

Introduction to the ggdendro package for plotting dendograms and tree diagrams

Andrie de Vries

August 9, 2011

ggdendro is a package that makes it easy to extract dendogram and tree diagrams into a data frame.

1 Introduction

The **ggdendro** package provides a general framework to extract the plot data for a dendograms and tree diagrams.

It does this by providing generic function **dendro_data** that will extract the appropriate segment data as well as labels. This data is returned as a list of data.frames. These data frames can be extracted using three accessor functions:

- `segment`
- `label`
- `leaf_label`

The **ggplot** package doesn't get loaded automatically, so remember to load it first:

```
> library(ggplot2)
> library(ggdendro)
```

With the required packages loaded, we are ready.

2 Dendrograms

The `hclust()` and `dendrogram()` functions in R makes it easy to plot the results of hierarchical cluster analysis and other dendrograms in R. However, it is hard to extract the data from this analysis to customise these plots, since the `plot()` functions for both these classes prints directly without the option of returning the plot data.

```
> hc <- hclust(dist(USArrests), "ave")
> dhc <- as.dendrogram(hc)
> # Rectangular lines
> ddata <- dendro_data(dhc, type="rectangle")
> p <- ggplot(segment(ddata)) +
+   geom_segment(aes(x=x0, y=y0, xend=x1, yend=y1)) +
+   coord_flip() + scale_y_reverse(expand=c(0.2, 0))
> print(p)
```

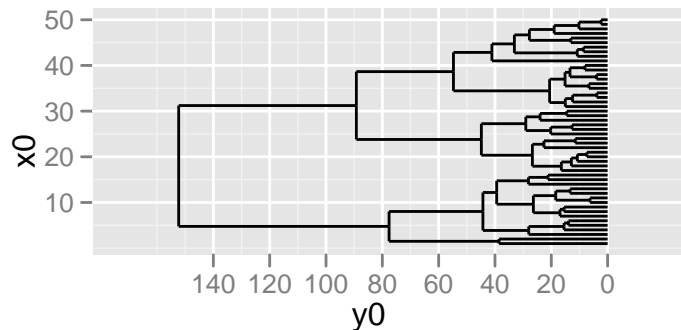


Figure 1: A dendrogram produced using `dendro_data` and `ggplot()`

Of course, using `ggplot` to create the dendrogram means one has full control over the appearance of the plot. For example, here is the same data, but this time plotted horizontally with a clean background:

```
> p <- p + coord_flip() +
+   opts(
+     panel.grid.major = theme_blank(),
+     panel.grid.minor = theme_blank(),
+     panel.background = theme_blank(),
+     axis.title.x = theme_text(colour=NA),
+     axis.title.y = theme_blank(),
```

```

+   axis.text.x = theme_blank(),
+   axis.text.y = theme_blank(),
+   axis.line = theme_blank()
+ )
> print(p)

```

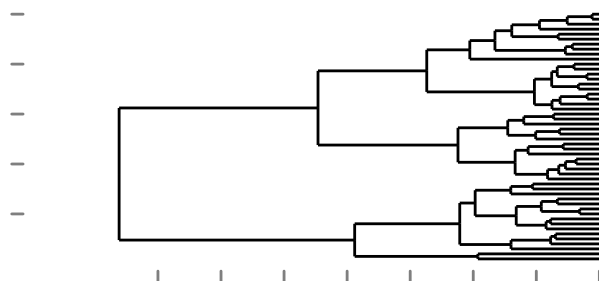


Figure 2: Dendrogram rotated on clear background

Dendrograms can also be drawn using triangular lines instead of rectangular lines. For example:

```

> ddata <- dendro_data(dhc, type="triangle")
> p <- ggplot(segment(ddata)) +
+   geom_segment(aes(x=x0, y=y0, xend=x1, yend=y1)) +
+   coord_flip() + scale_y_reverse(expand=c(0.2, 0)) +
+   opts(
+     panel.grid.major = theme_blank(),
+     panel.grid.minor = theme_blank(),
+     panel.background = theme_blank(),
+     axis.title.x = theme_text(colour=NA),
+     axis.title.y = theme_blank(),
+     axis.text.x = theme_blank(),
+     axis.text.y = theme_blank(),
+     axis.line = theme_blank()
+   )
> print(p)

```

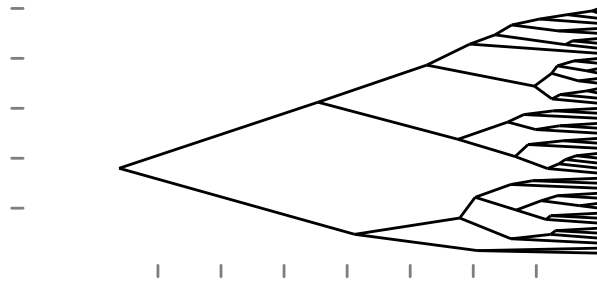


Figure 3: A dendrogram with triangular connection lines

3 Tree diagrams

The `tree` function in package `tree` creates tree diagrams. To extract the plot data for these diagrams using `ggdendro` follows the same basic pattern as dendrograms:

```
> require(tree)
> data(cpus, package="MASS")
> cpus.ltr <- tree(log10(perf) ~ syst+mmin+mmax+cach+chmin+chmax, cpus)
> tree_data <- dendro_data(cpus.ltr)
> p <- ggplot(segment(tree_data)) +
+   geom_segment(aes(x=x, y=y, xend=xend, yend=yend, size=n),
+     colour="blue", alpha=0.5) +
+   scale_size("n", to=c(0, 3)) +
+   geom_text(data=label(tree_data),
+     aes(x=x, y=y, label=label), vjust=-0.5, size=3) +
+   geom_text(data=leaf_label(tree_data),
+     aes(x=x, y=y, label=label), vjust=0.5, size=2)
> print(p)
```

4 Conclusion

The `ggdendro` package makes it easy to extract the line segment and label data from `hclust`, `dendrogram` and `tree` objects.

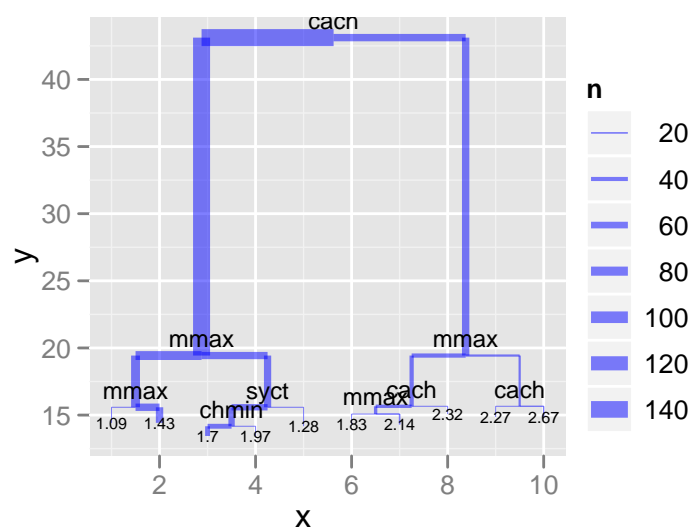


Figure 4: Tree plot