Condensed Bishop

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Introduction

These are my condensed notes from Bishop's **Pattern Recognition and Machine Learning[^Bishop's Pattern Recognition and Machine Learning].**

This is a work in progress

Section 2.4 The Exponential Family

The exponential family of functions can be generalized as:

$p(\mathbf{x}|\eta) = h(x)g(\eta)e^{\eta^T u(x)}$

Where:

* Where $h(x)$ is ??
* And $g(\eta)$ is the coefficient that ensures the distribution is normalized.
* And $u(x)$ is som function of x

The generalized form of the likelihood estimator function for the exponential family of functions is:

$p(\mathbf{x}|\eta) = \prod_{n=1}^{N} h(x_n)g(\eta)^N e^{\eta^T \sum_{n=1}^{N} u(x_n)}$

NOT MY STUFF BELOW

Figures

Margin Figures

Images and graphics play an integral role in Tufte's work. To place figures or tables in the margin you can use the `fig.margin` knitr chunk option. For example:

```
library(ggplot2)
qplot(Sepal.Length, Petal.Length, data = iris,
    color = Species)
```

Note the use of the `fig.cap` chunk option to provide a figure caption. You can adjust the proportions of figures using the `fig.width`
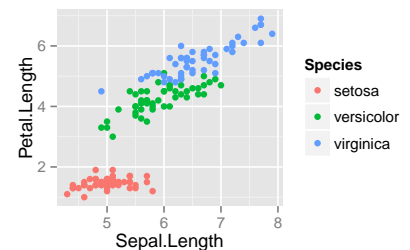

Figure 1: Sepal length vs. petal length, colored by species

and `fig.height` chunk options. These are specified in inches, and will be automatically scaled down to fit within the handout margin.

Equations

You can also include LaTeX equations in the margin by explicitly invoking the `marginfigure` environment.

Note the use of the `\caption` command to add additional text below the equation.

$$\frac{d}{dx}\left(\int_0^x f(u)\,du\right) = f(x).$$

Figure 2: An equation

Full Width Figures

You can arrange for figures to span across the entire page by using the `fig.fullwidth` chunk option.

```
qplot(wt, mpg, data = mtcars, colour = factor(cyl))
```
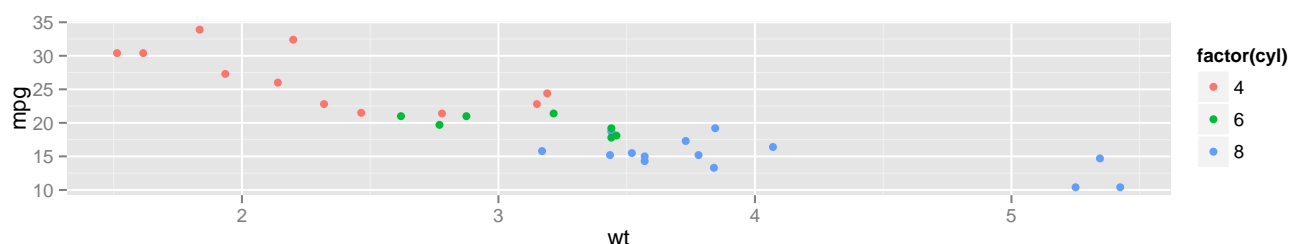

Figure 3: Full width figure

Note the use of the `fig.width` and `fig.height` chunk options to establish the proportions of the figure. Full width figures look much better if their height is minimized.

Main Column Figures

Besides margin and full width figures, you can of course also include figures constrained to the main column.

```
qplot(factor(cyl), mpg, data = mtcars, geom = "boxplot")
```

Sidenotes

One of the most prominent and distinctive features of this style is the extensive use of sidenotes. There is a wide margin to provide ample room for sidenotes and small figures. Any use of a footnote will automatically be converted to a sidenote. [1]

If you'd like to place ancillary information in the margin without the sidenote mark (the superscript number), you can use the `\marginnote` command.

[1] This is a sidenote that was entered using a footnote.

This is a margin note. Notice that there isn't a number preceding the note.
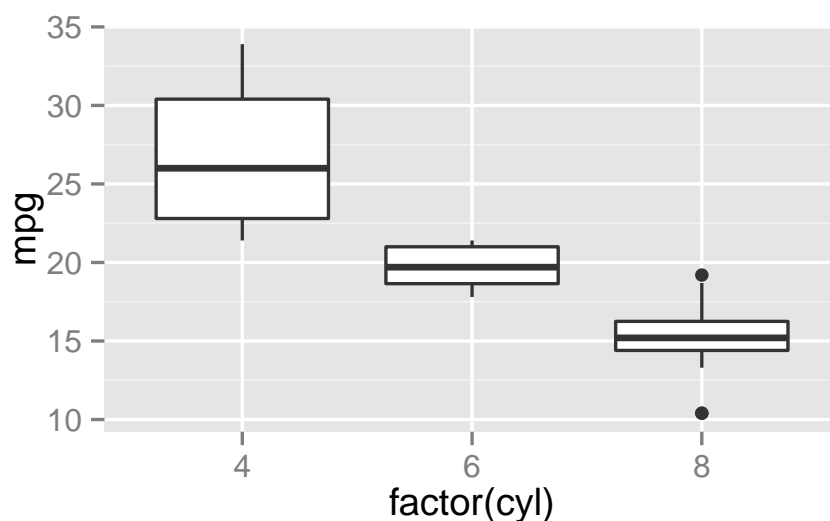
Note also that the two footnote references (`tufte_latex` and `books_be`, both defined below) were also included in the margin on the first page of this document.

Tables

You can use the **xtable** package to format LaTeX tables that integrate well with the rest of the Tufte handout style. Note that it's important to set the `xtable.comment` and `xtable.booktabs` options as shown below to ensure the table is formatted correctly for inclusion in the document.

```r
library(xtable)
options(xtable.comment = FALSE)
options(xtable.booktabs = TRUE)
xtable(head(mtcars[, 1:6]), caption = "First rows of mtcars")
```

	mpg	cyl	disp	hp	drat	wt
Mazda RX4	21.00	6.00	160.00	110.00	3.90	2.62
Mazda RX4 Wag	21.00	6.00	160.00	110.00	3.90	2.88
Datsun 710	22.80	4.00	108.00	93.00	3.85	2.32
Hornet 4 Drive	21.40	6.00	258.00	110.00	3.08	3.21
Hornet Sportabout	18.70	8.00	360.00	175.00	3.15	3.44
Valiant	18.10	6.00	225.00	105.00	2.76	3.46

Table 1: First rows of mtcars

[^Bishop's Pattern Recognition and Machine Learning]: http://www.rmki.kfki.hu/~banmi/elte/Bishop%20-%20Pattern%20Recognition%20and%20Machine%20Learning.pdf