Supplemental File2 of

1 ggtreeExtra: A universal package to visualize compact circular layers of phylogenetic tree

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1.1 Examples to show how to use *ggtreeExtra* with some geometric function defined by ggplot2-based packages

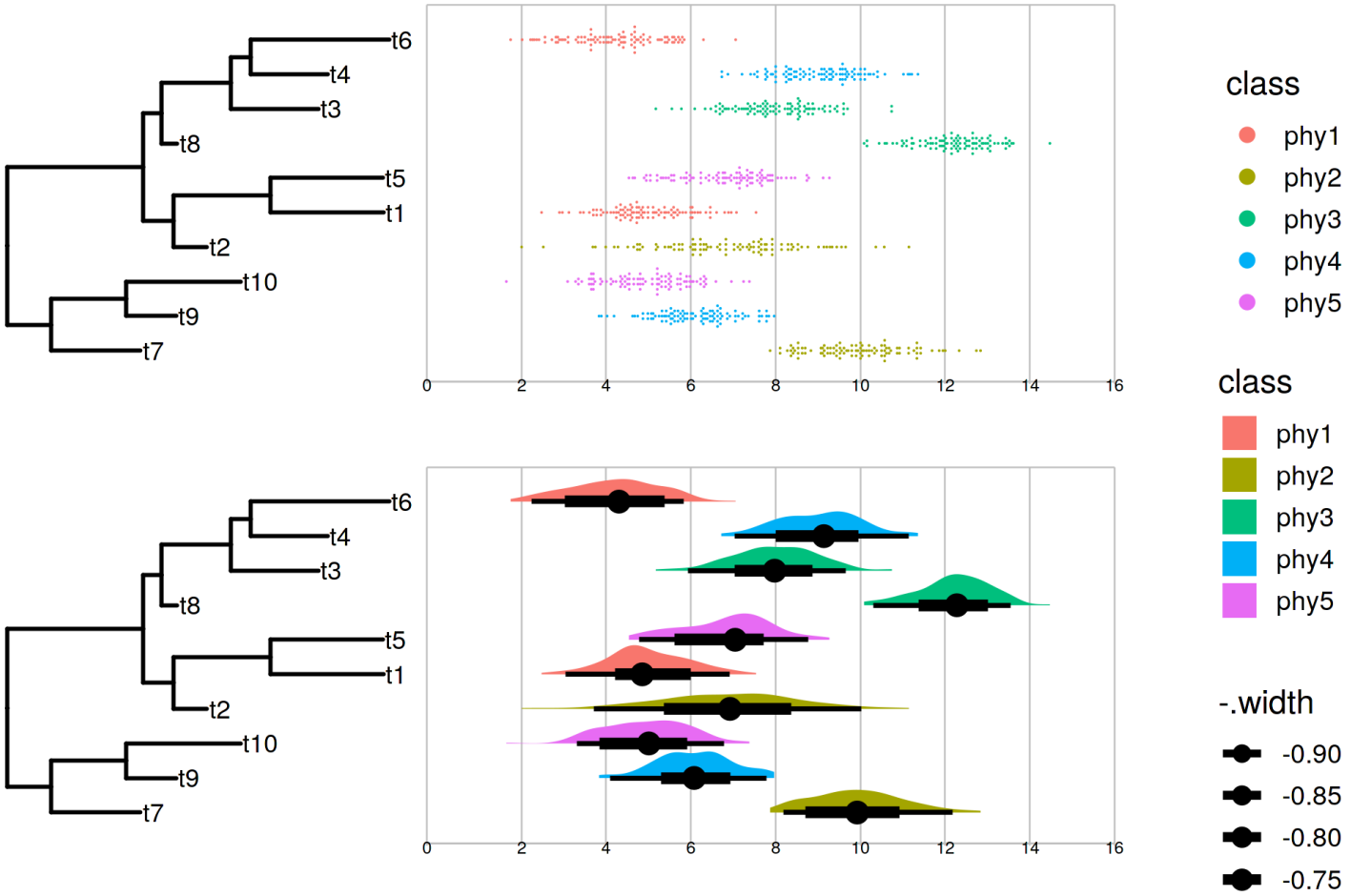
The supplementary file1 has listed several examples to show how to map the associated data to circular phylogenetic tree using *ggtreeExtra*. These examples has contained the illustration how to use *ggtreeExtra* with common geometric function defined by *ggplot2*(Wickham 2016). Here, we show several cases that *ggtreeExtra* works with geometric function defined by ggplot2-based packages.

1.1.1 Working with *ggdist* package

ggdist(Kay 2020) can be used to display the distribution and uncertainty of data, *ggtreeExtra* can work with several geometric function defined by it (supplementary file Table.S1). If the associated data should be displayed the distribution, such as the gene expression in different samples.

```
library(tibble)
library(tidyr)
library(ggdist)
library(ggtree)
library(ggplot2)
library(ggtreeExtra)
library(patchwork)
set.seed(1024)
df = tribble(
    ~id, ~class, ~value,
    "t1",  "phy1", rnorm(100, mean = 5),
    "t2",  "phy2", rnorm(100, mean = 7, sd = 1.5),
    "t3",  "phy3", rnorm(100, mean = 8),
    "t4",  "phy4", rnorm(100, mean = 9),
    "t5",  "phy5", rnorm(100, mean = 7),
    "t6",  "phy1", rnorm(100, mean = 4),
    "t7",  "phy2", rnorm(100, mean = 10),
    "t8",  "phy3", rnorm(100, mean = 12),
    "t9",  "phy4", rnorm(100, mean = 6),
    "t10", "phy5", rnorm(100, mean = 5)
  ) %>% unnest(value)
tr <- rtree(10)
p <- ggtree(tr) + geom_tiplab(size=3)
# The associate data (df)
p1 <- p +
      geom_fruit(data=df,
                 geom=geom_dots,
                 mapping=aes(y=id, x=value, fill=class),
                 position=position_identityx(),
                 color=NA,
                 dotsize=3,
                 pwidth=1.8,
```

```
                offset=0.1,
                orientation="y",
                side="both",
                grid.params=list(),
                axis.params=list(axis="x",text.size=2, nbreak=6)
      ) +
      theme(legend.key.size=unit(0.5, "cm"))
p2 <- p +
      geom_fruit(data=df,
                geom=geom_slabinterval,
                mapping=aes(y=id, x=value, fill=class),
                position=position_identityx(),
                pwidth=1.8,
                offset=0.1,
                orientation="y",
                side="right",
                stat=StatSampleSlabinterval,
                grid.params=list(),
                axis.params=list(axis="x",text.size=2, nbreak=6)
      ) +
      theme(legend.key.size=unit(0.5, "cm"))

p1 / p2
```



SFig. S1: This example to show ggtreeExtra works with *geom_dots* and *geom_slabinterval* of *ggdist*(Kay 2020).

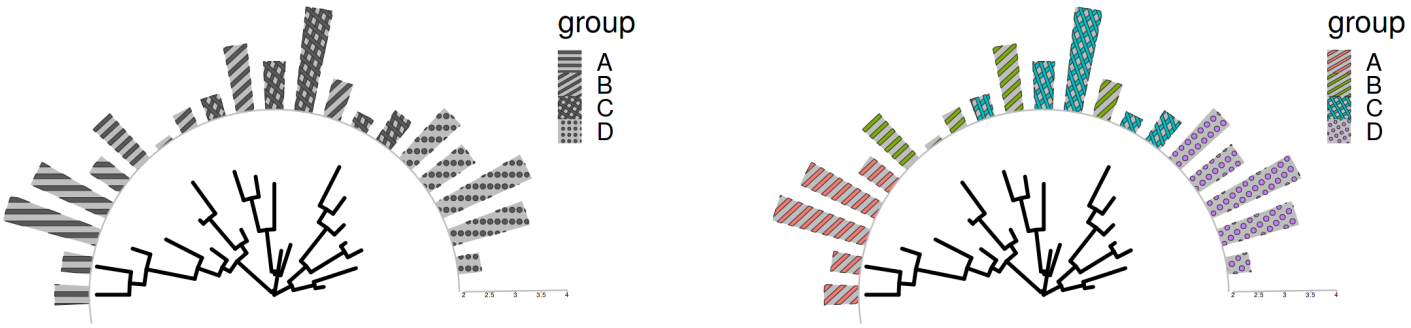
1.1.2 Working with *ggpattern* package

ggpattern(FC 2020) provides geometric layers which support filled areas with geometric and image-based patterns. Some geometric layers of it can also work with *ggtreeExtra*.

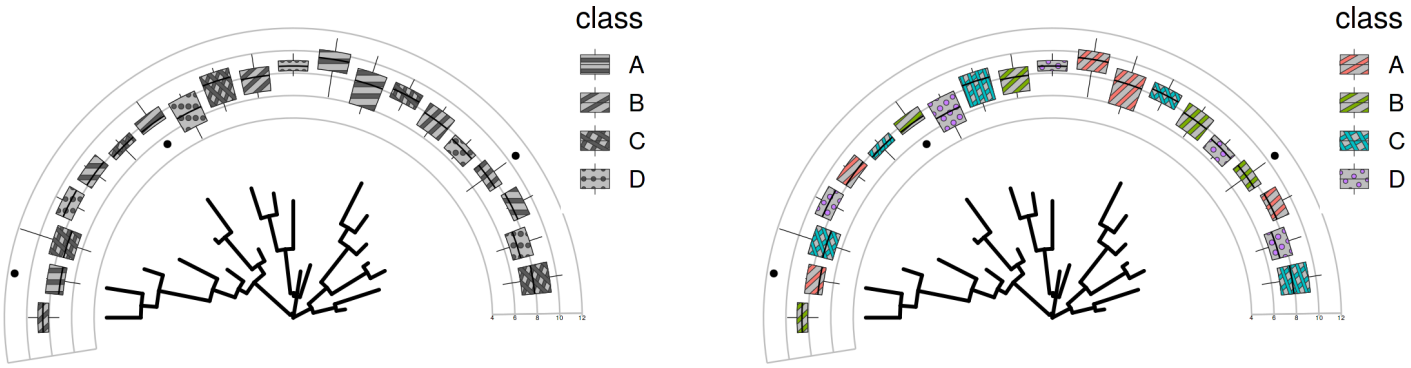
```
library(ggtree)
library(ggtreeExtra)
library(ggpattern)
library(ggplot2)

set.seed(1024)

tr <- rtree(20)
dat <- data.frame(id=tr$tip.label,
                  value=abs(rnorm(20, 3)),
                  group=c(rep("A", 5), rep("B", 5), rep("C", 5), rep("D", 5)))

dt <- data.frame(id=rep(tr$tip.label, 8), value=abs(rnorm(20 * 8, 8, 1.5)),
                 class=rep(rep(c("A","B","C","D"), 5), 8))

p <- ggtree(
          tr,
          layout="fan",
          open.angle=180
     )

p1 <- p +
      geom_fruit(
          data=dat,
          geom=geom_bar_pattern,
          mapping=aes(y=id, x=value, pattern=group, pattern_angle=group),
          width=0.6,
          stat="identity",
          pwidth = 0.6,
          pattern_spacing =0.01,
          pattern_size = 0.1,
          pattern_density = 0.4,
          fill = "grey",
          pattern_fill="grey35",
          position=position_identityx(),
          axis.params=list(axis="xy")
      ) +
      theme(
          legend.position= c(0.94, 0.8),
          legend.key.size = unit(0.3, 'cm')
      )

p2 <- p +
      geom_fruit(
          data=dat,
          geom=geom_bar_pattern,
          mapping=aes(y=id, x=value, pattern=group, pattern_fill=group),
          width=0.6,
          stat="identity",
          pwidth = 0.6,
          pattern_spacing =0.01,
          pattern_size = 0.1,
          pattern_density = 0.4,
          fill = "grey",
```

```
          position=position_identityx(),
          axis.params=list(axis="xy")
      ) +
      theme(
          legend.position= c(0.94, 0.8),
          legend.key.size = unit(0.3, 'cm')
      )

p3 <- p +
      geom_fruit(
          data=dt,
          geom=geom_boxplot_pattern,
          mapping=aes(y=id, x=value, pattern=class, pattern_angle = class),
          size=0.1,
          outlier.size=0.5,
          pwidth=0.5,
          pattern_size = 0.1,
          pattern_density = 0.4,
          pattern_spacing =0.01,
          fill = "grey",
          pattern_fill="grey35",
          position=position_dodgex(),
          grid.params=list(),
          axis.params=list(axis="x")
      ) +
      theme(
          legend.position= c(0.94, 0.8),
          legend.key.size = unit(0.5, 'cm')
      )

p4 <- p +
      geom_fruit(
          data=dt,
          geom=geom_boxplot_pattern,
          mapping=aes(y=id, x=value, pattern=class, pattern_fill = class),
          size=0.1,
          outlier.size=0.5,
          pwidth = 0.5,
          pattern_size = 0.1,
          pattern_density = 0.4,
          pattern_spacing =0.01,
          fill = "grey",
          position=position_dodgex(),
          grid.params=list(),
          axis.params=list(axis="x")
      ) +
      theme(
          legend.position= c(0.94, 0.8),
          legend.key.size = unit(0.5, 'cm')
      )

p1 + p2
```

```
p3 + p4
```



SFig. S2: This example to show ggtreeExtra works with *geom_bar_pattern* and *geom_boxplot_pattern* of *ggpattern*(FC 2020).



SFig. S3: This example to show ggtreeExtra works with *geom_bar_pattern* and *geom_boxplot_pattern* of *ggpattern*(FC 2020).

Reference

FC, Mike. 2020. *Ggpattern: Geoms with Patterns.*

Kay, Matthew. 2020. *ggdist: Visualizations of Distributions and Uncertainty.* https://doi.org/10.5281/zenodo.3879620.

Wickham, Hadley. 2016. *Ggplot2: Elegant Graphics for Data Analysis.* Springer-Verlag New York. https://ggplot2.tidyverse.org.