Tutorial for The R Graph Gallery

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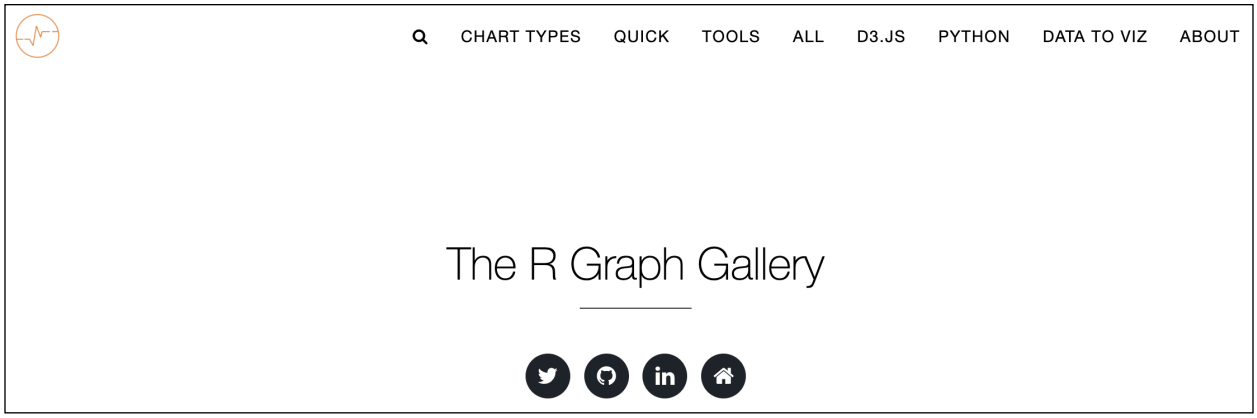
· Introduction of The R Graph Gallery

The R graph gallery is a collection of charts made with the R programming language. The gallery provides hundreds of charts ,which made by packages 'tidyverse' and 'ggplot2'. It is easy to make your own chart by using the reproducible code provided by the gallery. The R Graph Gallery is a good tool for the R programming beginners to make their own charts.

· Step 1: Go to the Website and Get Started

Here is the website: https://r-graph-gallery.com/

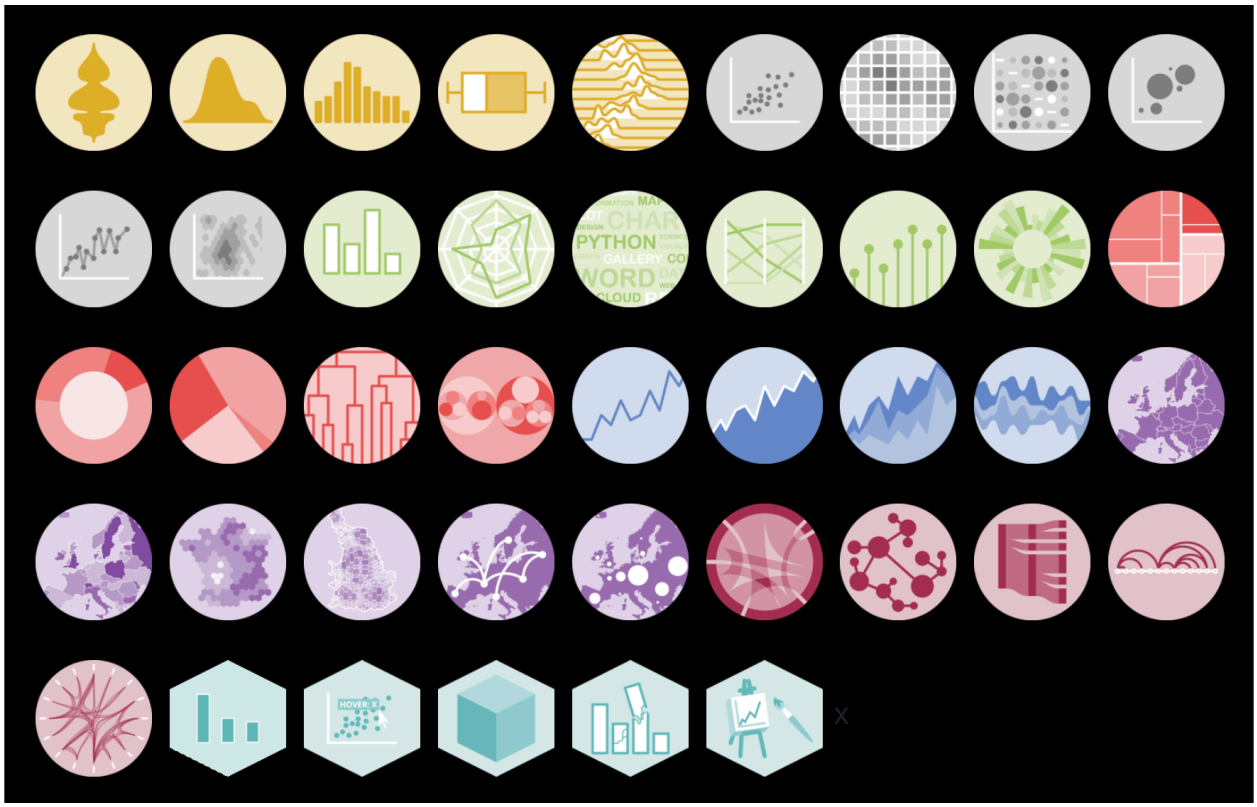


This is how the gallery looks like.

· Step 2: Find the Type of Chart You Need in the Gallery

Click "CHART TYPES".

Then you need to choose the type you want from dozens of different chart types provided by the gallery.

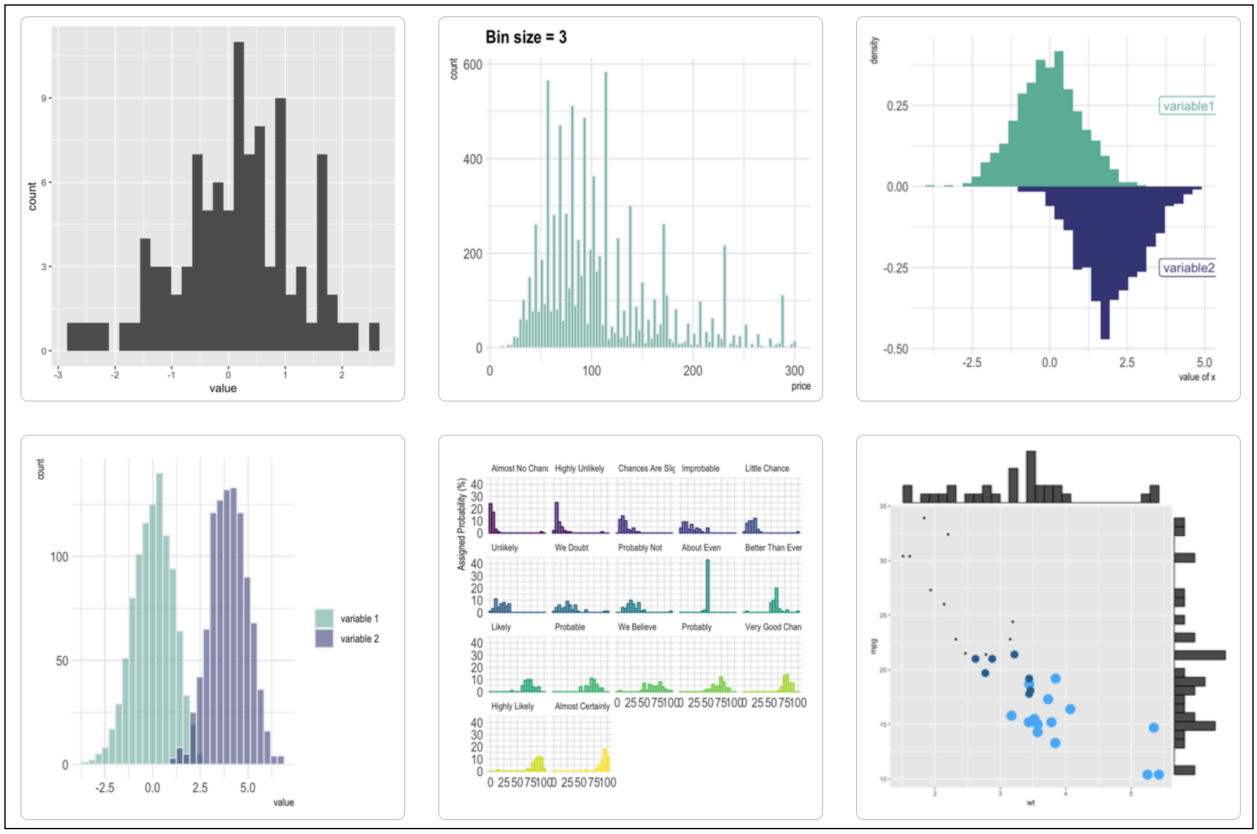


For example, we choose “Histogram”.
Then, you can see the introduction of the type of chart (Histogram) in the gallery.

Histogram

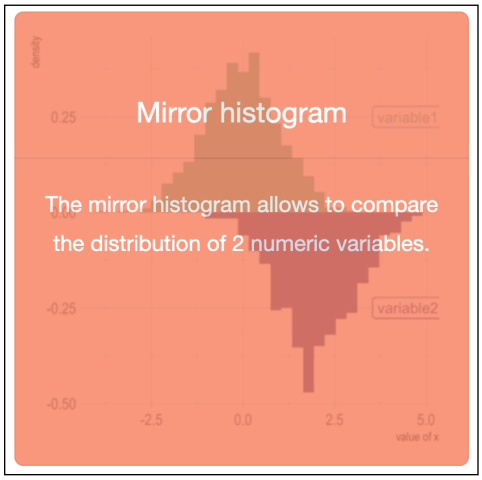
Welcome to the histogram section of the R graph gallery. A histogram is used to study the distribution of one or several variables, as explained in data-to-viz.com. If you're looking for a simple way to implement it in R, pick an example below. This page focuses on ggplot2 but base R examples are also provided. This online course can be a great addition to know more about ggplot2.

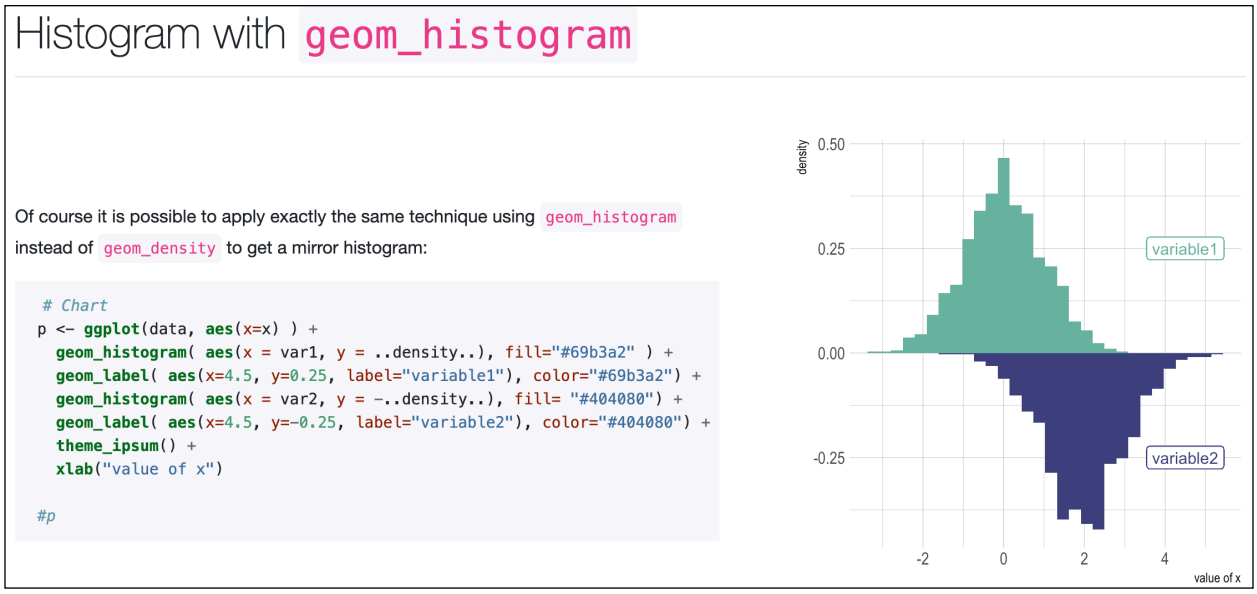
The histogram can be built via the packages ggplot2 and tidyverse, or it can be built just by base R. Codes for both way to build histograms are provided by the gallery.



Here are some kinds of histograms you can find in the gallery. To make your own histograms, you should just pick one you like and the codes will be there for you.

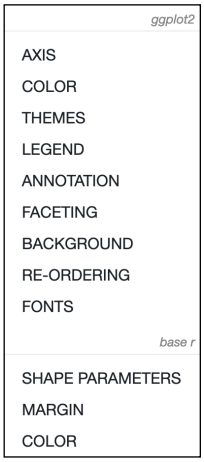
For example, we choose “Mirror Histogram”:





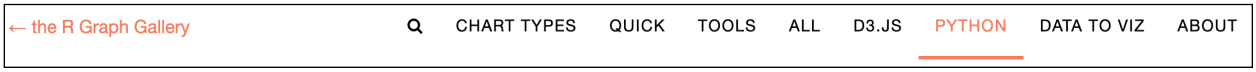
Then, you will find the codes for the Mirror histogram in the gallery. You just need to change the name of dataset, and the names of variables in order to build your own mirror histograms.

· Other Functions of the Gallery



In order to make the charts fancier, you can try “QUICK”.

You can find codes here to change the color and themes of the charts, add the titles and subtitles to the charts and so on.



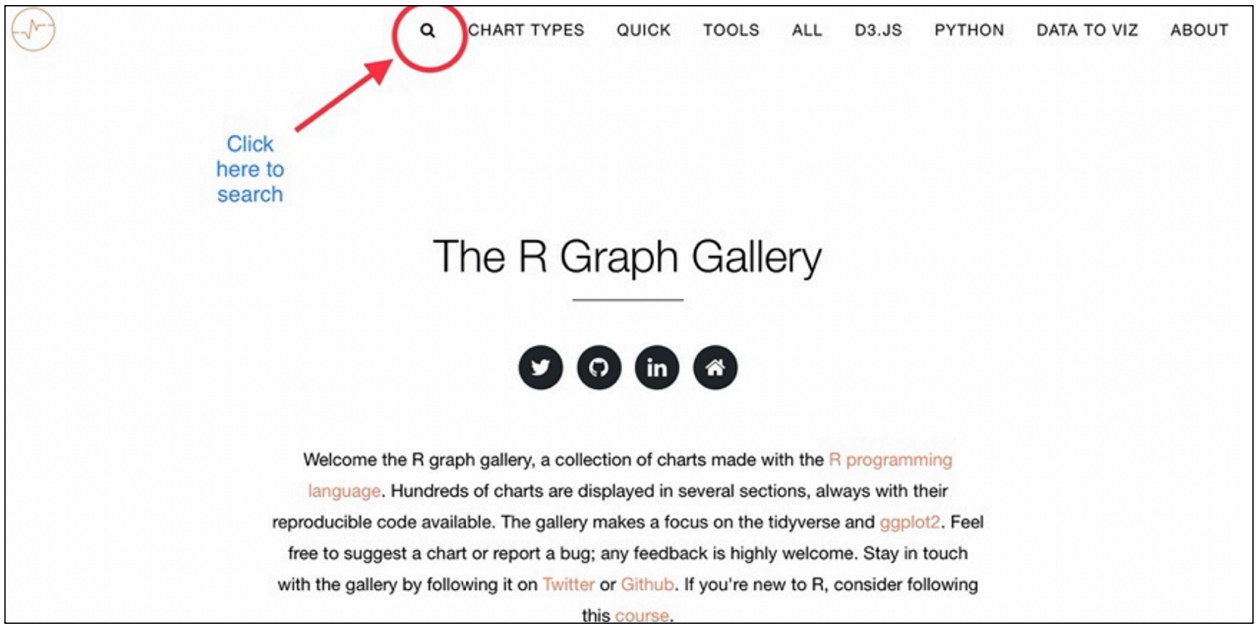
The gallery also provides PYTHON codes.

· A Specific Example of Specific Uses of the R Graph Gallery

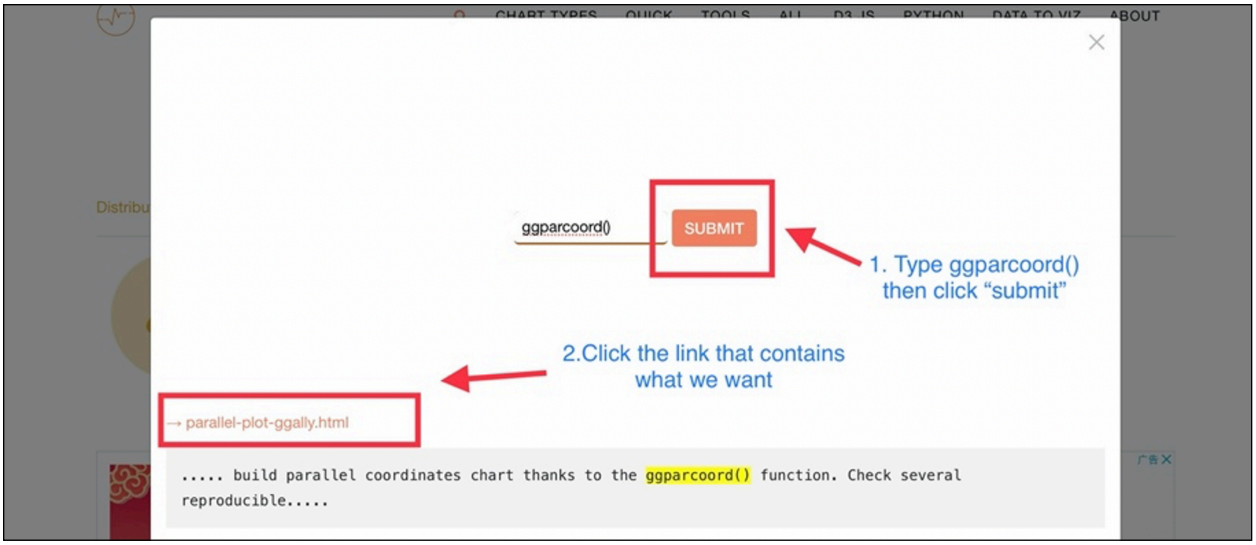
In problem set 3, we have one question is:

> Create a static parallel coordinates plot using `GGally::ggparcoord()` showing state death rate patterns for these eight codes for all fifty states. Your graph should have one line for each state and the codes should be the axes of the graph. Include a conversation chart below displaying the `Cause of death` for each of the eight `Cause of death Code` values since they're too long to fit in the plot. Apply alpha blending, splines, and rescaling to create the clearest version of the plot that you can. Discuss outliers, clusters, and correlations in detail.

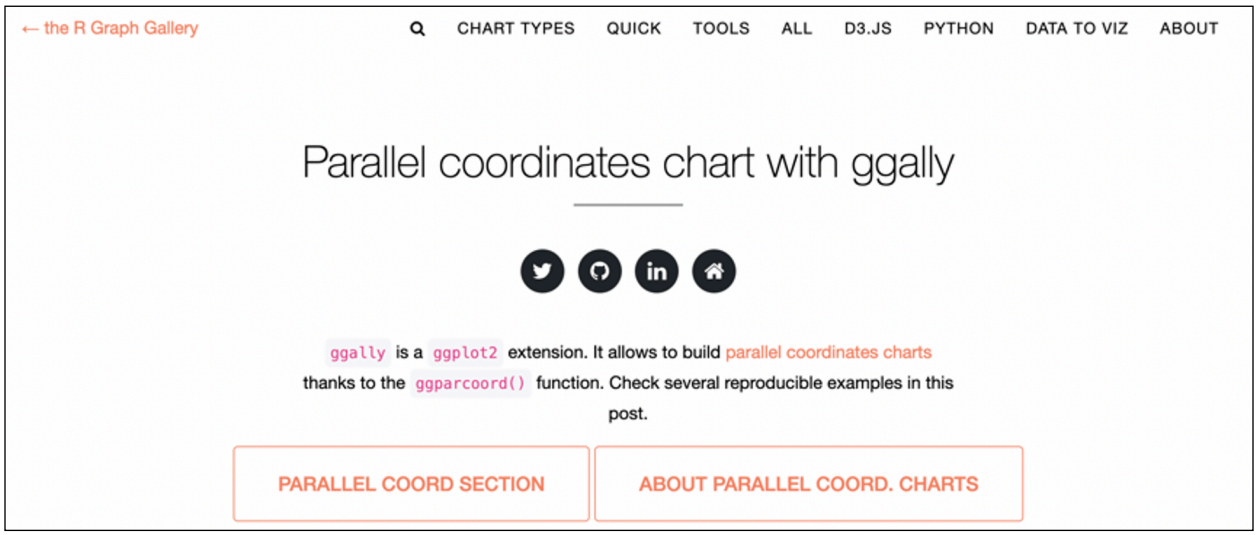
This question tells us that we need to use the code ***ggparcoord( )*** to showing state death rate patterns for these eight codes for all fifty states. Then we can search for ***ggparcoord( )*** in R Graph Gallery website:



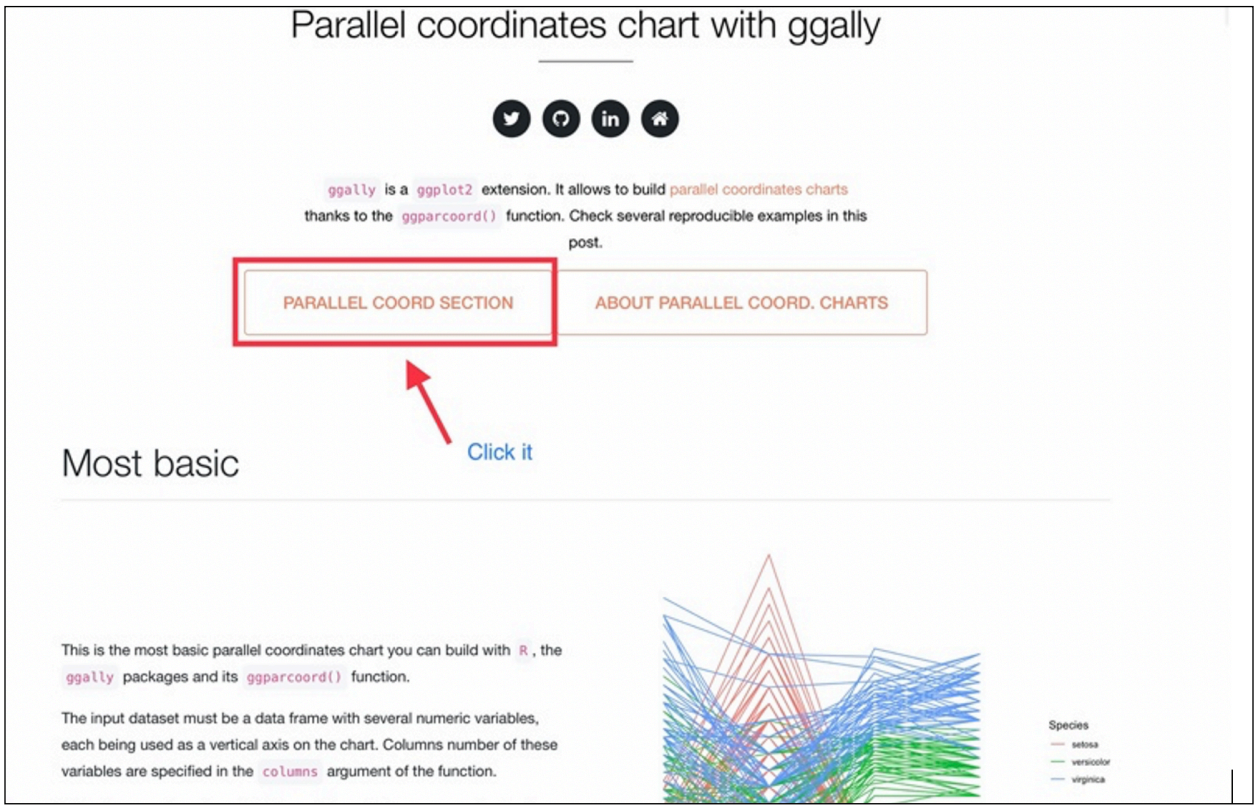
When we find the link containing the desired keyword, click on it.



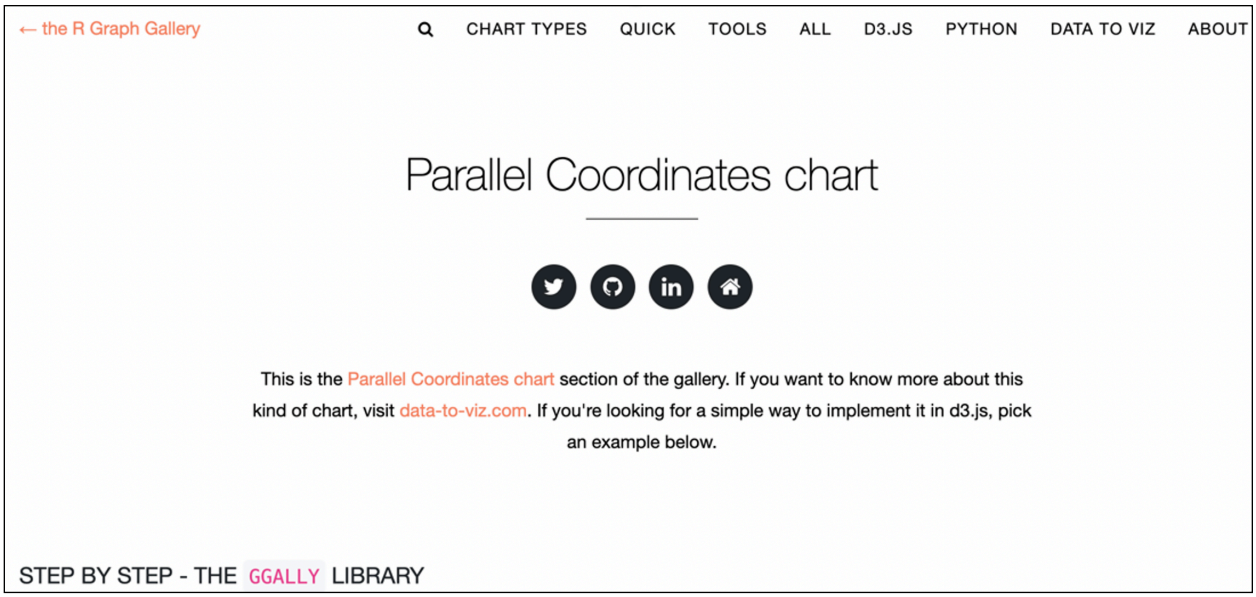
Then we will get this page:

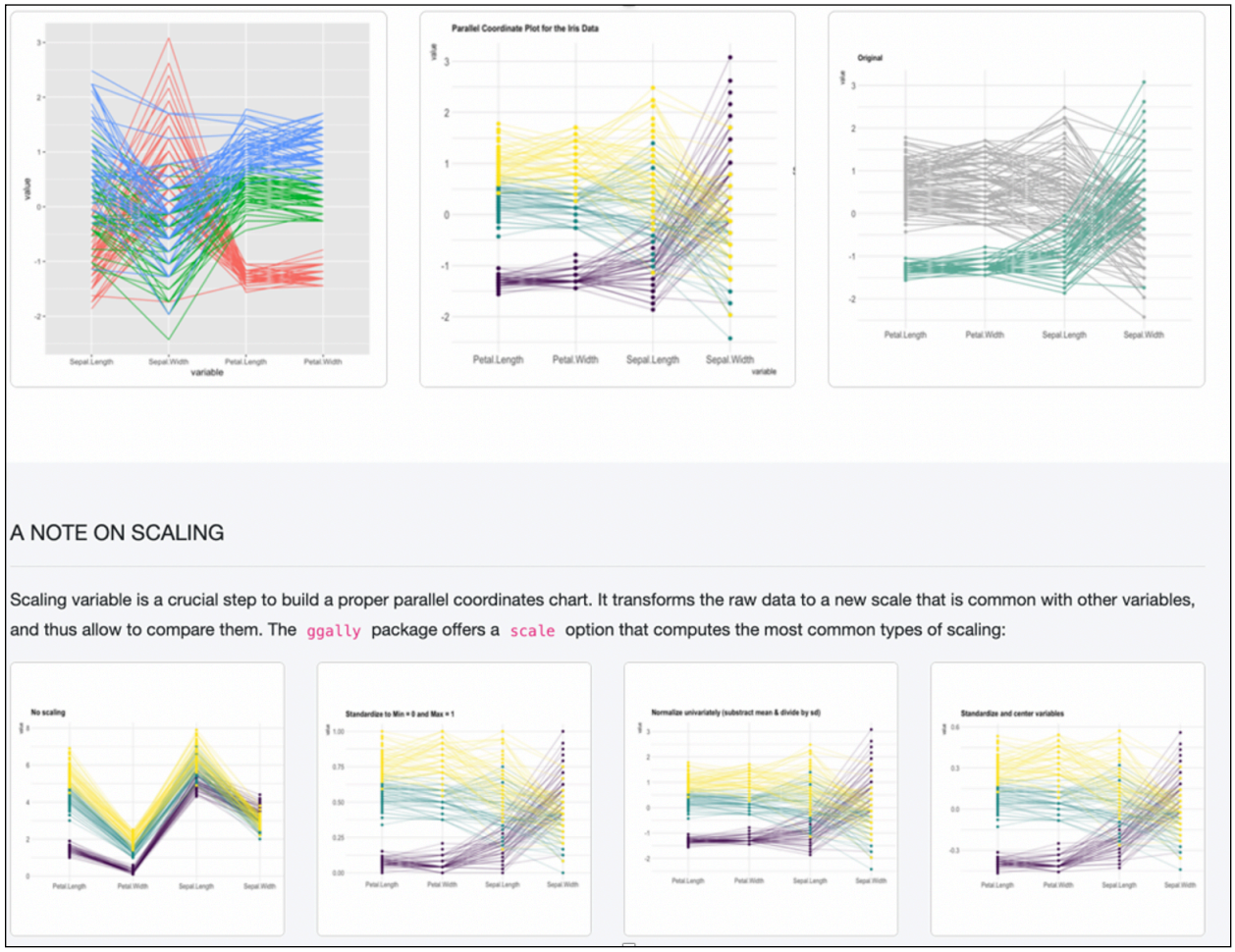


If we click on the option on the left:

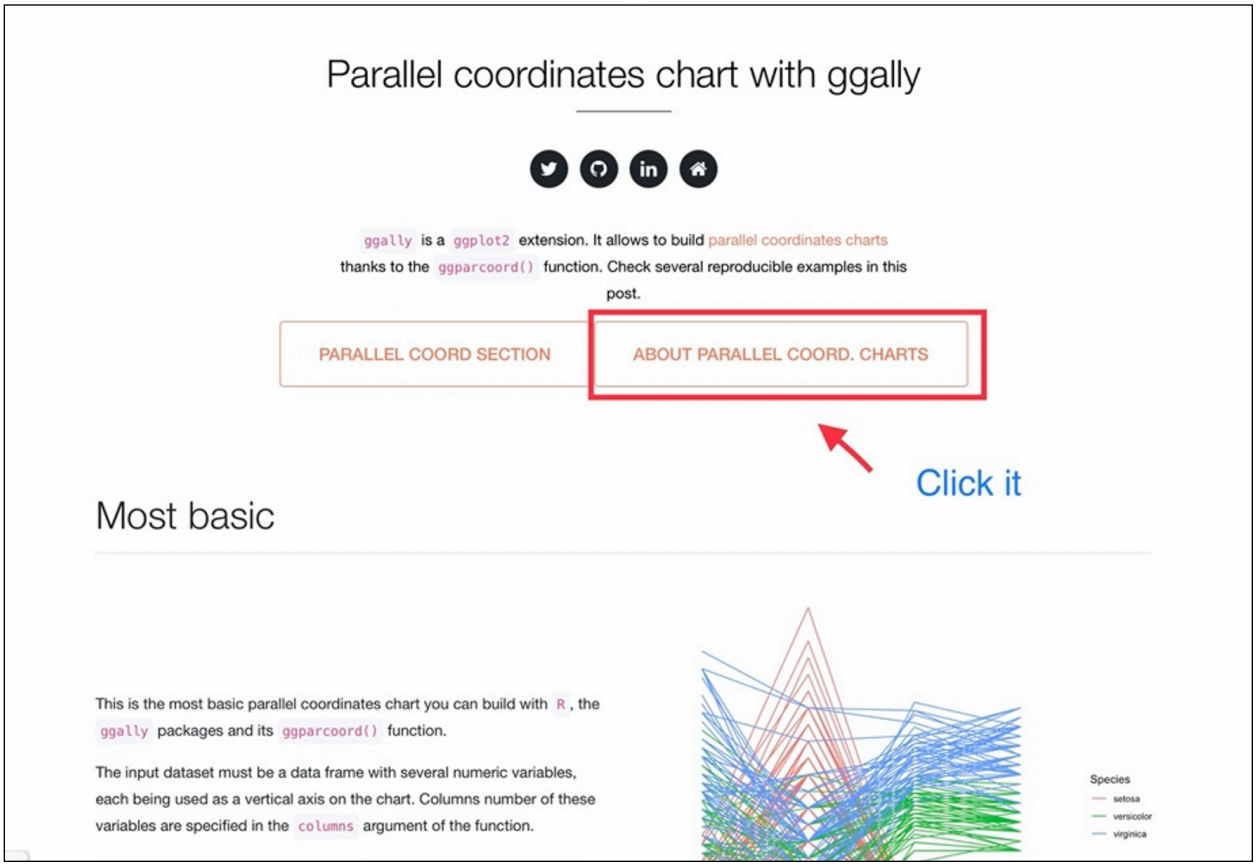


Then we can see many different styles of parallel coordinates charts.





If we click on the option on the right:

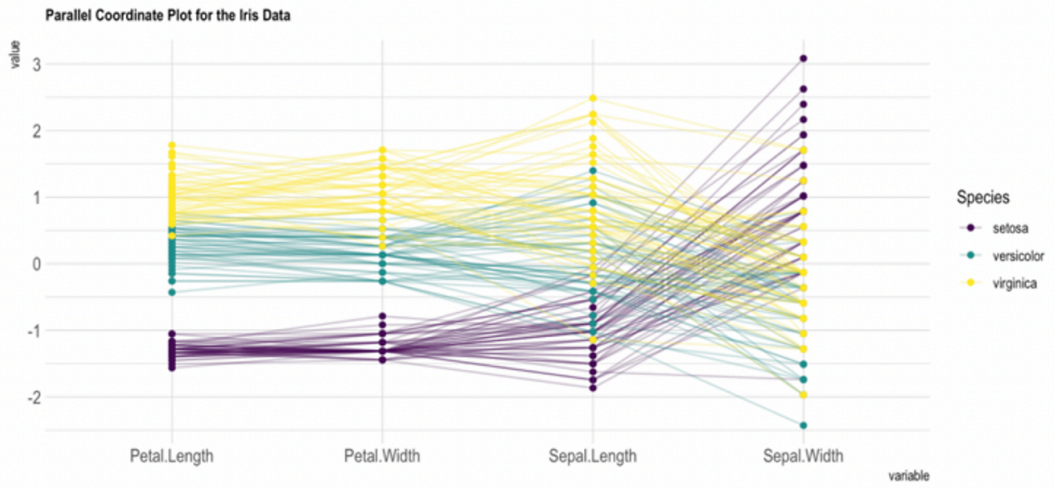


Then we will get a detailed description of parallel coordinates charts including definitions, roles, variation, common mistakes, related and how to build on ourselves by R or Python.

Definition

`Parallel plot` or parallel coordinates plot allows to compare the feature of several individual observations (`series`) on a set of numeric variables. Each vertical bar represents a variable and often has its own scale. (The units can even be different). Values are then plotted as series of lines connected across each axis.

The `iris` dataset provides four features (each represented with a vertical line) for 150 flower samples (each represented with a color line). Samples are grouped in three species. The chart below highlights efficiently that setosa has smaller Petals, but its sepal tends to be wider.



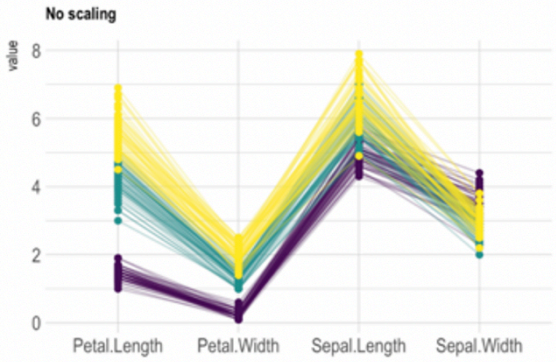
Note: Parallel plot is the equivalent of a spider chart, but with cartesian coordinates. Thus, it is often prefered.

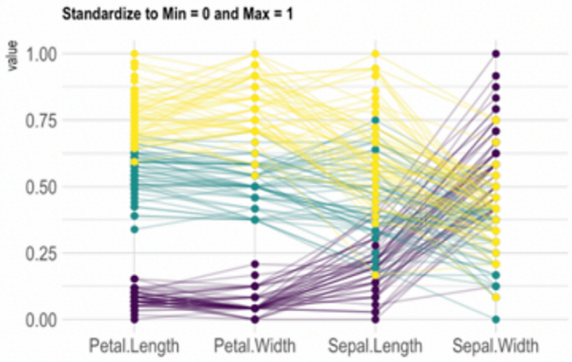
Variation

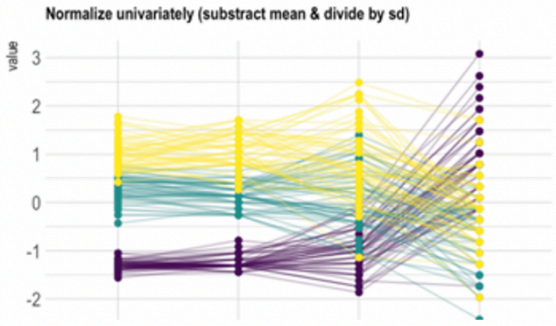
Here is an overview of the parallel coordinates features you can play with:

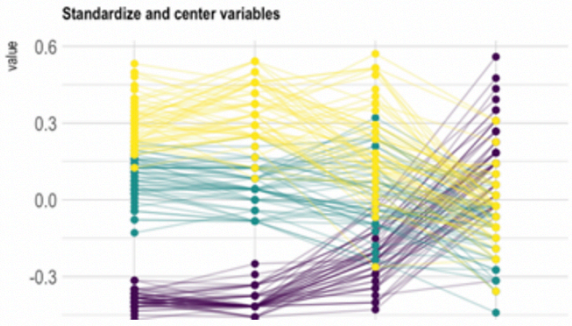
- *Scaling* - scaling transforms the raw data to a new scale that is common with other variables. It is a crucial step to compare variables that do not have the same unit, but can also help otherwise as shown in the example below:

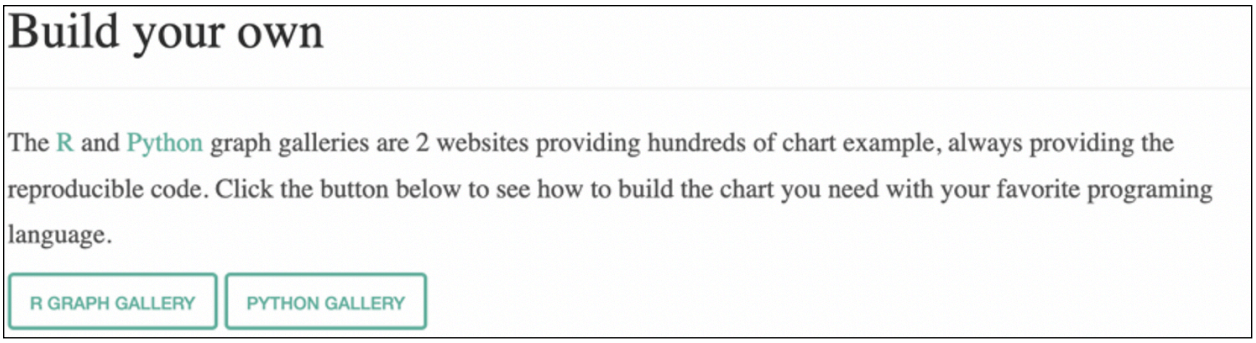
CODE





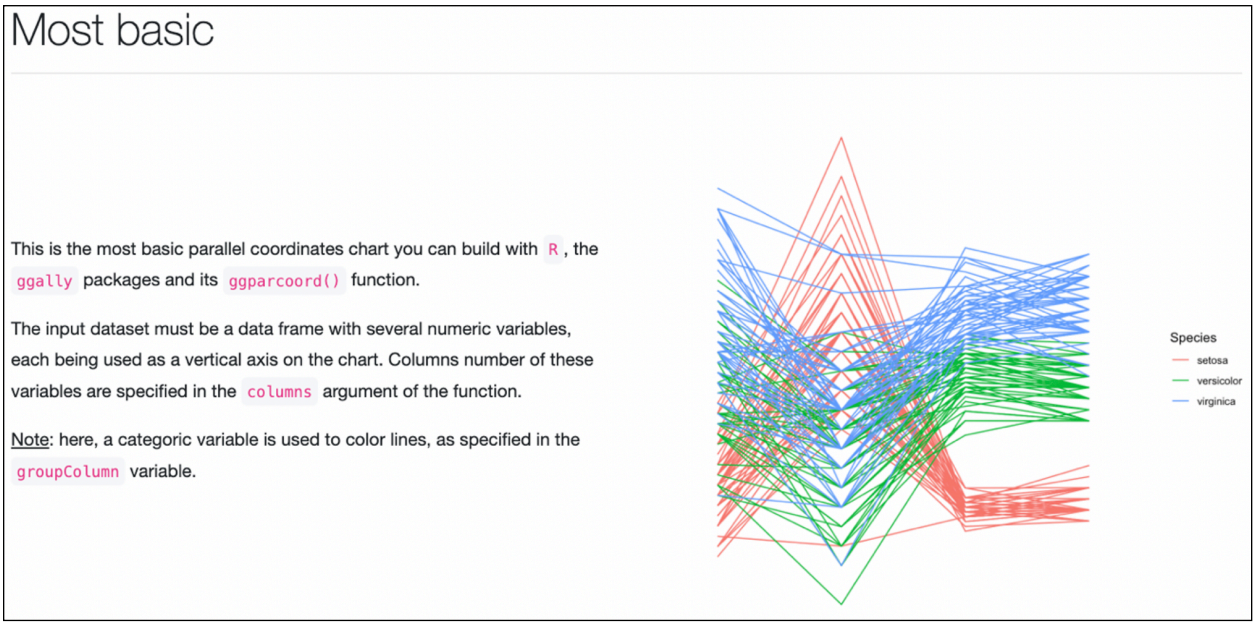






Go back to the site we originally searched out and keep scrolling down and we'll get the code for exactly how to draw parallel coordinates charts in R.

Firstly, we need to use *ggally* library and *ggparcoord*( ) function. We can also use groupColumn variable to categorize variable and color line.




```
# Libraries
library(GGally)

# Data set is provided by R natively
data <- iris

# Plot
ggparcoord(data,
    columns = 1:4, groupColumn = 5
    )
```

Then we can also know how to Custom color, theme, general appearance:

Custom color, theme, general appearance

This is pretty much the same chart as te previous one, except for the following customizations:

- color palette is improved thanks to the `viridis` package
- title is added with `title`, and customized in `theme`
- dots are added with `showPoints`
- a bit of transparency is applied to lines with `alphaLines`
- `theme_ipsum()` is used for the general appearance


```
 # Libraries
library(hrbrthemes)
library(GGally)
library(viridis)

# Data set is provided by R natively
data <- iris

# Plot
ggparcoord(data,
    columns = 1:4, groupColumn = 5, order = "anyClass",
    showPoints = TRUE,
    title = "Parallel Coordinate Plot for the Iris Data",
    alphaLines = 0.3
    ) +
  scale_color_viridis(discrete=TRUE) +
  theme_ipsum()+
  theme(
    plot.title = element_text(size=10)
  )
```

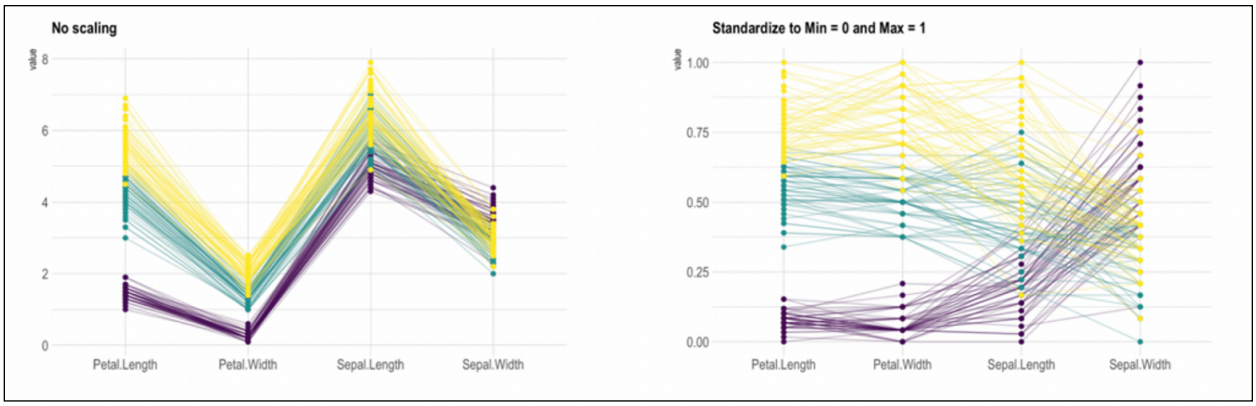
How to scaling:

Scaling

Scaling transforms the raw data to a new scale that is common with other variables. It is a crucial step to compare variables that do not have the same unit, but can also help otherwise as shown in the example below.

The `ggally` package offers a `scale` argument. Four possible options are applied on the same dataset below:

- `globalminmax` → No scaling
- `uniminmax` → Standardize to Min = 0 and Max = 1
- `std` → Normalize univariately (substract mean & divide by sd)
- `center` → Standardize and center variables




```r
ggparcoord(data,
    columns = 1:4, groupColumn = 5, order = "anyClass",
    scale="globalminmax",
    showPoints = TRUE,
    title = "No scaling",
    alphaLines = 0.3
    ) +
  scale_color_viridis(discrete=TRUE) +
  theme_ipsum()+
  theme(
    legend.position="none",
    plot.title = element_text(size=13)
  ) +
  xlab("")

ggparcoord(data,
    columns = 1:4, groupColumn = 5, order = "anyClass",
    scale="uniminmax",
    showPoints = TRUE,
    title = "Standardize to Min = 0 and Max = 1",
    alphaLines = 0.3
    ) +
  scale_color_viridis(discrete=TRUE) +
  theme_ipsum()+
  theme(
    legend.position="none",
    plot.title = element_text(size=13)
  ) +
  xlab("")
```

Based on these codes provided on the website, we can modify them according to the requirements of the topic and get parallel coordinates chart we need.

```r
q1c <- q1b_temp[q1b_temp$State != "District of Columbia",] %>%
  select(c(1,3,4)) %>%
  spread(.,key = Cause.of.death.Code,value =death_rate)

ggparcoord(data = q1c,columns = 2:9,alphaLines = 0.6,showPoints = F, scale = "globalminmax",boxplot = F)+
  theme(panel.grid.minor = element_blank())+
  theme(panel.grid.major.y = element_blank()) +
  xlab(NULL)
```