

### 1. Baseline

Mapdesc

### 2. Static

Mapdesc



Compdesc  
Corrdesc  
Sortdesc  
Reordesc  
Brushdesc

### 3. Video

Mapdesc



Compdesc  
Corrdesc  
Sortdesc  
Reordesc  
Brushdesc

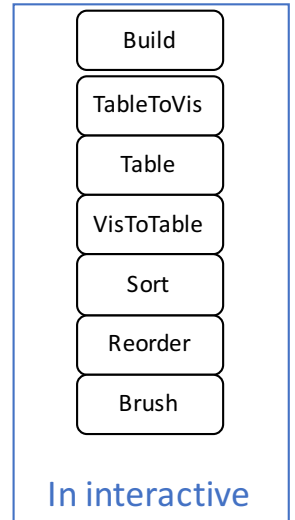
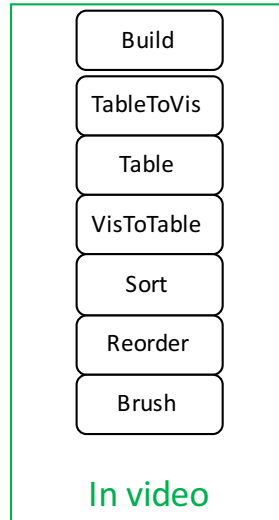
### 4. Interactive

Mapdesc



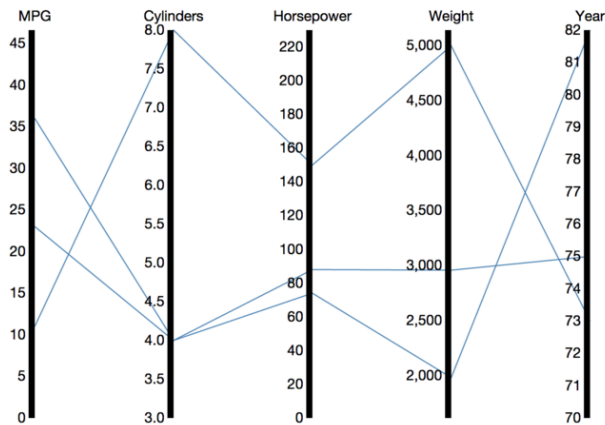
Compdesc  
Corrdesc  
Sortdesc  
Reordesc  
Brushdesc

In text + figure



## Construction of Parallel Coordinates

name	MPG	Cylinders	Horsepower	Weight	Year
Chevrolet Impala	11	8	150	4997	73
Volkswagen Rabbit L	36	4	74	1980	82
Peugeot 504	23	4	88	2957	75

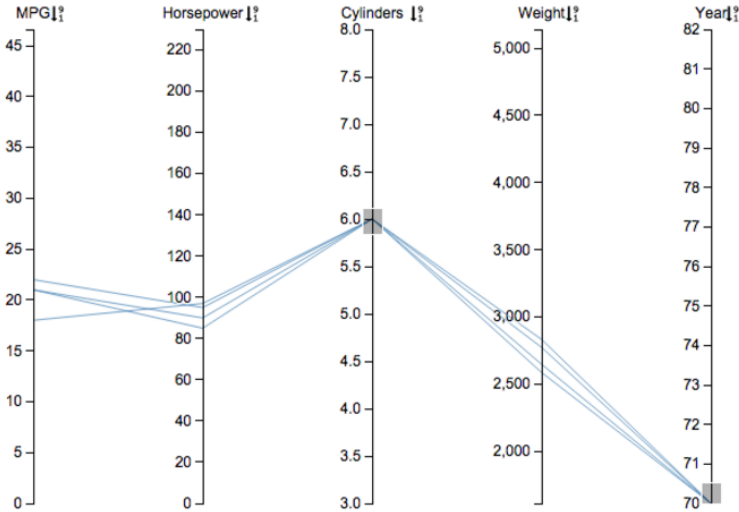


The usual way of describing parallel coordinates would be to talk about high-dimensional spaces and how the technique lays out coordinate axes in parallel rather than orthogonal to each other. But there's a much simpler way of looking at it: as the representation of a data table. The table above describes car models released from 1970 to 1982, and contains their mileage (MPG), number of cylinders, horsepower, weight, and year they were introduced (among others).

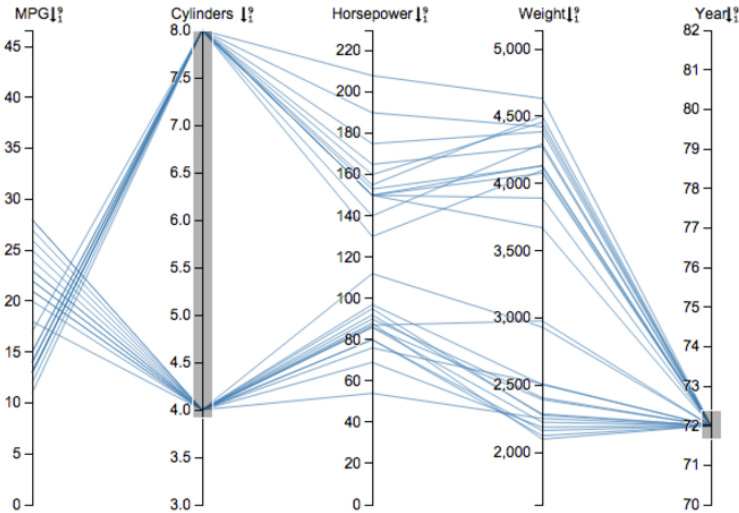
Now imagine each of these columns being mapped onto a vertical axis in the image above. Each data value would end up somewhere along the line, scaled to lie between the minimum at the bottom and the maximum at the top. A pure collection of points would not be terribly useful, however, so the points belonging to the same record (row) are connected with lines. That creates the characteristic jumble of lines parallel coordinates are famous for.

## Compare between items in Parallel Coordinates

In parallel coordinates, you can compare multiple items. By looking at how closely lines are placed over axes, you can determine whether they are similar or different.

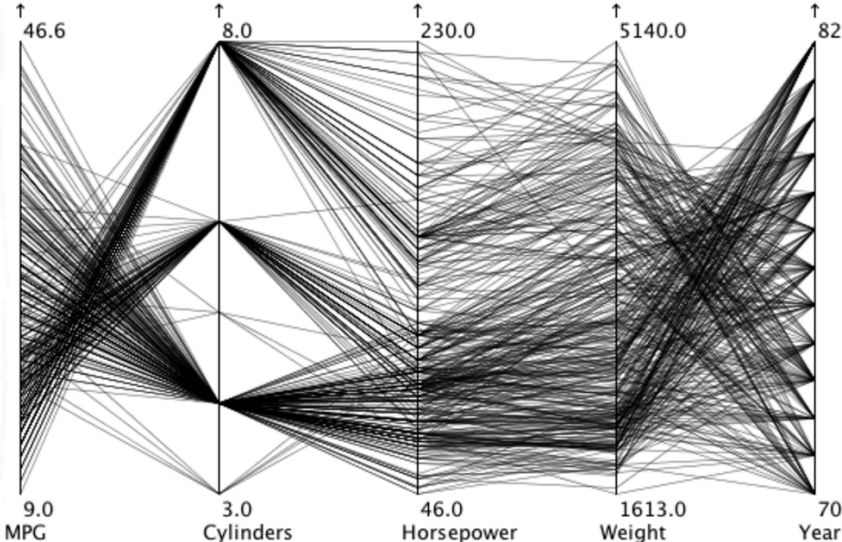


This picture above shows that the four filtered lines are very closely proportioned. We can say the four lines are very similar.



This picture above shows multiple lines. Here's how we can describe these lines: they are on a same year, and they are distributed between 10 and 30 MPGs. In particular, they are clearly divided into two distinct groups with respect to the three attributes, namely Cylinders, Horsepower, and Weight. We can say that we can group these lines differ from each other with respect to cylinders, horsepower, or weight.

## Reading Correlation in Parallel Coordinates



Correlation refers to the relationship between one column and another. For example, you can see the relationship between Year and Weight. The picture shows that many lines are crossing (not parallel). This indicates that as weight is heavier, year is older. In other words, as year gets newer, the lighter the car becomes.

# Sortdesc

## Sorting in Parallel Coordinates

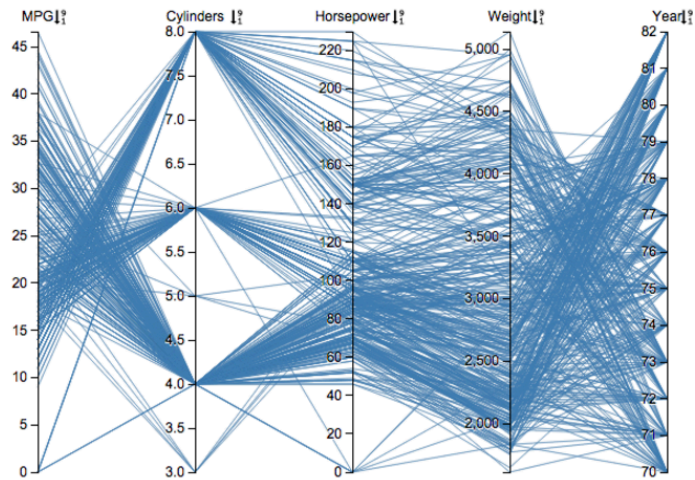


Figure 1. The axis 'Cylinders' is sorted in descending order.

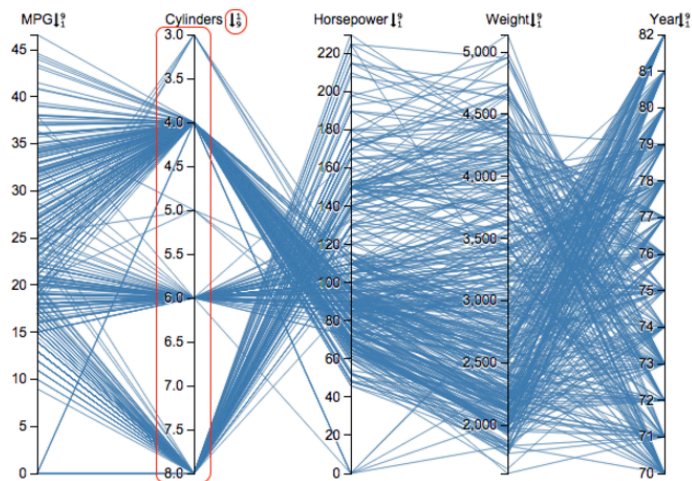


Figure 2. The axis 'Cylinders' is sorted in ascending order.

Parallel Coordinates has an axis of values in an ascending or descending order. When you want to sort data in a different order, you can use 'sorting'. 'Sorting' works like as following. By default, the axes are sorted in descending order. You click on a small icon near each axis label (an arrow-shaped icon next to the label 'Cylinders' in Figure 2). This arrow icon is a toggle button. As soon as you click on this small icon, values in the attribute are sorted in an ascending order. The two figures above show that values are sorted in a descending order (Figure 1) and in an ascending order (Figure 2).

## Reordering axes in Parallel Coordinates

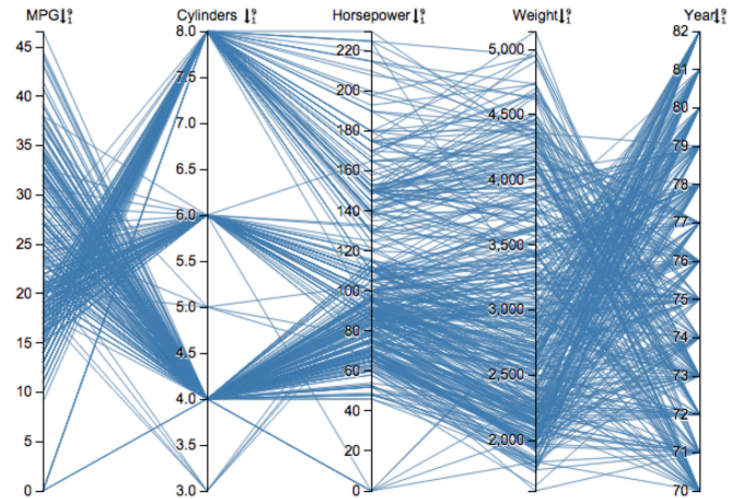


Figure 1. The axis 'Cylinders' can be grabbed and relocated to other positions.

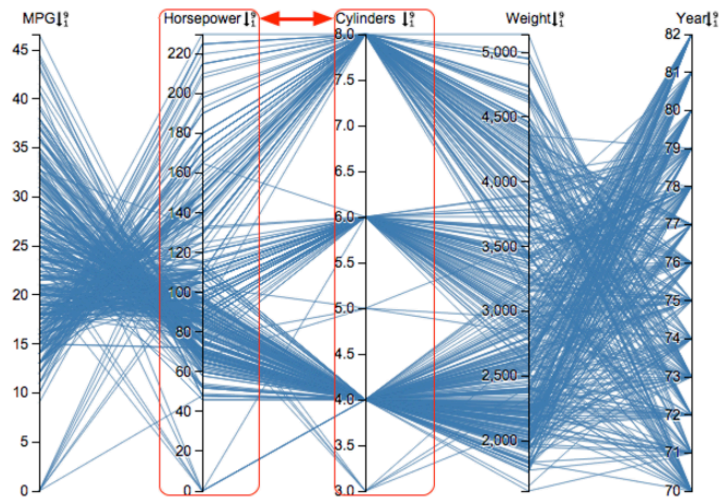


Figure 2. The axis 'Cylinders' shifted to the third axis.

Parallel Coordinates have axes in a certain order. To check out correlation between two attributes, it is better to place the two axes close together. You can do this by reordering axes using a drag and drop interaction: grab an axis by clicking and holding on an axis label, drag the axis label to desired location by moving the axis, and releases the mouse; the axis will be relocated to the position where the mouse is released. For example, as shown in Figures 1 and 2, the Cylinders axis is moved from the second axis to the third axis by this action.

## Brushing in Parallel Coordinates

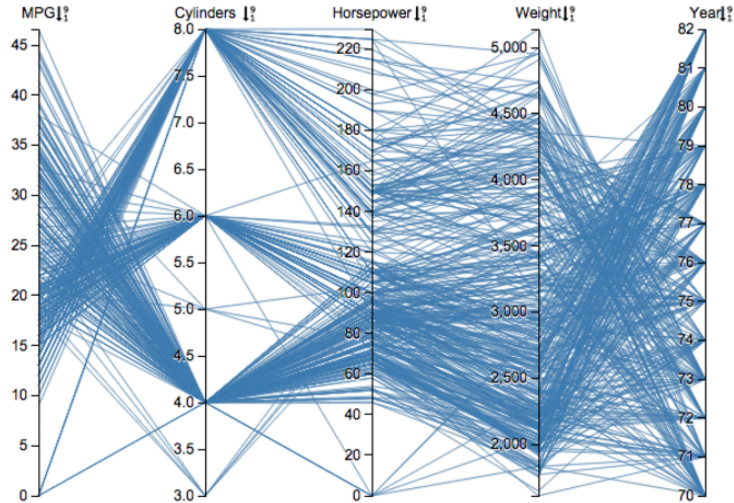


Figure 1. All lines are shown without filtering.

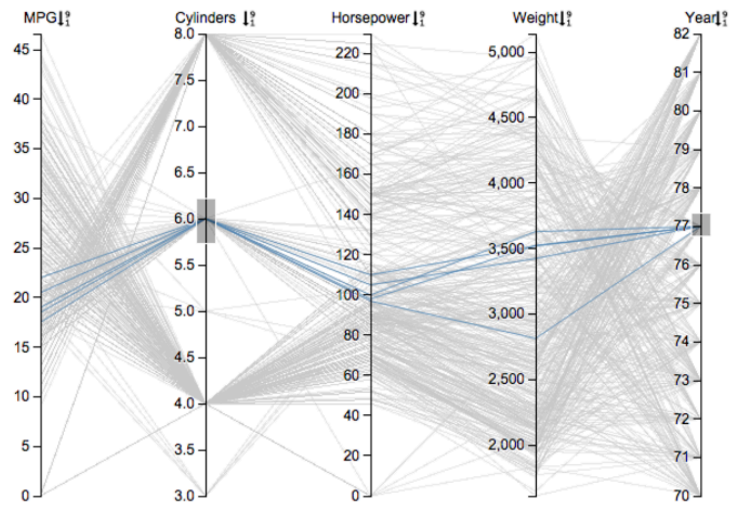


Figure 2. Two boxes are drawn on Cylinders and Year, respectively. Those which cross the box are highlighted.

Parallel Coordinates can include so many lines. If you want to filter data with some conditions, you can use 'brushing'. 'Brushing' works like as following. You specify a specific range of values for one attribute by creating a box on an axis. You create a box by click-and-dragging, as you do to grab an icon on your desktop. Then, those lines which cross the box will only be highlighted. The two figures above show the before and after image of 'brushed' parallel coordinates. In Figure 2, you can see only five lines are highlighted in blue because they cross the two boxes in the Cylinders axis and in the Year axis, respectively.