CSE 564 Visualization and Visual Analytics - Lab1 Report

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Demo

This code is live on
https://blockbuilder.org/BryanBo-Cao/1e2f511ee3bbdae742777dc73cf7a441
PLEASE switch to side-by-side mode to see the whole functionality of this code instead of using fullscreen.
Video: https://youtu.be/0LYa9eJWVIg or
https://drive.google.com/file/d/17B9CF45wkOdwSOqX8n0_8E35caYpdrEN/view?usp=sharing

File Structure

All files include **index.html, College.csv, compute_min_spanning_tree.py, minimum_spanning_tree_mtx.json** where **1) index.html** is the main file to run and all the d3 code is in this file; **2) College.csv** is the dataset downloaded from the college dataset from https://vincentarelbundock.github.io/Rdatasets/datasets.html, the original dataset has College 777 data points, 18 dimensions; **3) compute_min_spanning_tree.py** is the python code to compute the minimum spanning tree for the first 70 data points and save the data as **4) minimum_spanning_tree_mtx.json**, then index.html visualize it in force-directed layout graph. Note that in the force-directed layout graph, the distances between two nodes are the euclidean distance using all the attribute.

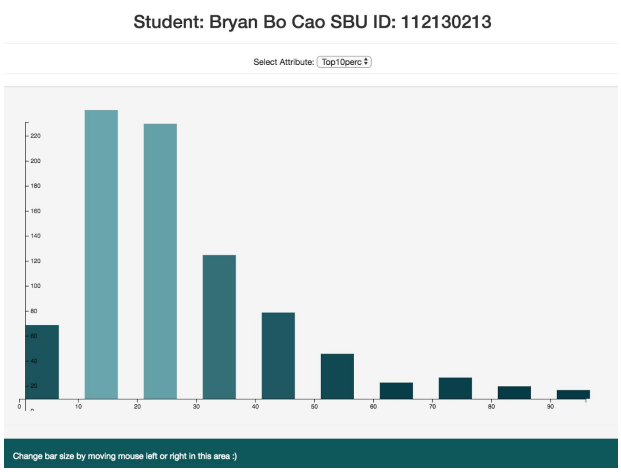
Code

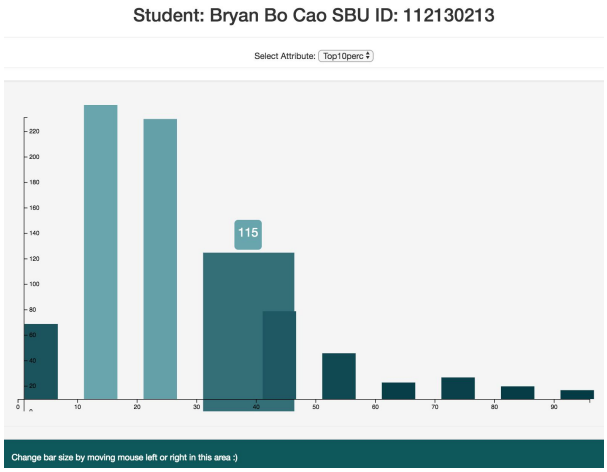
Bootstrap is used as the base of css. The code first creates a canvas, then it creates barchart_svg, piechart_svg and force_svg to display each kind of chart separately.

Barchart_svg is initialized by init_barchart(display_data_values), it computes both x and y scale and calculates bar width and height. And then transform it by

bar_h = function(d) { return svg_h - y_scale(d.length)},
bar_c = function(d) { return color_scale(d.length)}, // bar color
bar_t = function(d) { return "translate(" + x_scale(d.x0) + "," + y_scale(d.length) + ")";}; // bar transform

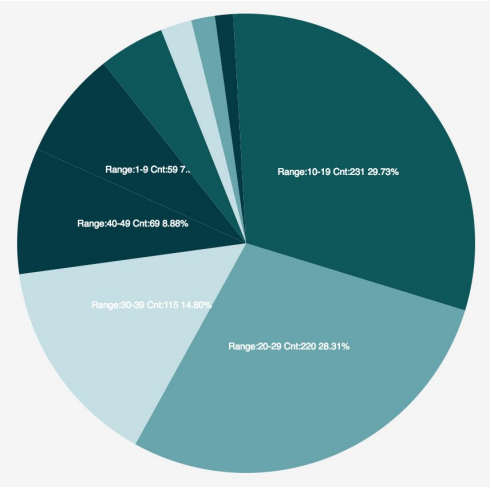
Each rectangle is appended to barchart with two events listener -- mouseover and mouseout. Mouseover is used to enlarge the corresponding rectangle and show the content on top of the bar while mouseover is used to define the action to make the rectangle smaller.





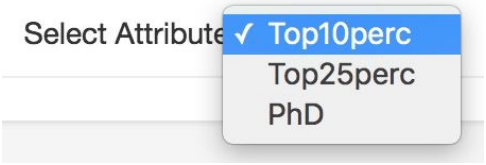
Similarly, for piechart, scaled data is stored in display_data4piechart, and bound by

```
var group = piechart_svg.append("g")
                .attr("transform", "translate(550, 300)");
var pie = d3.pie().value(function(d) { return d; });
var arc = d3.arc().innerRadius(0).outerRadius(radius);
var arc_group = group.selectAll(".arc")
                     .data(pie(display_data4piechart))
                     .enter()
                     .append("g")
                     .attr("class", "arc");
```



Whenever a mouseclick event is happened, the next type of chart will be displayed while the other two will be hidden, which is done by the function change_chart().

To select another variable, you can simply click on the dropdown menu and select one of other variables. The dropdown menu is shown below



When a different variable is selected, it will call the functions of update_barchart(), update_piechart(). Note that the minimum spanning tree is computed based on all attributes that I use, therefore changing attribute will not change the force directed layout in my code.

To decrease or increase the size of bar, a user needs to move the mouse over the area, shown below

Then it will listen to onmousemove event by

```
d3.select("#change_bar_size_div")
        .on('onmousemove', check_lr_movement);
```

In the function check_lr_movement(), this effect is done by comparing the mouse position between the current and the previous one, then change the bar width based on the previous size by

```
if (pre_mouse_x_pos < event.clientX) {
            // move right to make bars thicker
            curr_bar_w++;
} else {
            // move left to make bars thinner
            curr_bar_w--;
}
```

Dataset is loaded by d3.csv("College.csv", function(data) and minimum spanning tree matrix is loaded by d3.json("minimum_spanning_tree_mtx.json").

Note that D3 Version 4 is used for visualization, Python 3.7 is used to run compute_min_spanning_tree.py.