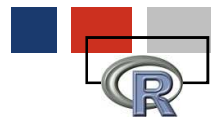


# VI. Comunicação

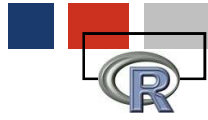




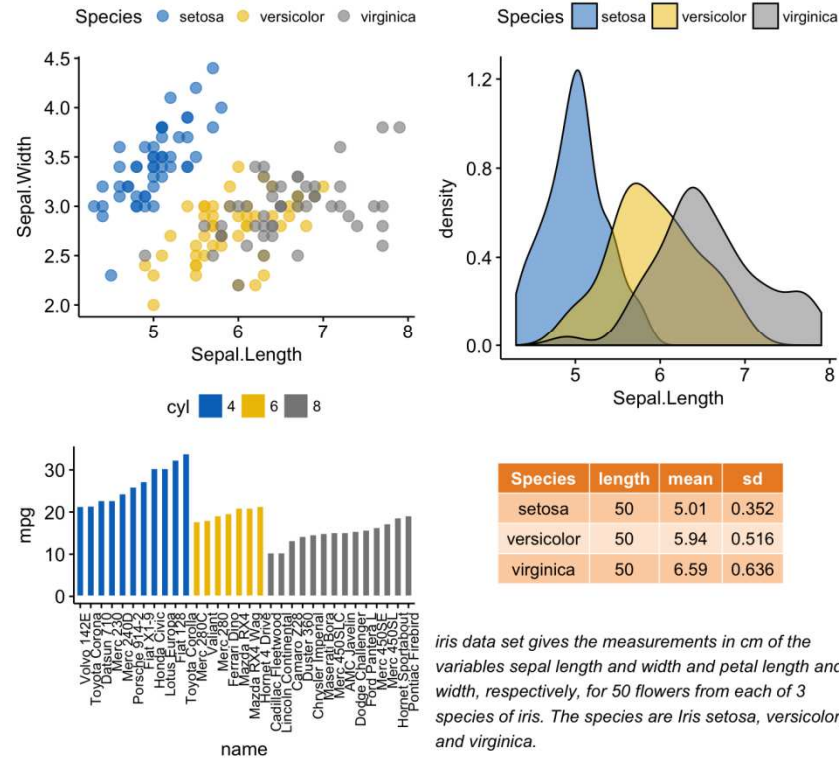
## VI. Comunicação visualização



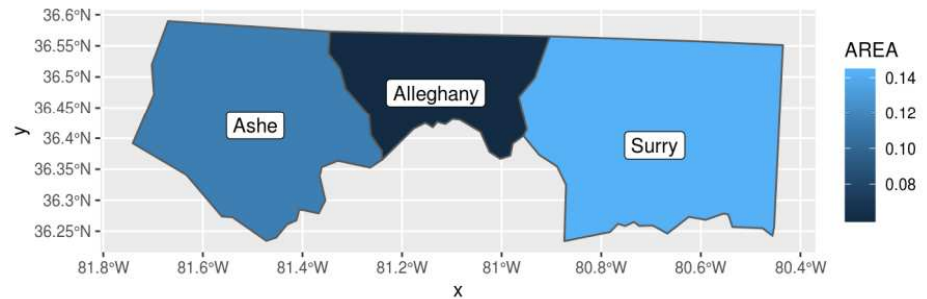
INSTITUTO NACIONAL DE ESTATÍSTICA  
STATISTICS PORTUGAL



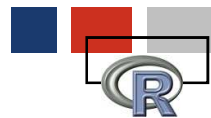
# VI. Comunicação



iris data set gives the measurements in cm of the variables sepal length and width and petal length and width, respectively, for 50 flowers from each of 3 species of iris. The species are *Iris setosa*, *versicolor*, and *virginica*.



INSTITUTO NACIONAL DE ESTATÍSTICA  
STATISTICS PORTUGAL



## VI. Comunicação

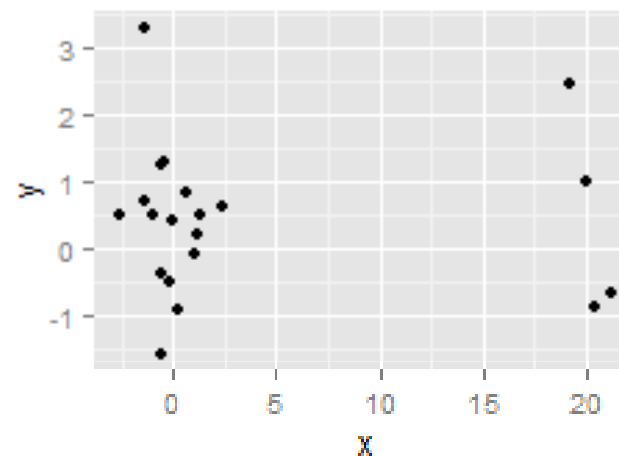


- Estrutura do `ggplot()`

```
ggplot(Data, aes(x=A,y=B)) + geom_point()
```

```
ggplot(Data) + geom_point(aes(x=A,y=B))
```

```
Data %>% ggplot() + geom_point(aes(x=A,y=B))
```



- Dados
- Tipo de gráfico
- Estética (Aesthetic)





## VI. Comunicação

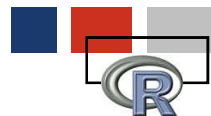


### Tipo de gráfico

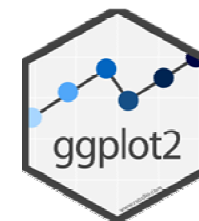
Data %>% ggplot(aes(x=A,y=B)) + geom\_point()

Variável	Função	descrição
a contínua ggplot(aes(x=A))	geom_histogram()	Histograma
	geom_boxplot(x="",y=A)	Diagramas de extremos e quartis
	geom_area()	Gráficos de áreas
	geom_density()	Densidade
a discreta ggplot(aes(x=A))	geom_bar()	Gráfico de barras ou circular
a discreta, b contínua ggplot(aes(x=A,y=B))	geom_bar()	Gráfico de barras ou circular
	geom_boxplot()	Diagramas de extremos e quartis
a continua, b contínua ggplot(aes(x=A,y=B))	geom_point()	Gráfico de dispersão
Mapa ggplot(data=Mapa)	geom_sf()	Mapa com informação geográfica





## VI. Comunicação

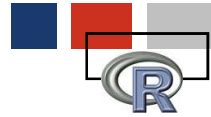


### Tipo de gráfico adicionais

```
Data %>% ggplot(aes(x=A,y=B)) + geom_point()
```

Função	descrição
<code>geom_line()</code>	Adiciona uma reta
<code>geom_abline()</code>	Adiciona uma reta diagonal
<code>geom_vline()</code>	Adiciona uma reta vertical
<code>geom_hline()</code>	Adiciona uma reta horizontal
<code>geom_smooth()</code>	Adiciona uma curva (modelo)
<code>geom_text()</code>	Adiciona texto





## VI. Comunicação



**Estética (Aesthetic)** - Definir as variáveis a utilizar no gráfico

```
ggplot(Data, aes(x=A,y=B)) + geom_point()
```

- Variáveis para eixos

```
aes(x=var1, y=var2)
```

- Variável para cor (se for variável contínua, escala de cores)

```
aes(x=var1, y=var2, color=var3)
```

```
aes(x=var1, y=var2, fill=var3)
```

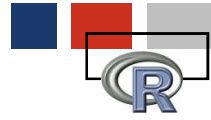
- Variável para dimensão de pontos

```
aes(x=var1, y=var2, size=var3)
```

- Variável para forma dos pontos

```
aes(x=var1, y=var2, shape=var3)
```





## VI. Comunicação



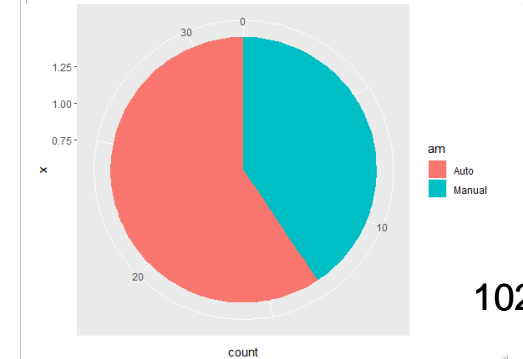
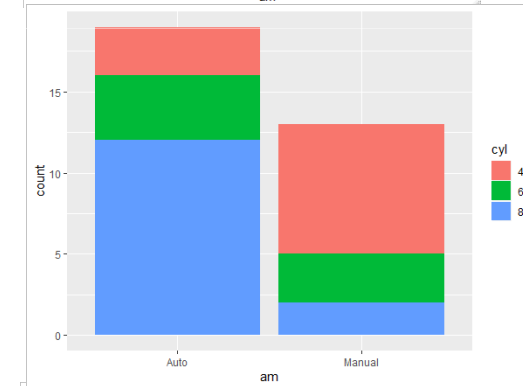
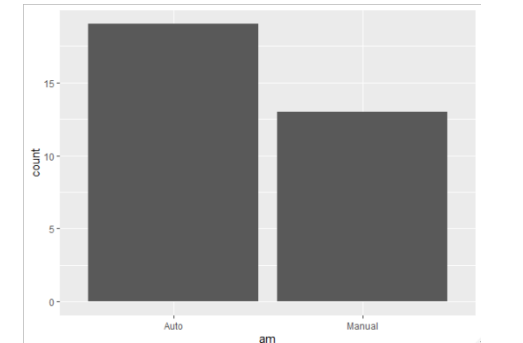
- Gráfico de barras e circular `geom_bar()`

```
> carros %>% ggplot()+geom_bar(aes(x=am))
```

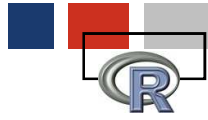
Variável do tipo *factor*

```
> carros %>% ggplot()+geom_bar(aes(x=am, fill=cyl))
```

```
> carros %>% ggplot(aes(x = 1, fill = am)) +  
  geom_bar() +  
  coord_polar(theta = "y")
```





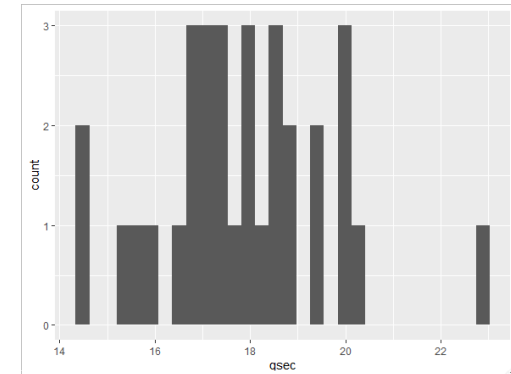


## VI. Comunicação

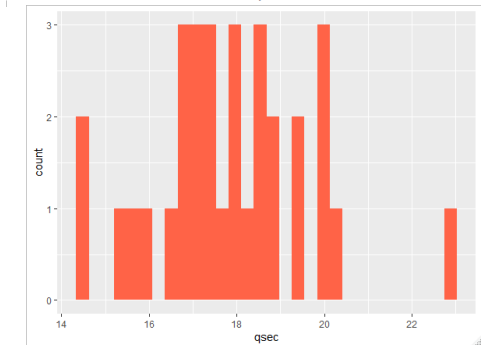


- Histogramas `geom_histogram()`

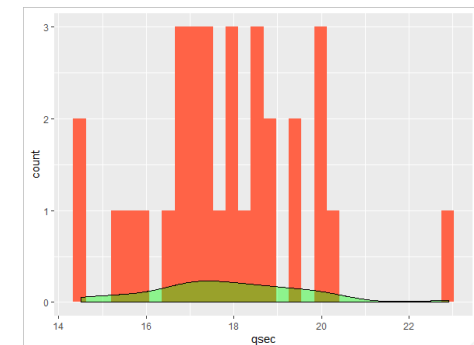
```
> carros %>% ggplot(aes(x=qsec)) + geom_histogram()
```



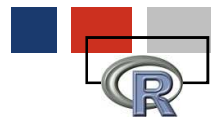
```
> carros %>% ggplot(aes(x=qsec)) +  
  geom_histogram(fill="tomato")
```



```
> carros %>% ggplot(aes(x=qsec)) +  
  geom_histogram(fill="tomato") +  
  geom_density(fill="green", alpha=.4)
```



INSTITUTO NACIONAL DE ESTATÍSTICA  
STATISTICS PORTUGAL

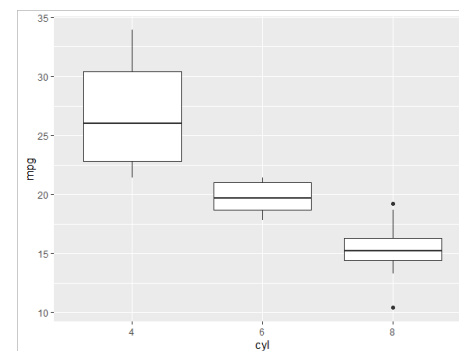


## VI. Comunicação

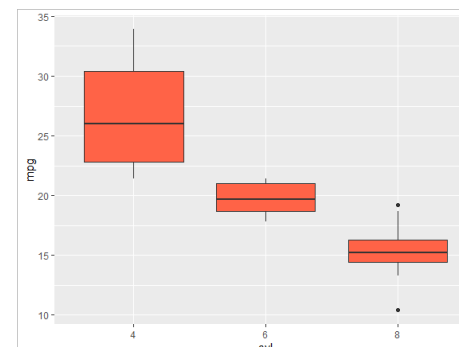


- Gráfico de extremos e quartis `geom_boxplot()`

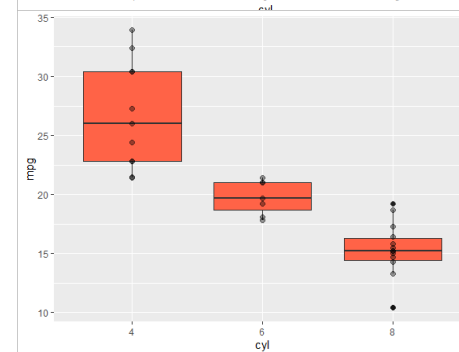
```
> carros %>% ggplot(aes(x=as.factor(cyl), y=mpg)) +  
  geom_boxplot()
```

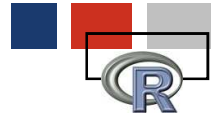


```
> carros %>% ggplot(aes(x=cyl, y=mpg)) +  
  geom_boxplot(fill="tomato")
```



```
> carros %>% ggplot(aes(x=cyl, y=mpg)) +  
  geom_boxplot(fill="tomato") +  
  geom_point(size=2, alpha=.4, color="black")
```





## VI. Comunicação



- Gráfico de dispersão `geom_point()`

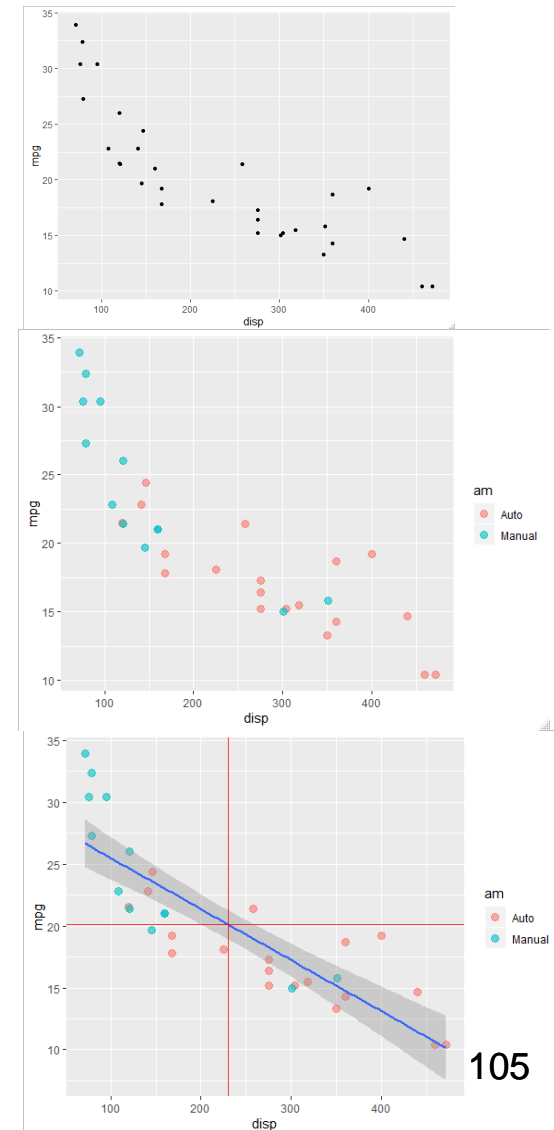
```
> carros %>% ggplot(aes(x=cyl, y=mpg))+ geom_boxplot()
```

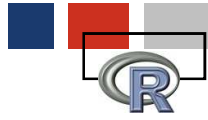
```
> carros %>% ggplot(aes(x=disp, y=mpg)) +  
  geom_point(aes(color=am), size=3, alpha=.6)
```

```
> carros %>% ggplot(aes(x=disp, y=mpg)) +  
  geom_point(aes(color=am), size=3, alpha=.6) +  
  geom_smooth(method = "lm") +  
  geom_vline(aes(xintercept=mean(disp)), color="red", alpha=0.8) +  
  geom_hline(aes(yintercept=mean(mpg)), color="red", alpha=0.8)
```



INSTITUTO NACIONAL DE ESTATÍSTICA  
STATISTICS PORTUGAL





## VI. Comunicação

### Personalização de gráficos

```
> carros %>% ggplot(aes(x=am, fill=am)) + geom_bar(stat="count")
```

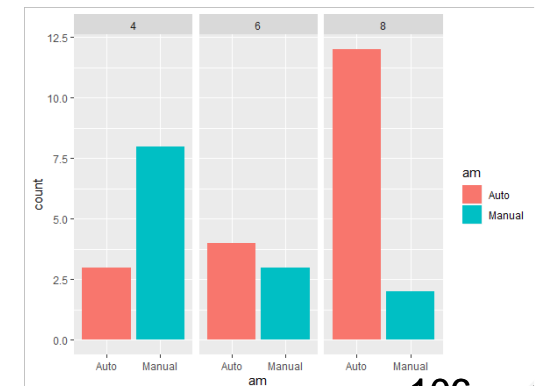
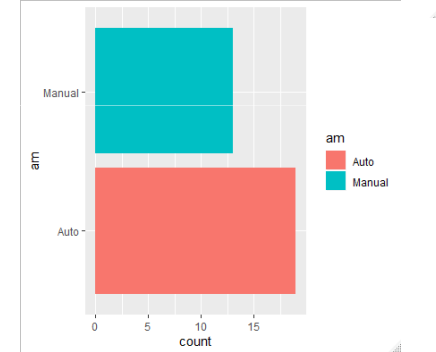
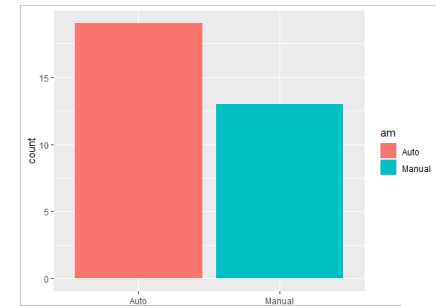
```
> carros %>% ggplot(aes(x=am, fill=am)) + geom_bar(stat="count")  
+ coord_flip()
```

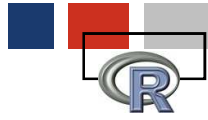
#### ■ Faces (facet) do gráfico

```
> carros %>% ggplot(aes(x=am, fill=am)) +  
  geom_bar(stat="count")+  
  facet_wrap(~cyl)
```



INSTITUTO NACIONAL DE ESTATÍSTICA  
STATISTICS PORTUGAL





## VI. Comunicação



### Personalização de gráficos

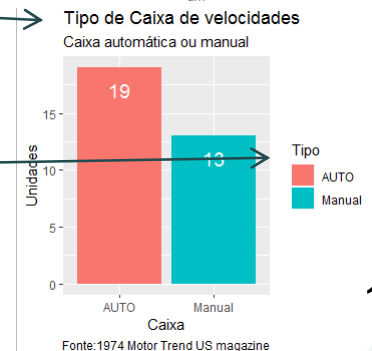
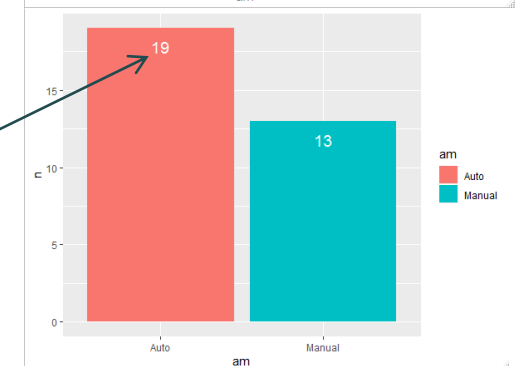
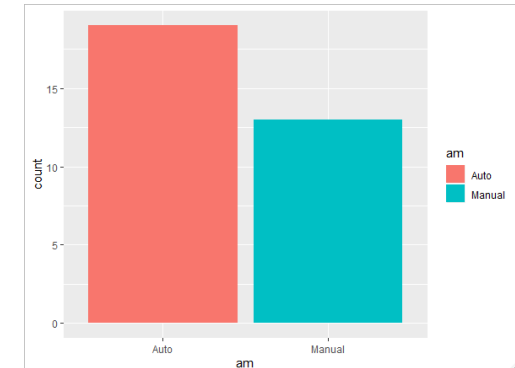
```
> caixa<-carros %>% group_by(am) %>% summarise(n=n())
am      n
Auto    19
Manual  13
> caixa %>% ggplot(aes(x=am,y=n,fill=am)) + geom_bar(stat="identity")
Ou
> carros %>% ggplot(aes(x=am, fill=am)) + geom_bar(stat="count")
```

- Adicionar texto nas barras

```
> grafico <- caixa %>% ggplot(aes(x=am,y=n,fill=am)) +
  geom_bar(stat="identity") +
  geom_text(aes(label=n), vjust=2,size=5,color="white")
```

- Definir títulos e legendas

```
> grafico <- grafico + labs(title="Tipo de Caixa de velocidades",
  subtitle = "Caixa automática ou manual",
  caption = "Fonte:1974 Motor Trend US magazine",
  x= "Caixa", y= "Unidades",
  fill="Tipo")
```



INSTITUTO NACIONAL DE ESTATÍSTICA  
STATISTICS PORTUGAL



## VI. Comunicação



### ■ Mapas com *ggplot()*

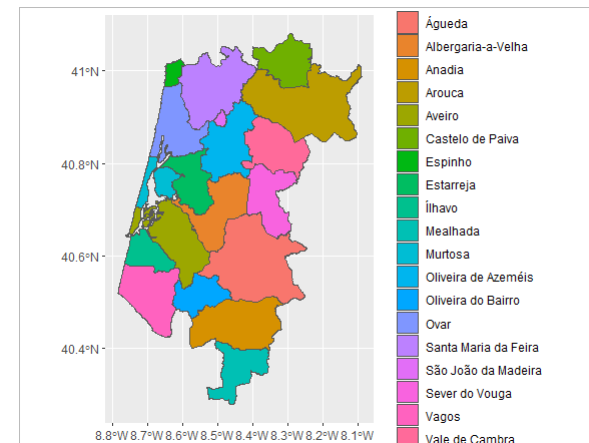
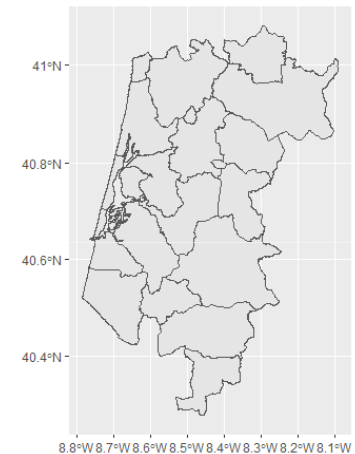
```
> library(sf)
> Mapa <- st_read(system.file("shape/gadm36_PRT_2.shp", package="sf"))
```

```
> Aveiro <- Mapa %>% filter(NAME_1=="Aveiro")
```

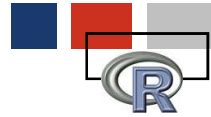
	Distrito	Município	geometry
1	Aveiro	Águeda	MULTIPOLYGON (((-8.462351 4...
2	Aveiro	Albergaria-a-Velha	MULTIPOLYGON (((-8.527728 4...
3	Aveiro	Anadia	MULTIPOLYGON (((-8.444925 4...
4	Aveiro	Arouca	MULTIPOLYGON (((-8.304522 4...
5	Aveiro	Aveiro	MULTIPOLYGON (((-8.740417 4...

```
> ggplot(data=Aveiro) + geom_sf()
```

```
> ggplot(data=teste) + geom_sf(aes(fill=Município))
```



INSTITUTO NACIONAL DE ESTATÍSTICA  
STATISTICS PORTUGAL

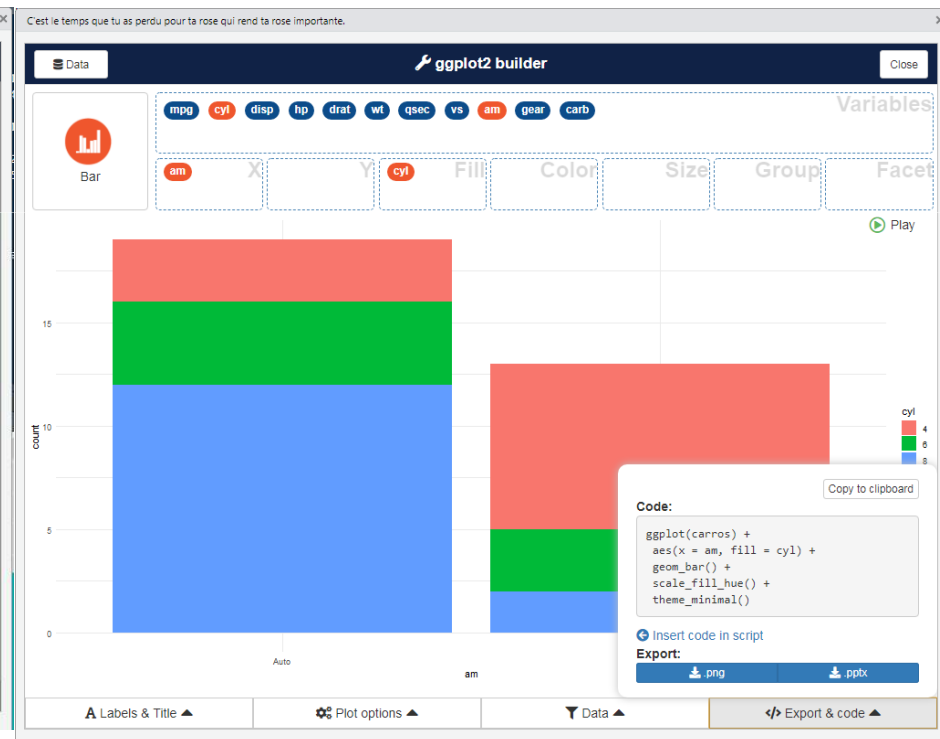
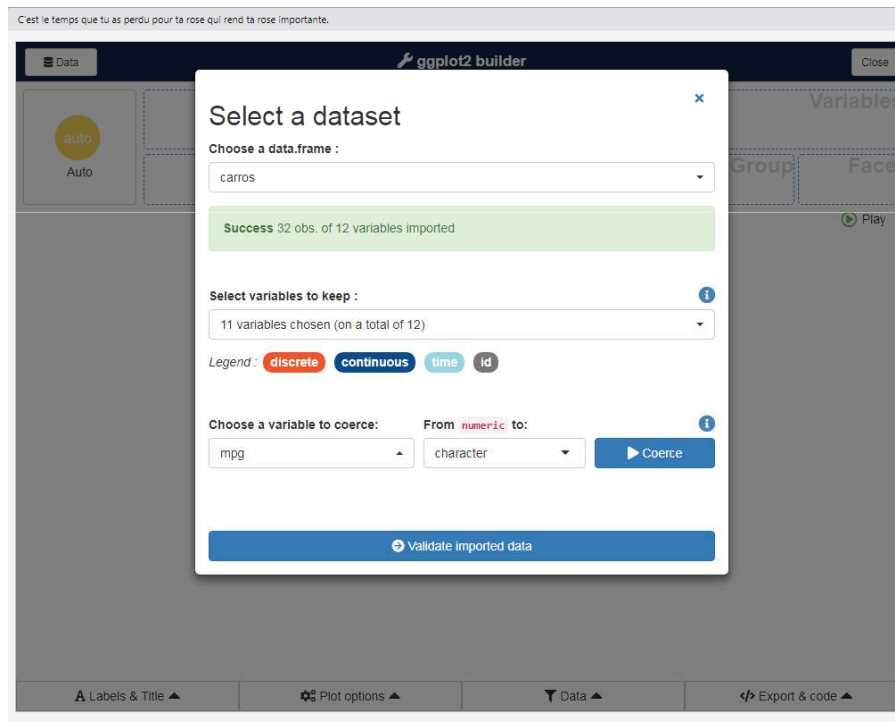


## VI. Comunicação



- Package *esquisse* – GUI de apoio ao *ggplot2*

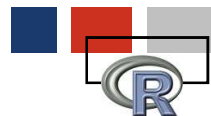
```
> library(esquisse)  
> esquisser(carros)
```





INSTITUTO NACIONAL DE ESTATÍSTICA  
STATISTICS PORTUGAL

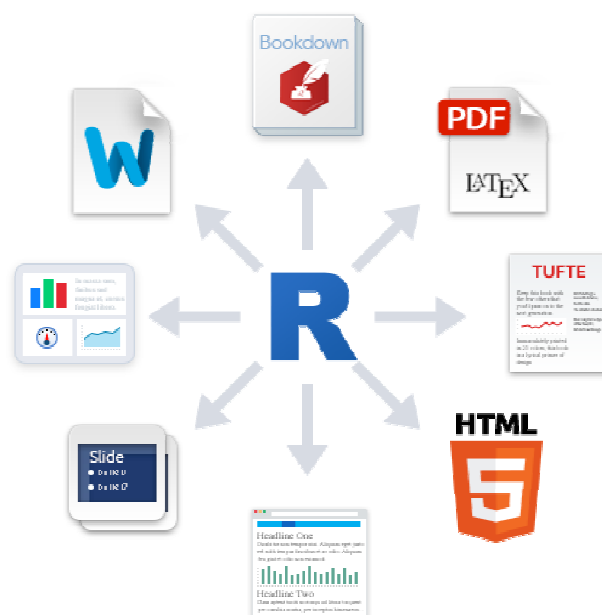


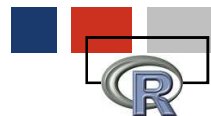


## VI. Comunicação



- O *rmarkdown* é um pacote para criação de documentos dinâmicos que permite integrar output gerado de várias linguagens como *R*, *Python*, *SQL*, *Bash*,...

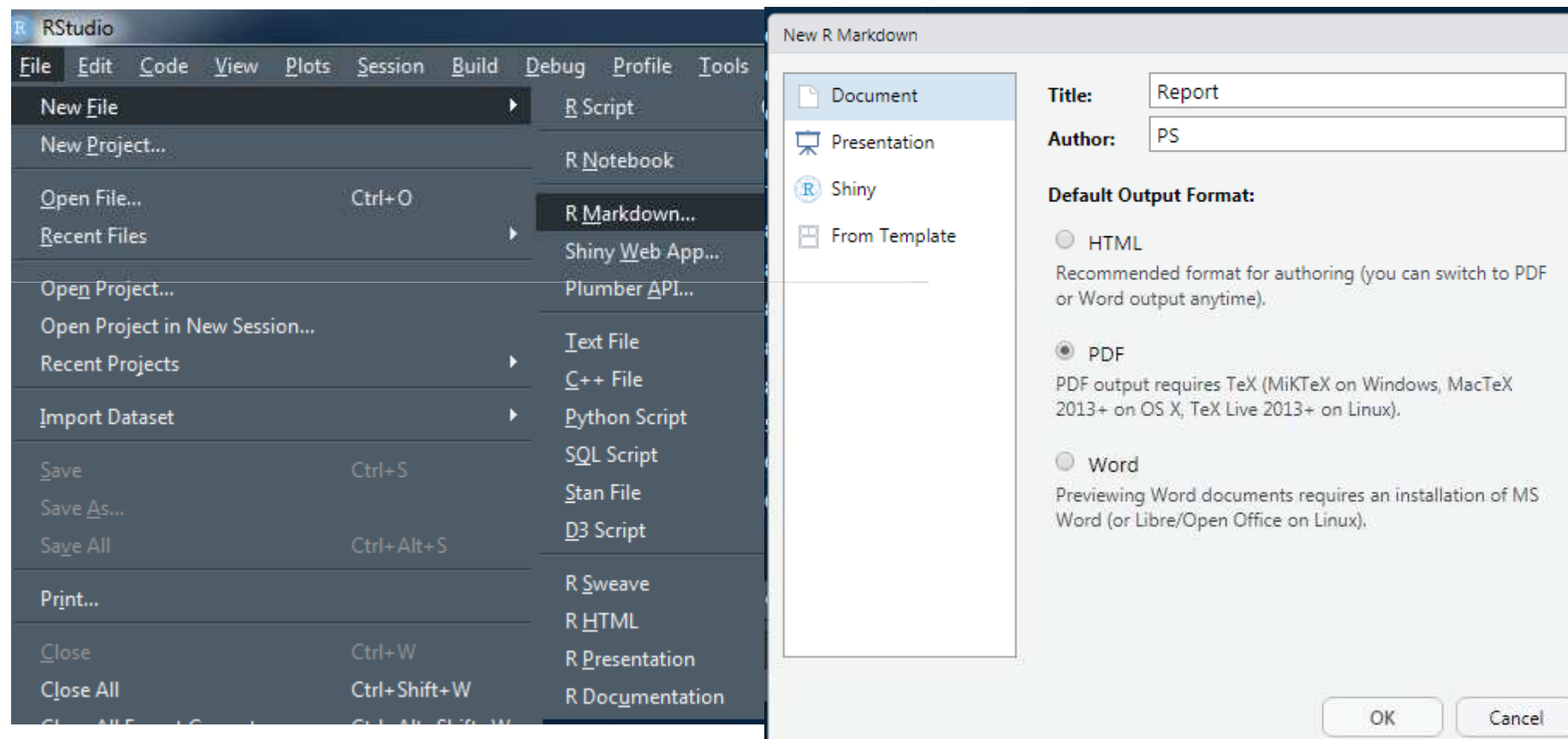


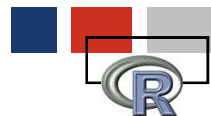


## VI. Comunicação



- Criar um novo documento *rmarkdown*.



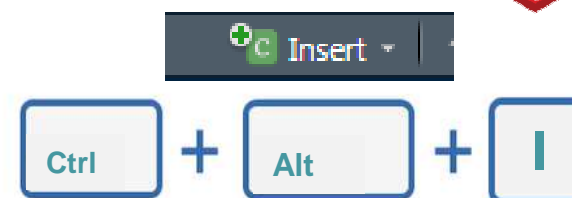


## VI. Comunicação



- **Texto dinâmico** de código r em bloco (*chunk*)

```
{r Gerar_numeros, OPÇÕES}  
x <- rnorm(30)
```



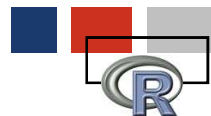
- **Texto dinâmico** código r *in-line*

Foram gerados `r length(x)` números aleatórios

Foram gerados 30 números aleatórios

Opção	Descrição
<code>include = FALSE</code>	Código é executado mas nem o código nem o resultado vão ser incluídos no documento gerado
<code>echo = FALSE</code>	Resultado da execução do código vai para o documento mas o código não
<code>message = FALSE</code>	Mensagens resultantes da execução do código não vão para o documento
<code>warning = FALSE</code>	Warnings resultantes da execução do código não vão para o documento





## VI. Comunicação



### Formatação de texto

Emphasis, aka italics, with `*asterisks*` or `_underscores_`.

Strong emphasis, aka bold, with `**asterisks**` or `__underscores__`.

Combined emphasis with `**asterisks and _underscores_**`.

Strikethrough uses two tildes. `~~Scratch this.~~`



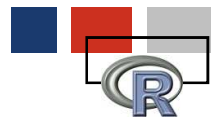
Emphasis, aka italics, with *asterisks* or *underscores*.

Strong emphasis, aka bold, with **asterisks** or **underscores**.

Combined emphasis with ***asterisks and underscores***.

Strikethrough uses two tildes. ~~Scratch this.~~





# VI. Comunicação



## Formatação de texto

```
# H1
## H2
### H3
#### H4
##### H5
##### H6
```



H1

H2

H3

H4

H5

H6

1. Primeiro elemento

- Primeiro sub-elemento
- Segundo sub-elemento



1. Primeiro elemento

- Primeiro sub-elemento
- Segundo sub-elemento

$$\sum_{i=1}^n \left( \frac{X_i}{Y_i} \right)$$



$$\sum_{i=1}^n \left( \frac{X_i}{Y_i} \right)$$



INSTITUTO NACIONAL DE ESTATÍSTICA  
STATISTICS PORTUGAL



## VI. Comunicação



### Inserir Imagens

Exemplo de imagem:

Inline: `![INE_Top](img/logo_ine.png) "Logotipo INE - In line"`

```
```{r pressure, echo=FALSE, fig.cap="Logotipo do INE em r", out.width = '100%'}  
knitr::include_graphics("img/logo_ine.png")  
```
```



Exemplo de imagem:

Inline:



INSTITUTO NACIONAL DE ESTATÍSTICA  
STATISTICS PORTUGAL

"Logotipo INE - In line"



INSTITUTO NACIONAL DE ESTATÍSTICA  
STATISTICS PORTUGAL

*Logotipo do INE em r*



INSTITUTO NACIONAL DE ESTATÍSTICA  
STATISTICS PORTUGAL



## VI. Comunicação



### Inserir tabelas

- No rmarkdown

| Tables        | Are           | Cool   |
|---------------|---------------|--------|
| col 3 is      | right-aligned | \$1600 |
| col 2 is      | centered      | \$12   |
| zebra stripes | are neat      | \$1    |



| Tables        | Are           | Cool   |
|---------------|---------------|--------|
| col 3 is      | right-aligned | \$1600 |
| col 2 is      | centered      | \$12   |
| zebra stripes | are neat      | \$1    |

- No R

```
> library(knitr)
> kable(carros)
```



|                | mpg  | cyl | disp  | hp  | drat |
|----------------|------|-----|-------|-----|------|
| Mazda RX4      | 21.0 | 6   | 160.0 | 110 | 3.90 |
| Mazda RX4 Wag  | 21.0 | 6   | 160.0 | 110 | 3.90 |
| Datsun 710     | 22.8 | 4   | 108.0 | 93  | 3.85 |
| Hornet 4 Drive | 21.4 | 6   | 258.0 | 110 | 3.08 |





## VI. Comunicação



```
---
output:
  pdf_document: default
  word_document: default
  html_document: default
---
```{r pressure, echo=FALSE, out.width = '100%'}
knitr::include_graphics("img/logo_ine.png")
```
```{r echo=FALSE, warnings=FALSE, include=FALSE}
library(dplyr)
library(knitr)
library(ggplot2)
carros <- carros
carros$modelo <- rownames(carros)
carros$am <- as.factor(carros$am)
levels(carros$am) <- c("AUTO", "Manual")
```

# 3 Carros com consumos mais altos
```{r tabela, echo=FALSE}
kable(carros %>% arrange(mpg) %>% slice(1:3) %>%
      mutate(l100 = (100*3.785411784)/(1.609344*mpg)) %>%
      select(modelo, cyl, mpg, am, l100))
```

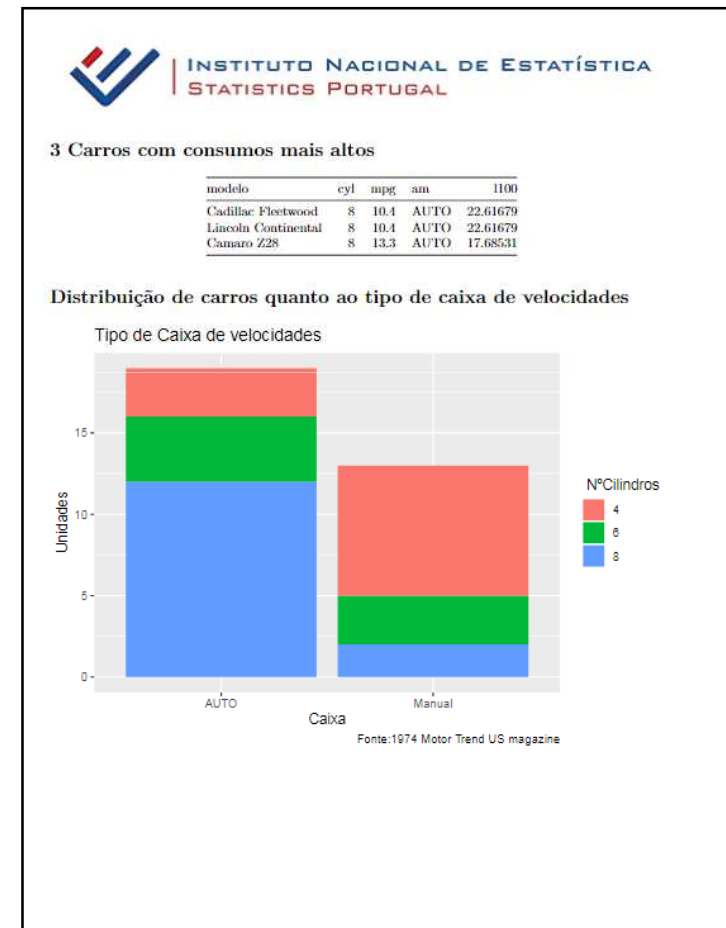
---

# Distribuição de carros quanto ao tipo de caixa de velocidades

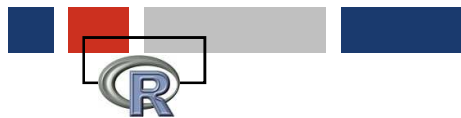
```{r graficos, echo=FALSE}
carros %>% ggplot()+geom_bar(aes(x=as.factor(am), fill=as.factor(cyl)))+
  labs(title="Tipo de Caixa de velocidades",
       caption = "Fonte:1974 Motor Trend US magazine",
       x= "Caixa", y= "Unidades",
       fill=" N°Cilindros")
```
```



INSTITUTO NACIONAL DE ESTATÍSTICA  
STATISTICS PORTUGAL







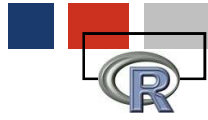
# Report

## Distribuição de ganhos médios em Portugal Continental



INSTITUTO NACIONAL DE ESTATÍSTICA  
STATISTICS PORTUGAL

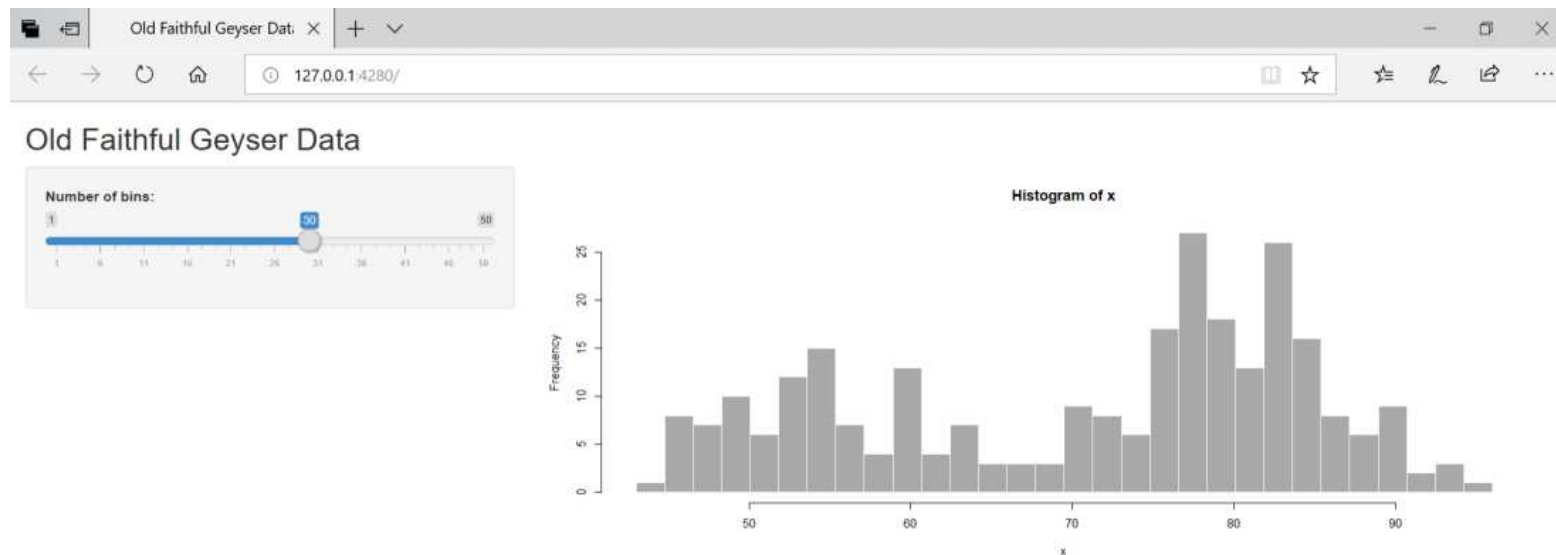




## VI. Comunicação



- O *shiny* é um package do R que permite construir aplicações web a partir do R
- Estas aplicações poderão servir para disponibilizar informação/gráficos em "tempo real"





## VI. Comunicação

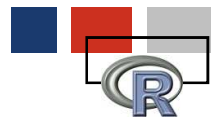


The screenshot displays the Shiny Gallery website in a web browser. The browser's address bar shows 'shiny.rstudio.com/gallery/'. The website has a navigation bar with links: 'Get Started', 'Gallery' (highlighted), 'Articles', 'Reference', 'Deploy', 'Help', and 'Contribute'. Below the navigation bar, the page is titled 'Shiny User Showcase' and includes the text: 'The Shiny User Showcase contains an inspiring set of sophisticated apps developed and contributed by Shiny users.' There are two rows of application thumbnails. The first row includes 'Genome browser', 'Papir', 'Lego Set Database Explorer', and a 'See more' link. The second row includes 'SuperZip example', 'Bus dashboard', 'Movie explorer', and 'Google Charts demo'. At the bottom, there is a section titled 'Start simple' with the text: 'If you're new to Shiny, these simple but complete applications are designed for you to learn from.'

<https://shiny.rstudio.com/gallery/>



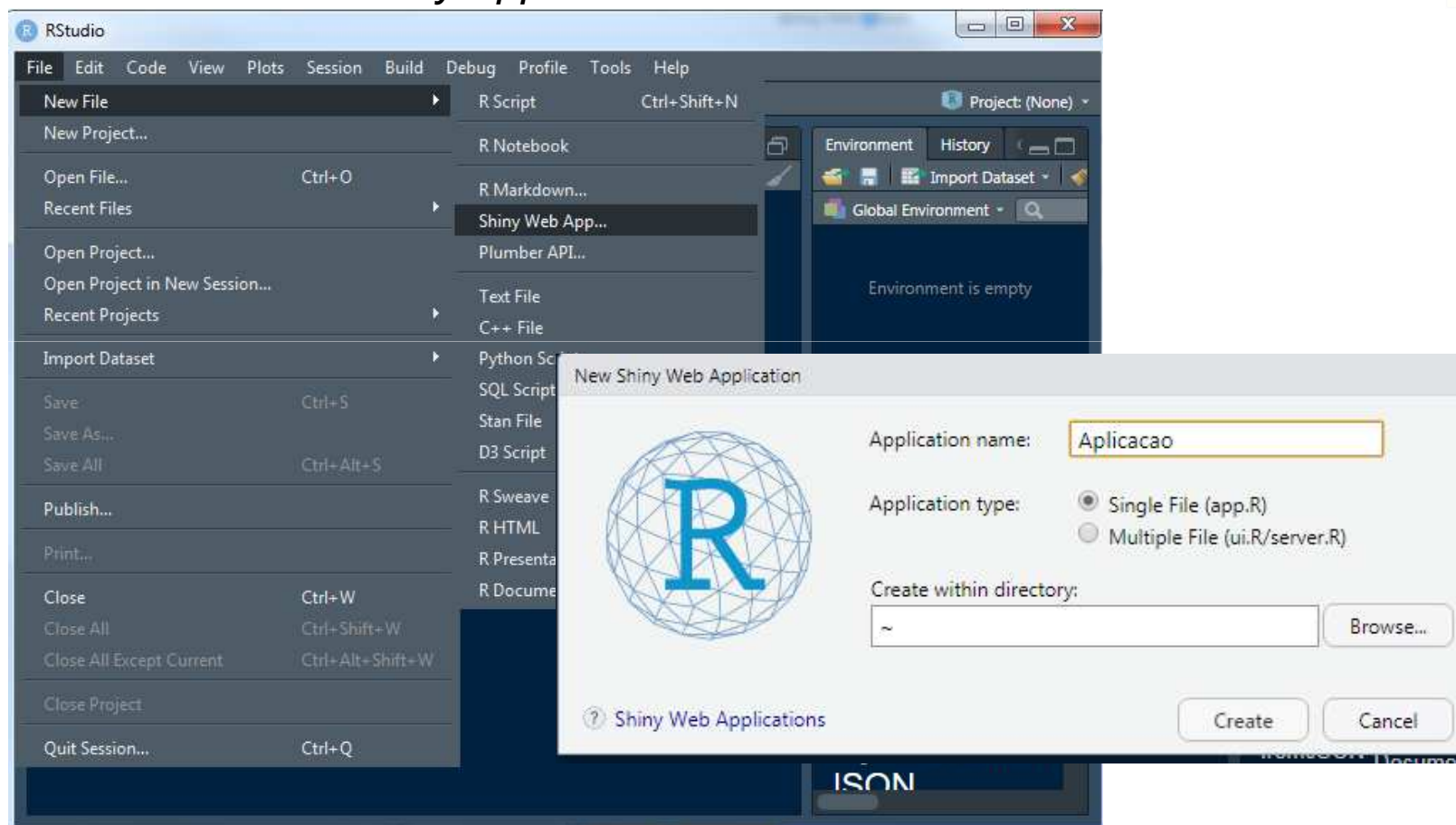
INSTITUTO NACIONAL DE ESTATÍSTICA  
STATISTICS PORTUGAL

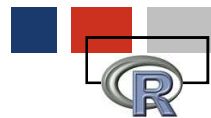


## VI. Comunicação



- Criar uma *shiny* App

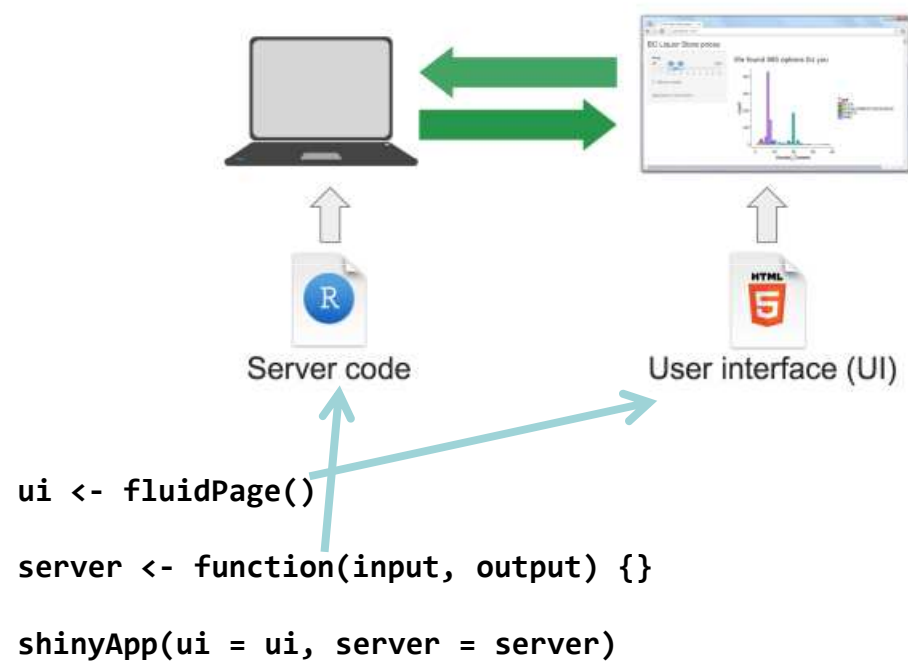




## VI. Comunicação



Funcionamento de uma aplicação shiny





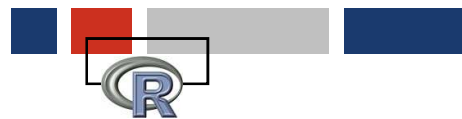
## VI. Comunicação



- **ui.r** - Lado do "cliente"

Estrutura de elementos de aplicação *shiny* - `fluidPage()`





## VI. Comunicação

- **ui.r** - Inputs



### Button

Action

`actionButton()`

### Single checkbox

☒ Choice A

`checkboxInput()`

### Checkbox group

☒ Choice 1  
☐ Choice 2  
☐ Choice 3

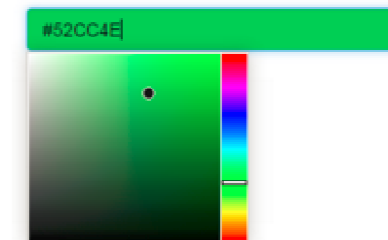
`checkboxGroupInput()`

### Date input

2014-01-01

`dateInput()`

### Colour input



`colourpicker::colourInput()`

### Date range

2014-01-24 to 2014-01-24

`dateRangeInput()`

### File input

Choose File No file chosen

`fileInput()`

### Numeric input

1

`numericInput()`

### Password Input

.....

`passwordInput()`

### Radio buttons

☒ Choice 1  
☐ Choice 2  
☐ Choice 3

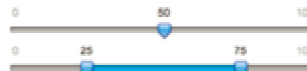
`radioButtons()`

### Select box

Choice 1

`selectInput()`

### Sliders



`sliderInput()`

### Text input

Enter text...

`textInput()`

### Text area

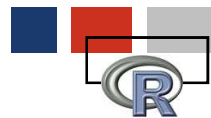
Multiple lines  
of text

`textAreaInput()`



INSTITUTO NACIONAL DE ESTATÍSTICA  
STATISTICS PORTUGAL



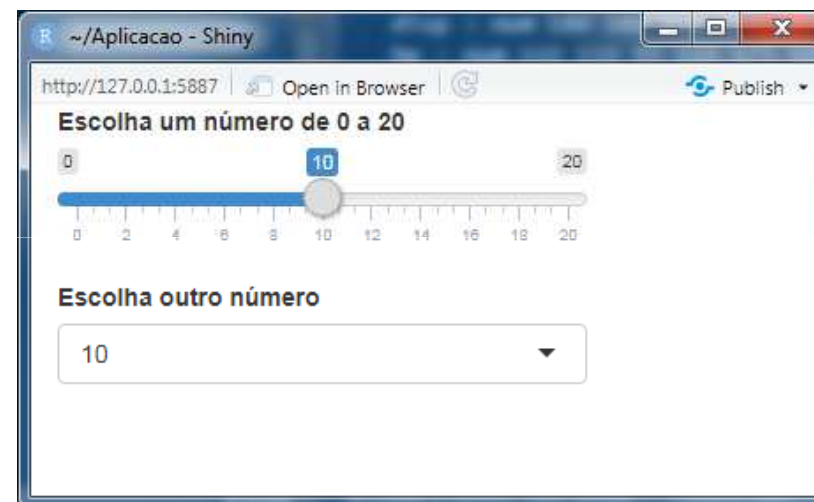


## VI. Comunicação



Exemplo de input()

```
ui <- fluidPage(  
  sliderInput("numero",  
    "Escolha um número de 0 a 20",  
    value = 10,  
    min = 0,  
    max = 20),  
  selectInput("numero2",  
    "Escolha outro número",  
    choices = 0:20,  
    selected = 10)  
)  
  
server <- function(input, output) {}  
  
shinyApp(ui = ui, server = server)
```





# VI. Comunicação



## • Outputs

**server.r**

**ui.r**



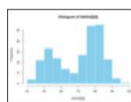
**DT::renderDataTable**(expr,  
options, callback, escape,  
env, quoted)

**dataTableOutput**(outputId, icon, ...)



**renderImage**(expr, env, quoted, deleteFile)

**imageOutput**(outputId, width, height, click,  
dblclick, hover, hoverDelay, hoverDelayType,  
brush, clickId, hoverId, inline)



**renderPlot**(expr, width, height, res, ..., env,  
quoted, func)

**plotOutput**(outputId, width, height, click,  
dblclick, hover, hoverDelay, hoverDelayType,  
brush, clickId, hoverId, inline)

'data.frame': 3 obs. of 2 variables:  
 \$ Sepal.Length: num 5.1 4.9 4.7  
 \$ Sepal.Width : num 3.5 3 3.2

**renderPrint**(expr, env, quoted, func,  
width)

**verbatimTextOutput**(outputId)

|   | Sepal.Length | Sepal.Width | Petal.Length | Petal.Width | Species |
|---|--------------|-------------|--------------|-------------|---------|
| 1 | 5.1          | 3.5         | 1.4          | 0.1         | setosa  |
| 2 | 4.9          | 3.0         | 1.4          | 0.1         | setosa  |
| 3 | 5.1          | 3.3         | 1.5          | 0.2         | setosa  |
| 4 | 5.0          | 3.4         | 1.5          | 0.2         | setosa  |
| 5 | 5.1          | 3.5         | 1.4          | 0.1         | setosa  |
| 6 | 5.0          | 3.4         | 1.5          | 0.2         | setosa  |

**renderTable**(expr,..., env, quoted, func)

**tableOutput**(outputId)

foo

**renderText**(expr, env, quoted, func)

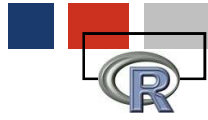
**textOutput**(outputId, container, inline)

**renderUI**(expr, env, quoted, func)

**uiOutput**(outputId, inline, container, ...)  
& **htmlOutput**(outputId, inline, container, ...)



INSTITUTO NACIONAL DE ESTATÍSTICA  
STATISTICS PORTUGAL



## VI. Comunicação

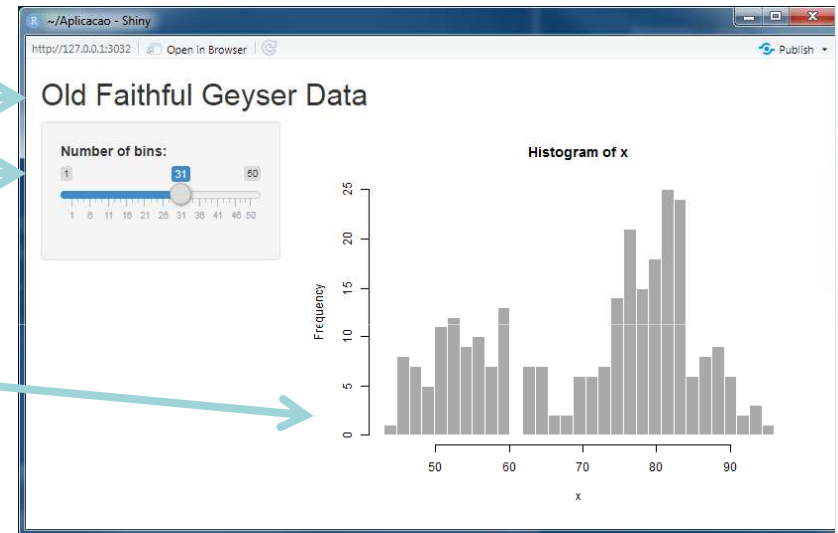


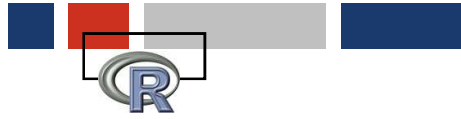
- Criar uma *shiny* App

```
library(shiny)
```

```
ui <- fluidPage(  
  titlePanel("Old Faithful Geyser Data"),  
  sidebarPanel(  
    sliderInput("nbins", "Number of bins:",  
      min = 1,  
      max = 50,  
      value = 30)  
  ),  
  mainPanel( plotOutput("distPlot") )  
)
```

```
server <- function(input, output) {  
  output$distPlot <- renderPlot({  
    x <- faithful[, 2]  
    bins <- seq(min(x), max(x), length.out = input$nbins + 1)  
    hist(x, breaks = bins, col = 'darkgray', border = 'white')  
  })  
}  
shinyApp(ui = ui, server = server)
```





# A nossa primeira *shinyApp*

Distribuição de funcionários do  
INE



INSTITUTO NACIONAL DE ESTATÍSTICA  
STATISTICS PORTUGAL



# Obrigado



INSTITUTO NACIONAL DE ESTATÍSTICA  
STATISTICS PORTUGAL