MLBDAI: Assignment Template and Formating Instructions

Anonymous student

Contents

General Information

Here general information is included that is needed for administrative/course purposes

- **Name**: [Write your name here]
- **Student-ID**: [Write your student ID here]
- **Time use**: [How long time did the assignment took (in hours)]

Introduction

This is a template with format instructions for Assignments in the Machine learning course at Uppsala University. R markdown is a convenient way of writing exercise reports by combining text and R code using markdown syntax. To create your assignment, remove the formatting instructions, and use this file as a

template. Keep the header (the first lines of this file between two lines of —) as it sets the author's name to be anonymous, and you can set the title to match the assignment number.

R markdown makes it easy to make a structured document with section and subsection titles, textual explanations, equations, code, and figures in a logical order. When you make changes to the code and re-run the notebook or "knit" (render) it to PDF, the relevant code is re-run, and the figures and results are updated without the need to copy and paste (which is prone to errors).

More information on how to use markdown, see **this** and more information on R markdown can be found **here**.

Also, *R Markdown: The Definite Guide*, an extensive book on R Markdown, can be found **here**.

Loading R packages

Below are examples of how to load packages that are used in the assignment

```
library(ggplot2)
```

Including source code

Try to avoid printing an excessive amount of code and think about what is essential for showing how did you get the result.

Write clear code. The code is also part of your report, and the clarity of the report affects if you pass the assignment. If the code is not self-explanatory, add comments. In a notebook, you can interleave explaining text and code.

If in doubt, additional source code can be included in an appendix.

Format instructions

All exercises in the assignment should start with a header fully specifying that it is exercise X, as (in rmd use #):

Exercise 1)

Subtasks in each assignment should be numbered and use header (in rmd use ##).

a)

For each subtask, include a necessary textual explanation, equations, code, and figures so that the answer to the question flows naturally. You can think about what kind of report you would like to review.

Code

We can easily add R code as chunks in the following way:

```
5 + 5
```

```
## [1] 10
```

This R code is evaluated when running the notebook or when rendering to PDF.

If you want to show and run the code, but the output is very long or messy, and you prefer to hide the output from the rendered report, you can use option results='hide'.

```
5 + 5
```

If you want to use some code in the notebook, but think it's not helpful for the teacher that grade your assignment, you can exclude it from the generated PDF with option `include=FALSE`. You will see the next block in rmd, but not in the generated PDF.

Plots

Include plots, where we can specify the width and height of the figure.

```
data("faithful")
plot(faithful$eruptions, faithful$waiting)
```

Or using qplot from ggplot2 package

```
library(ggplot2)
qplot(faithful$eruptions, faithful$waiting)
```

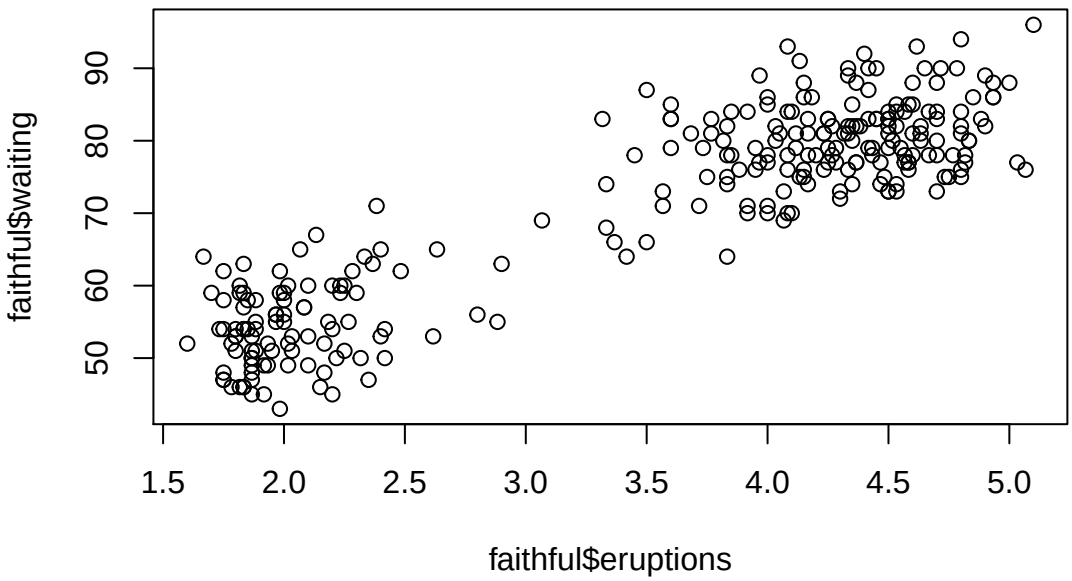
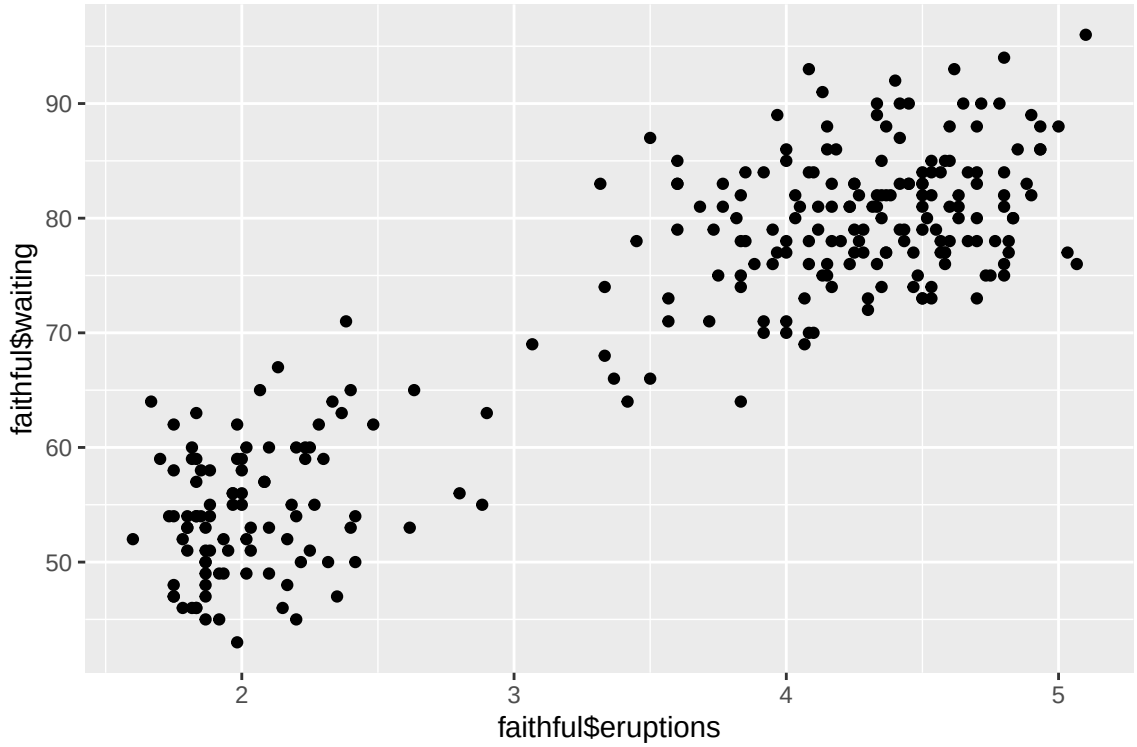


Figure 1: An example Figure.



Or using ggplot from ggplot2 package

```
ggplot(data=faithful, aes(x=eruptions, y=waiting)) + geom_point() +
  labs(x='Eruption time in mins', y='Waiting time to next eruption (in mins)')
```

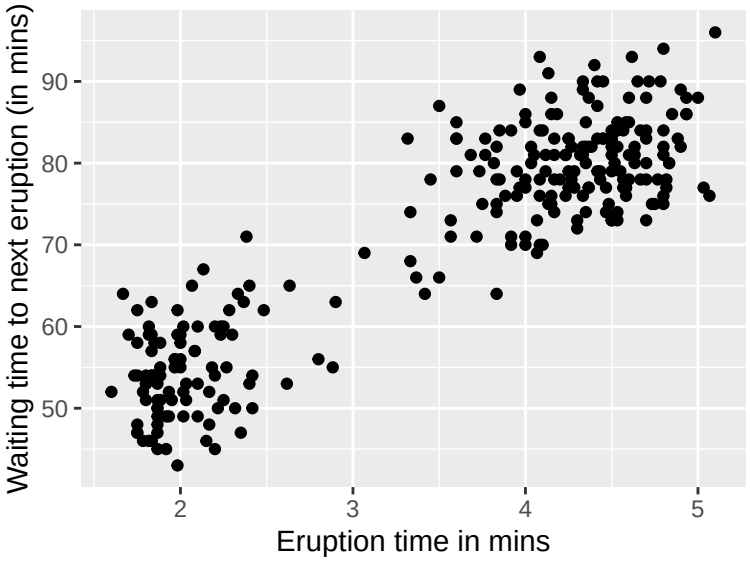


Figure 2: An smaller ggplot2 Figure.

Images

You can include an existing image (e.g., scanned copy of pen and paper equations)

Figure 3: Uppsala University

or alternatively

```
knitr::include_graphics("uu_logo.png")
```

Equations

You should write equations using LaTeX syntax, or you can include them as images if, for example, you use Microsoft Equations.

In Markdown, equations can easily be formulated using LaTeX in line as $f(k) = \binom{n}{k} p^k (1-p)^{n-k}$. Or use the math environment as follows:

$$\begin{array}{lll} x_{11} & x_{12} & x_{13} \\ x_{21} & x_{22} & x_{23}. \end{array}$$

The above example also illustrated multicolumn 'array'. An alternative way to make multiline equations with alignment is to use 'aligned' as follows;

$$\begin{aligned} y &\sim \text{normal}(\mu, 1) \\ \mu &\sim \text{normal}(0, 1). \end{aligned}$$

If you are new to LaTeX equations, you could use the latext4technics equation editor to create LaTeX equations to include in the report.

More information on using LaTeX in R markdown can be found in 2.5.3 in R Markdown: The Definite Guide.

A short introduction to equations in LaTeX can be found here.

Language

The language used in the course is English. Hence the report needs to be written in English.

Jupyter Notebook and other report formats

You are allowed to use any format to produce your report, such as Jupyter Notebooks, as long as you abide by the instructions in this template.