

R Markdown Demo

Meijing_Liang

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```
library(ggplot2)
library(hexbin)
```

R Markdown

This is an R Markdown document. Markdown is a simple formatting syntax for authoring HTML, PDF, and MS Word documents. For more details on using R Markdown see <http://rmarkdown.rstudio.com>.

When you click the **Knit** button a document will be generated that includes both content as well as the output of any embedded R code chunks within the document. You can embed an R code chunk like this:

Add Code Chunks

1) The keyboard shortcut Cmd/Ctrl + Alt + I

```
1 + 2
```

```
## [1] 3
```

2) The “Insert” button icon in the editor toolbar

3) Manually type the chunk delimiters {r} and

Chunk Header

Chunk Name

{r, followed by an optional chunk name, followed by comma-separated options}

1. easy navigation between chunks using the drop-down code navigator
2. setup cached chunks to avoid rerun

R for Data Science

Chunk Option

60+ customized options, arguments supplied to the chunk header.

[Learn more about chunk options at](#)

`eval = FALSE` prevents code from being evaluated.

`include = FALSE` runs the code, but doesn't show the code or results in the final document.

`echo = FALSE` prevents code, but not the results from appearing in the finished file.

`message = FALSE` or `warning = FALSE` prevents messages or warnings from appearing in the finished file.

`results = 'hide'` hides printed output, `fig.show = 'hide'` hides plots.

`error = TRUE` causes the render to continue even if code returns an error.

1. `include = FALSE`

2. `include = TRUE, echo = TRUE`

```
print("hello world!")
```

```
## [1] "hello world!"
```

3. `include = TRUE, echo = FALSE`

```
## [1] "hello world!"
```

Table

By default, R Markdown prints data frames and matrices as you'd see them in the console:

```
mtcars[1:5, ]
```

```
##           mpg  cyl  disp  hp  drat    wt  qsec vs  am  gear  carb
## Mazda RX4      21.0   6  160 110  3.90  2.620 16.46  0   1    4    4
## Mazda RX4 Wag  21.0   6  160 110  3.90  2.875 17.02  0   1    4    4
## Datsun 710      22.8   4  108  93  3.85  2.320 18.61  1   1    4    1
## Hornet 4 Drive  21.4   6  258 110  3.08  3.215 19.44  1   0    3    1
## Hornet Sportabout 18.7   8  360 175  3.15  3.440 17.02  0   0    3    2
```

If you prefer that data be displayed with additional formatting you can use the `knitr::kable` function. The code below generates Table 27.1.

```
knitr::kable(
  mtcars[1:5, ],
  caption = "A knitr kable."
)
```

Table 1: A knitr kable.

	mpg	cyl	disp	hp	drat	wt	qsec	vs	am	gear	carb
Mazda RX4	21.0	6	160	110	3.90	2.620	16.46	0	1	4	4
Mazda RX4 Wag	21.0	6	160	110	3.90	2.875	17.02	0	1	4	4
Datsun 710	22.8	4	108	93	3.85	2.320	18.61	1	1	4	1
Hornet 4 Drive	21.4	6	258	110	3.08	3.215	19.44	1	0	3	1
Hornet Sportabout	18.7	8	360	175	3.15	3.440	17.02	0	0	3	2

YAML Header

YAML stands for: it's “yet another markup language”, which is designed for representing hierarchical data in a way that's easy for humans to read and write.

Citations

you can add a citation (Zantis et al. 2023).

Including Plots

(a) hex plot - default

Construct a hex plot of wine density vs. alcohol, overplotting with a smoothing (loess) function. Label appropriately. Use default binwidths. Comment briefly on the quality of the plot.

Answer: With the hex plot, the density of the observations is easy to be seen. The brighter red hexagons indicate higher frequency, while the darker red hexagons indicate lower frequency. With the default binwidth, there are many empty hexagons, and each hexagon is slightly distorted, so a more appropriate binwidth may be required.

Using colours in LaTeX

```
# Hex plot
ggplot(wine.dat, aes(density, alcohol)) +
  geom_hex() +
  scale_fill_gradient(low = "green", high = "darkgreen") +
  geom_smooth(method = 'loess', formula = y ~ x, color = 'gold') +
  ggtitle('Wine Density vs. Alcohol Content') +
  xlab('Density (g/liter)') +
  ylab('Alcohol (% vol.)')
```

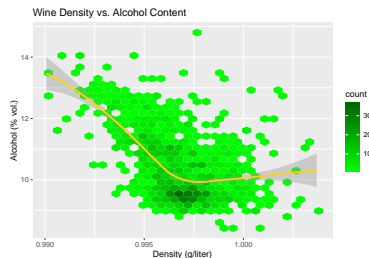


Figure 1: A nice image.

Zantis, Laura J., Caterina Borch, Martina G. Vijver, Willie Peijnenburg, Sara Di Lonardo, and Thijs Bosker. 2023. "Nano- and Microplastics Commonly Cause Adverse Impacts on Plants at Environmentally Relevant Levels: A Systematic Review." *Science of The Total Environment*, 161211. <https://doi.org/https://doi.org/10.1016/j.scitotenv.2022.161211>.