

Introduction to AI

Abstract

Some sorts of documents need abstracts. Others do not.

1 Analysis on the Penguin Dataset

Start your document with words, written in full sentences and paragraphs. It is a good idea to break your document into sections and subsections

1.1 EDA on Penguin Datasets

This dataset comprises features such as species, island and bill_length_mm. Firstly, I conducted an analysis to determine the type, number of values, number of unique values, and proportion of missing values for each feature within the dataset. The analysis is present in Table 1.

Table 1: Summary of Features

Feature	Type	Count	Nunique	% Null
rowid	int64	344	344	0.000000
species	object	344	3	0.000000
island	object	344	3	0.000000
bill_length_mm	float64	342	164	0.581395
bill_depth_mm	float64	342	80	0.581395
flipper_length_mm	float64	342	55	0.581395
body_mass_g	float64	342	94	0.581395
sex	object	333	2	3.197674
year	int64	344	3	0.000000

We can *emphasis* some words, i.e., make them *italic*, and we can make some words **bold**. Note how using a new line in the code does not correspond to a new line in the output file. Same if we have a large white space.

Instead, if we want a new line/new paragraph, you need to press enter twice, or use
which starts a new line but not a new paragraph.

1.2 lists

Lists can be numbered or unnumbered, and you can have sub-list inside a list.

1. This is the first item in a numbered list.
2. And the second
3. (a) Here the third item is in fact a numbered sub-list.
(b) item 2 of the numbered sub-list
4.
 - Here the fourth item is an unnumbered sub-list.
 - item 2 of the unnumbered sub-list

1.3 Definitions and theorems

Definitions, theorems, lemmas and so on, are 'environments' (like documents and lists). They need to begin and end.

Definition 1.1. A *label* allows the user to tell Latex 'remember the numbering of that definition/theorem/equation'

Lemma 1.2. *If something has a label, then we can refer to it, without knowing what number it is*

Proof. For example, by calling up Definition 1.1. This works even if the ordering of things move. Note that the end of proof square box is already there □

Theorem 1.3. *And a final theorem*

Proof. Combining Definition 1.1 with Lemman 1.2 we get Equation 2 below. □

2 Including maths

Some maths, like $\varepsilon > 0$ or $a_{23} = \alpha^3$, is written in-line. More important or complex maths is displayed on its own line. For example,

$$\lim_{x \rightarrow \infty} f(x) = \frac{\pi}{4}.$$

Sometimes you need multiple lines of maths to line up nicely:

$$\begin{aligned} f(x+y) &= (x+y, -2(x+y)) \\ &= (x, -2x) + (y, -2y) \\ &= f(x) + f(y), \end{aligned}$$



Figure 1: The logo for the University of Bristol

and sometimes you want to number lines in an equation

$$A^T = \begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}^T \tag{1}$$

$$= \begin{pmatrix} 1 & 3 \\ 2 & 4 \end{pmatrix} \tag{2}$$

3 References and Figures

\LaTeX [1] also allows you to cite your sources. For more details on how this can be done, we refer the reader to [2, sec: Embedded System]. But once you have a bibliography, you can use the `cite` command easily. Finally we add Figure 1 to show how to add graphics. Note that we first need to make sure to have the graphic uploaded to Overleaf or saved in the same folder as your tex file (whichever is relevant to your case). Notice how the picture was resized using the `scale` command and that \LaTeX determine that the picture looks better above.

References

- [1] Leslie Lamport, *\LaTeX : a document preparation system*, Addison Wesley, Massachusetts, 2nd edition, 1994.
- [2] Wikibooks, *\LaTeX /Bibliography Management*, [Online], Accessed at https://en.wikibooks.org/wiki/LaTeX/Bibliography_Management, (DATE ACCESSED).