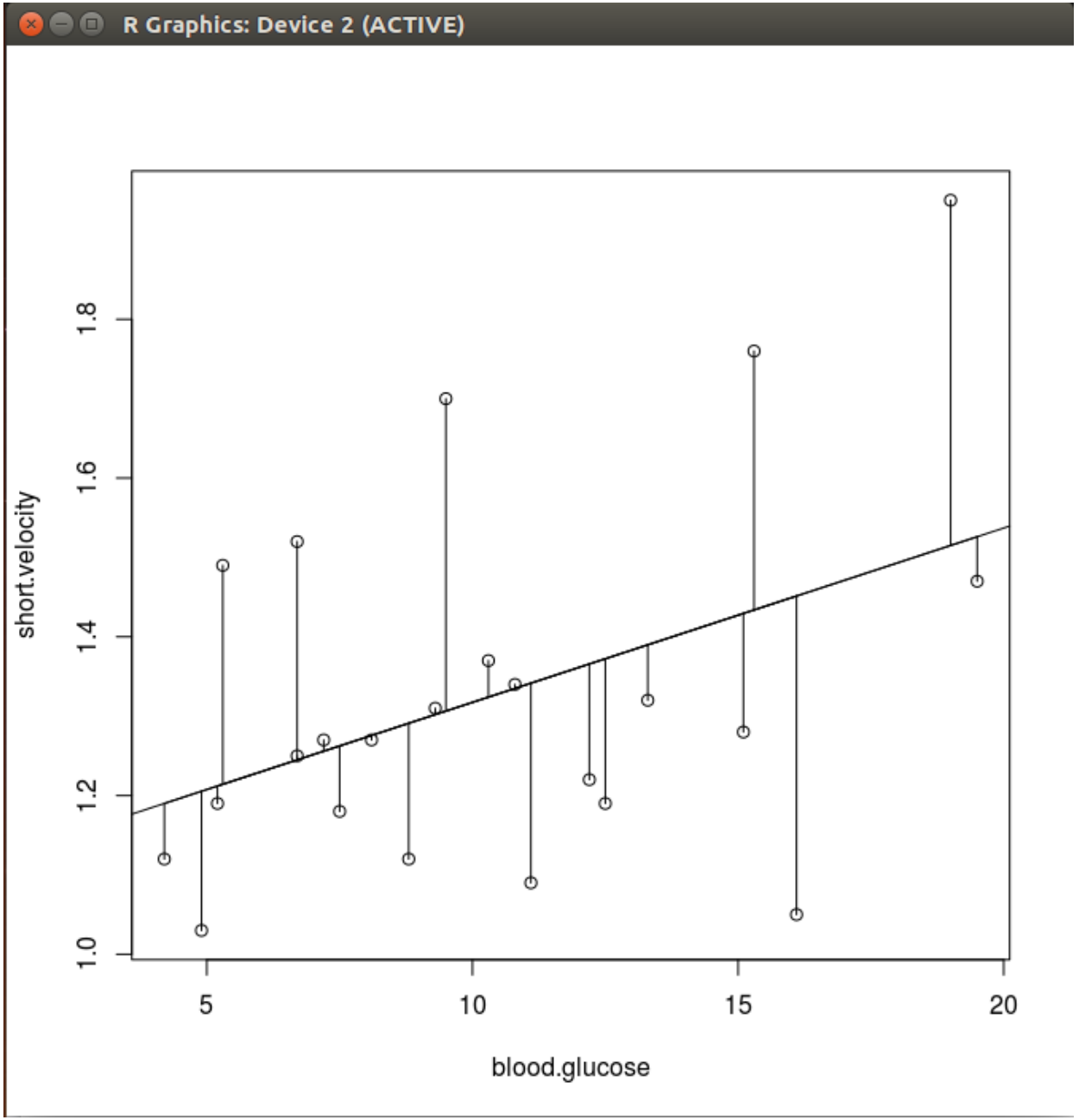
- Recalcular os valores, excluindo o dado faltante

  fitted(lm.velo)

```
       1        2        3        4        5        6        7        8        9
1.433841 1.335010 1.275711 1.526084 1.255945 1.214216 1.302066 1.341599 1.262534
      10       11       12       13       14       15       16       17       18
1.365758 1.244964 1.212020 1.515103 1.429449 1.244964       NA 1.190057 1.324029
      19       20       21       22       23       24
1.372346 1.451411 1.389916 1.205431 1.291085 1.306459
```

Gráfico dos valores observados conectados a reta

```
segments(blood.glucose,fitted(lm.velo),
blood.glucose,short.velocity)

abline(lm(short.velocity~blood.glucose))
```


R Graphics: Device 2 (ACTIVE)
short.velocity
1.0
1.2
1.4
1.6
1.8
5
10
15
20
blood.glucose