

**Assignment 2**

on

**CSCI 6610 Visual Analytics**

Submitted by

**Christian Gang Liu (B000415613/gn417126@dal.ca)**

.....

In partial fulfillment of the requirements for the Course CSCI 6610 Human  
Computer Interaction

**Computer Science**

**2019-10-03**

**DEPARTMENT OF Computer Science**

**Present to Teaching Assistant : Mateus Pereira; Leonardo  
Milhomem Franco Christino  
&  
Professor : Fernando Paulovich, PhD**

**DEPARTMENT OF Computer Science**

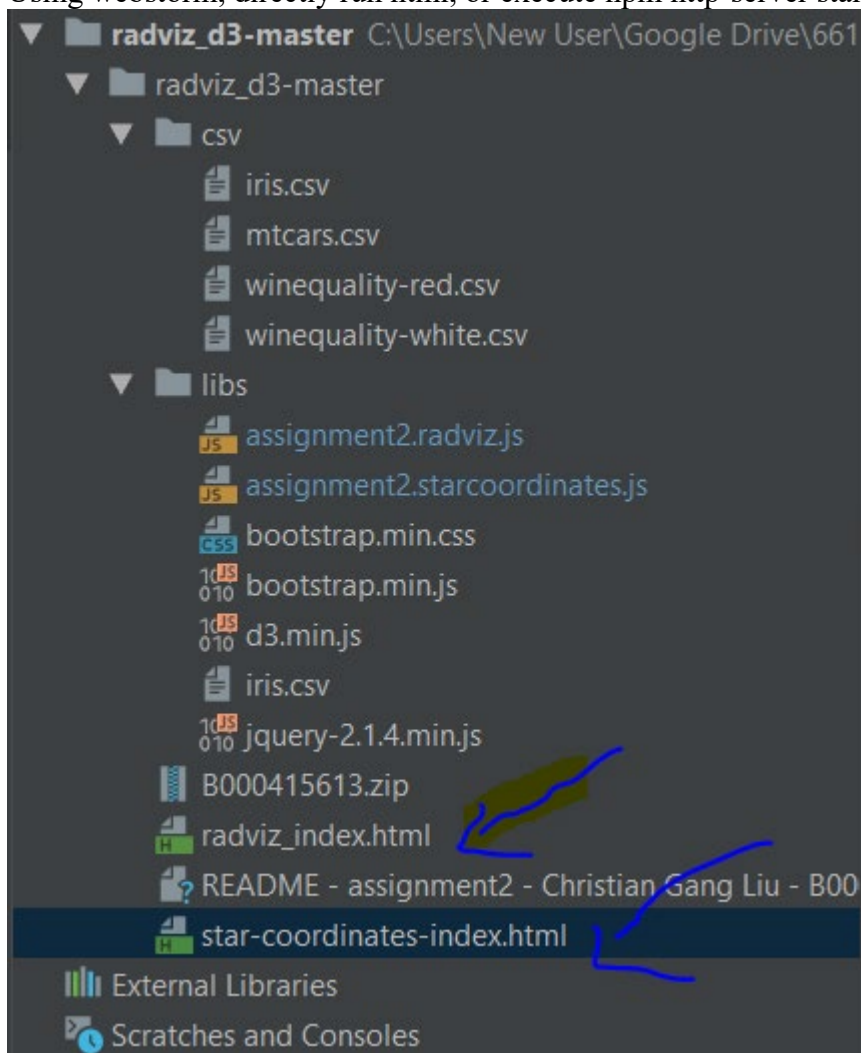
Implement a RadViz OR Star Coordinates visualization [1] using the D3 library. Your implementation should use HTML, CSS, and JS only! Do not use any other library besides D3 (<https://d3js.org/>).

Use one of the wine datasets provided in brightspace: winequality-red.csv or winequality-white.csv You can make these assumptions about the dataset:

- First row will contain the attribute names
- Last column is a class or regression (prediction) and can be numeric or nominal.
- All other columns are numeric.

How to execute program:

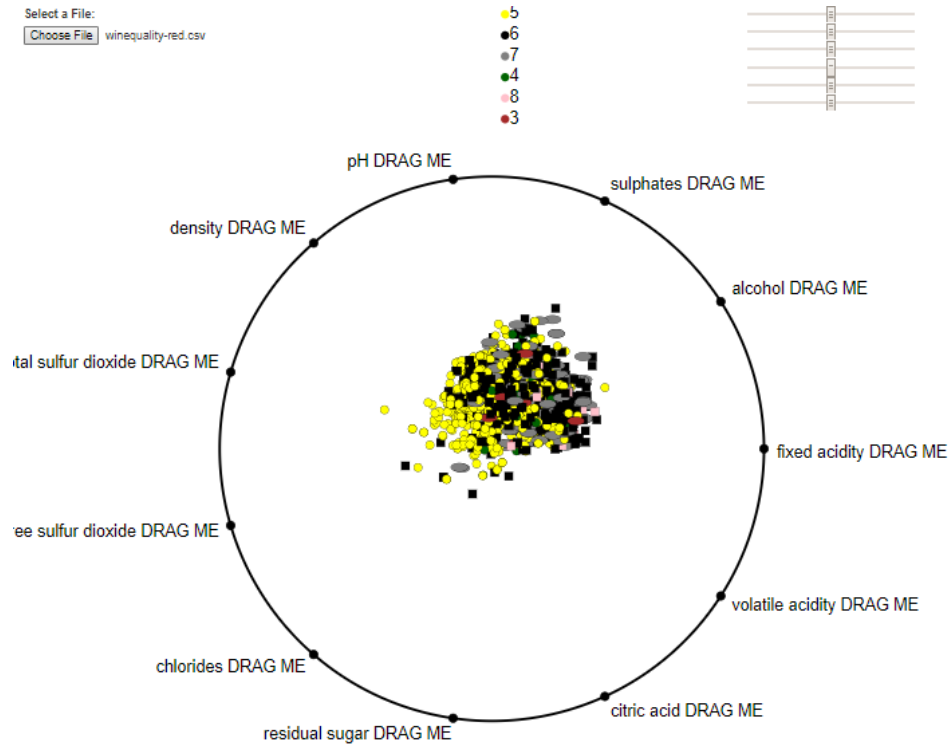
Using webstorm, directly run html, or execute `npm http-server` start for other IDE:



[100 Marks] Requirements:

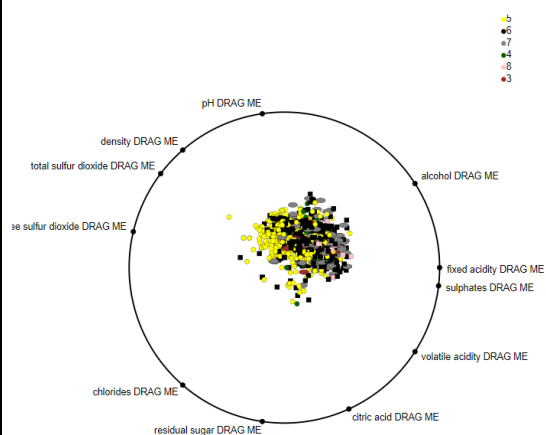
Code will be marked based on functionality, structure, reusability, best practices, and documentation.

1. [50 Marks] Static visualization, showing as anchors all data attributes. For the anchor name, use the attribute's name. The last column should be mapped to a color using a proper color scale. All other columns are numeric. The last column should not be used as an anchor!



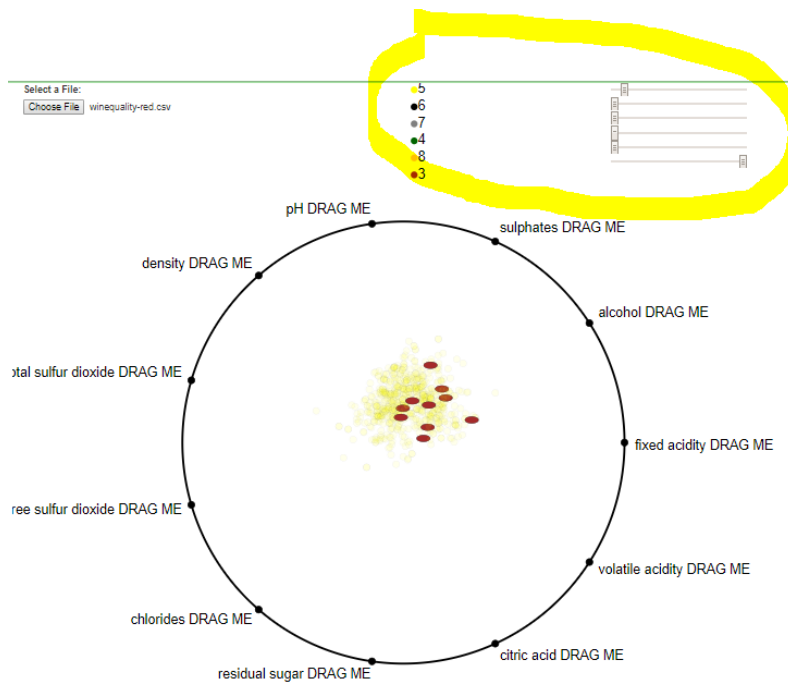
2. [20 Marks] Add interaction to your visualization.

- a. [10 Marks] Draggable anchors.



You can drag anchor to different angles.

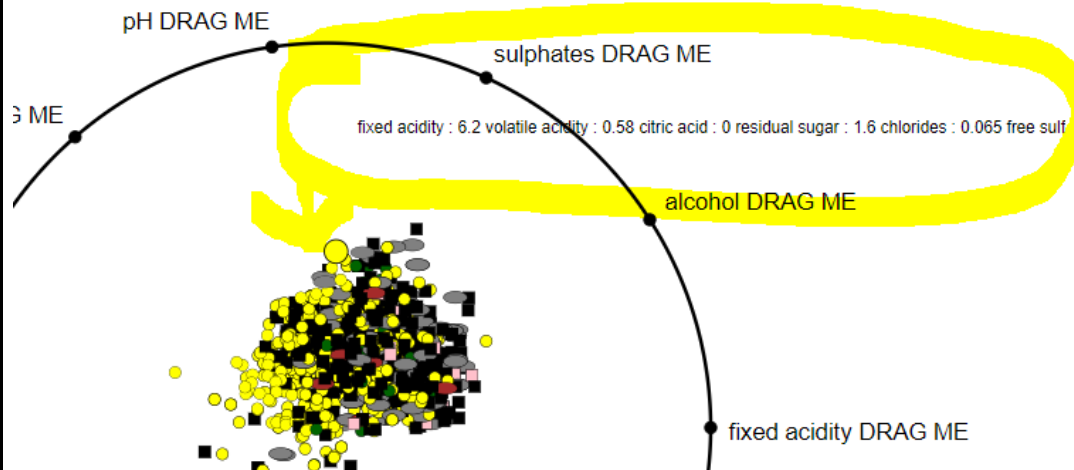
- b. [10 Marks] Slider for changing color opacity of all instances.  
You can change color for specific any feature.



2. [15 Marks] Smooth transition while dragging anchors (animation).  
I leveraged “transition” and “transform” to achieve the drag action smoothly.

```
.on('drag', function (d, index) {
  d3.select(this).raise().classed('active', true);
  let tempX = d3.event.x - radius;
  let tempY = d3.event.y - radius;
  let newAngle = Math.atan2(tempY, tempX);
  newAngle = newAngle < 0 ? 2 * Math.PI + newAngle : newAngle;
  d.theta = newAngle;
  d.x = radius + Math.cos(newAngle) * radius;
  d.y = radius + Math.sin(newAngle) * radius;
  d3.select(this).attr('cx', d.x).attr('cy', d.y);
  d3.select(this)
    .transition()
    .duration(250)
    .ease(d3.easeLinear)
    .attr('transform', function(d) {return "translate(" + d.x + "," + d.y + ")"});
  prepareFeatureNodes();
  //update data points
  featureAnchor[index] = newAngle;
  locateNode(dataAfter, featureNames, featureAnchor);
  prepareDataNodes();
})
```

4. [15 Marks] Add some more unique features. Ideas:  
a. Add more information to nodes (tooltip).  
When you hover one data node, this node will enlarged automatically , and the tooltips will show up to show the dimensions about that node.



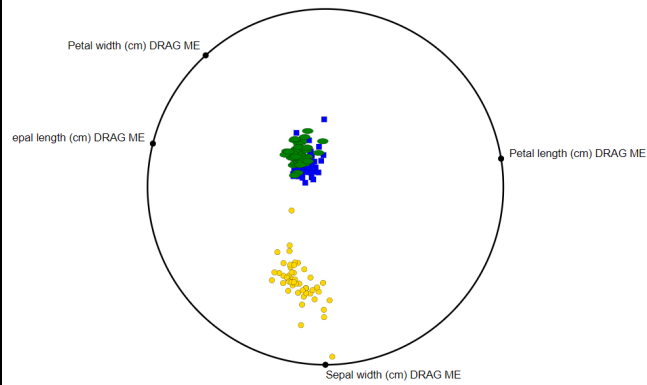
b. Select which anchors to show.

When you hover over the different 'quality' values text, it will increase the opacity value, and diminish others. For example on our screenshot, we only show quality 5 nodes.



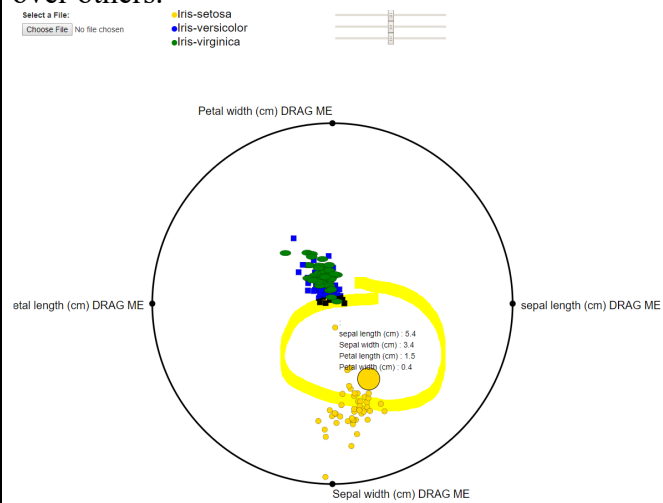
c. Automatically define anchors position to better represent data clusters.

As we can see, the code algorithm can optimize the best representation of clusters, which maximize the intra-variance between different nodes.



d. Some kind of data highlight/selection.

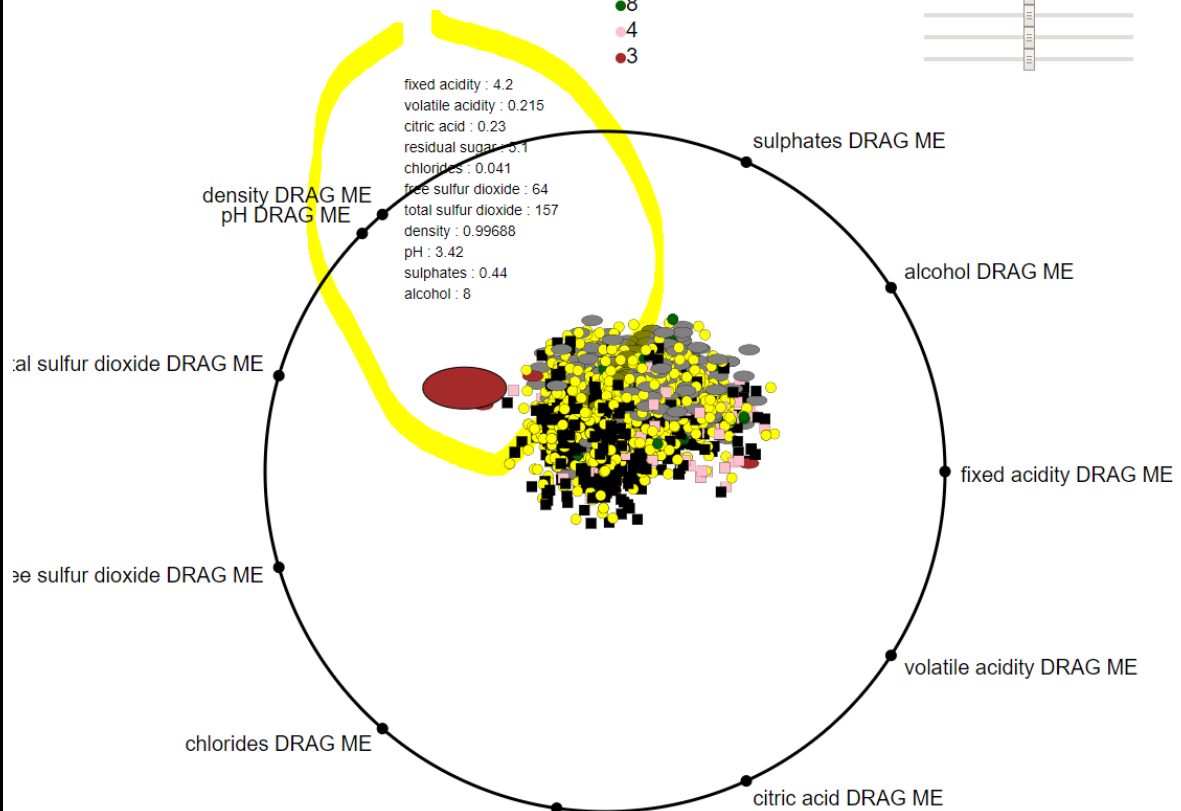
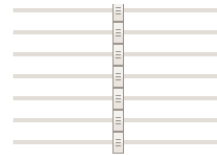
As we can see, when you hover center node, that node will be highlighted to be outstanding over others.



Select a File:

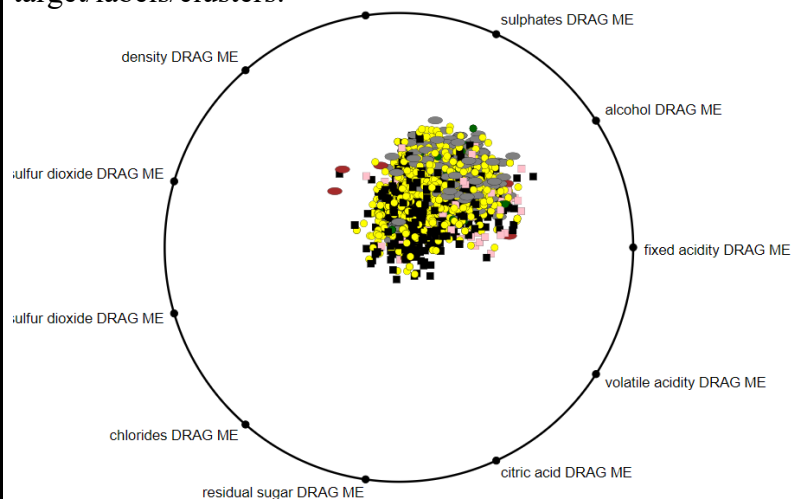
Choose File winequality-white.csv

6  
5  
7  
8  
4  
3



The grade will be based on the complexity and usefulness of the feature. You may need to create some extra interface to control one or more of your unique features. Feel free to add it the way you prefer, as long as it is still contained in the webpage.

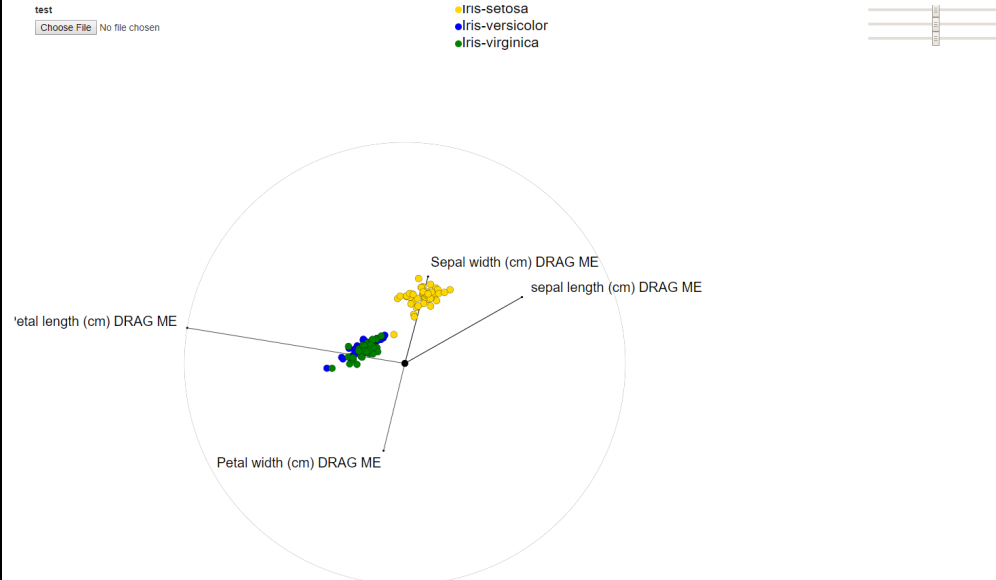
Moreover, my code also can assign different shapes and colors to different target/labels/clusters:



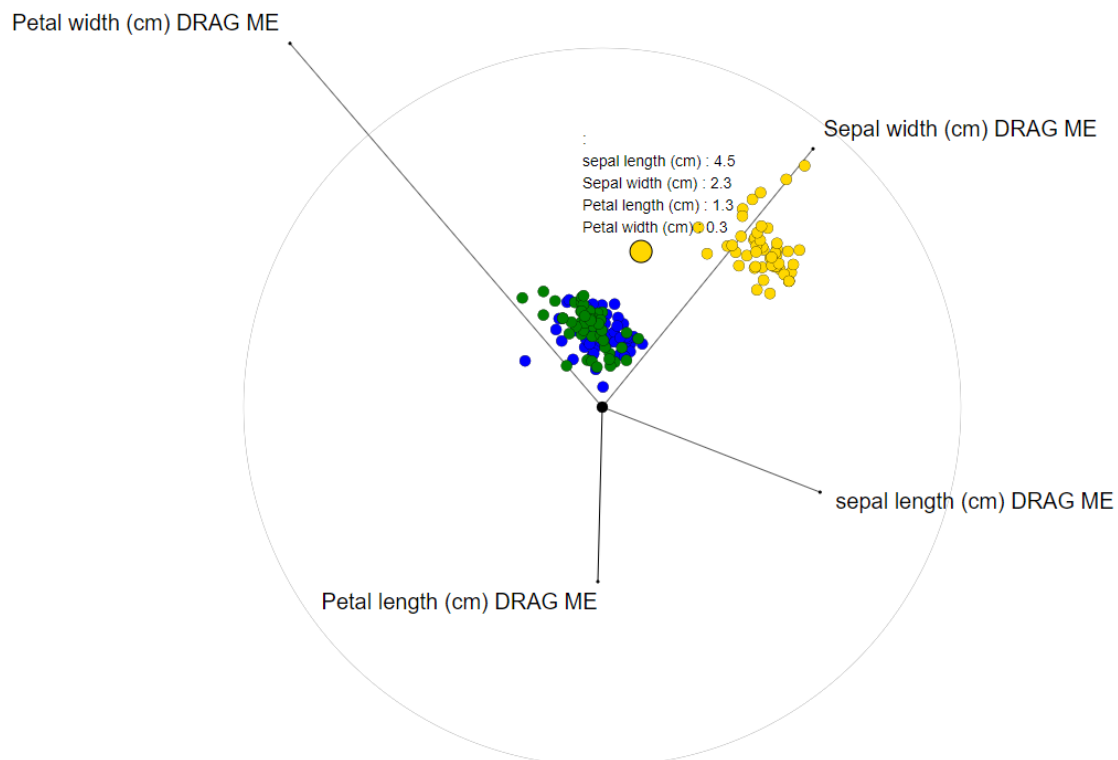
5. [+30 bonus marks] Implement both visualizations (RadViz and Star Coordinates) and include the functionality of selecting a new .csv file and show it in the visualization.

a. Also, test using the iris dataset (iris.csv). Version uploaded to brightspace contains column names.

Star Coordinates:

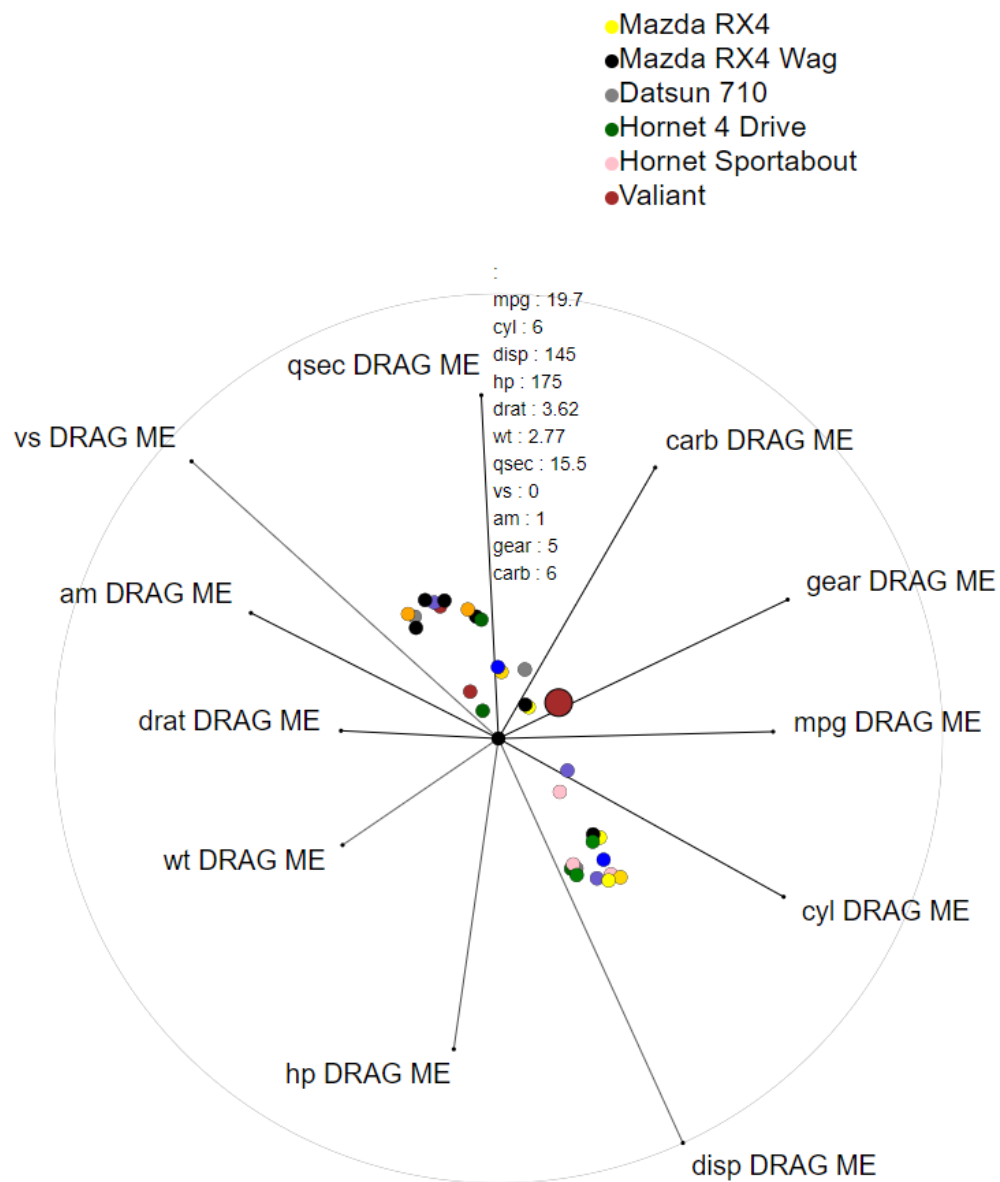


We can also drag the features nodes to longer length to assign different weight than original setup, like this:





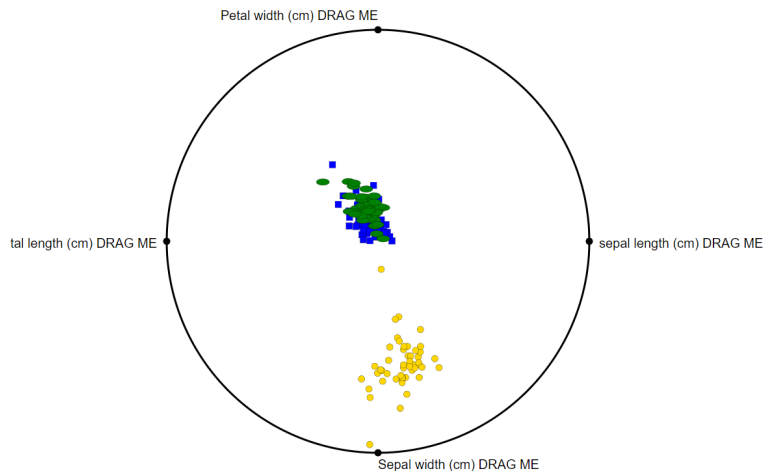
For the new data set: mtcars.csv, similarly:



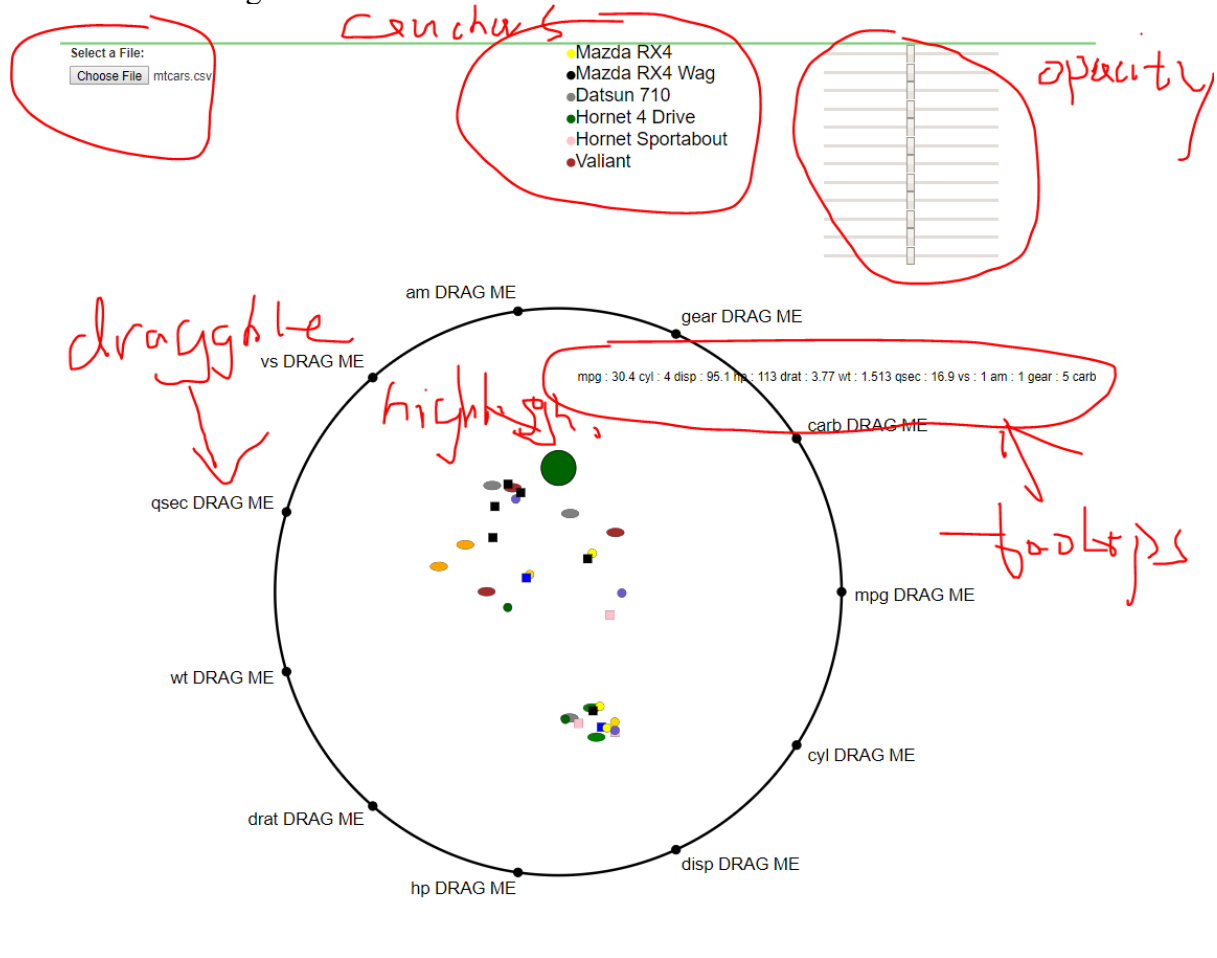
Radviz:

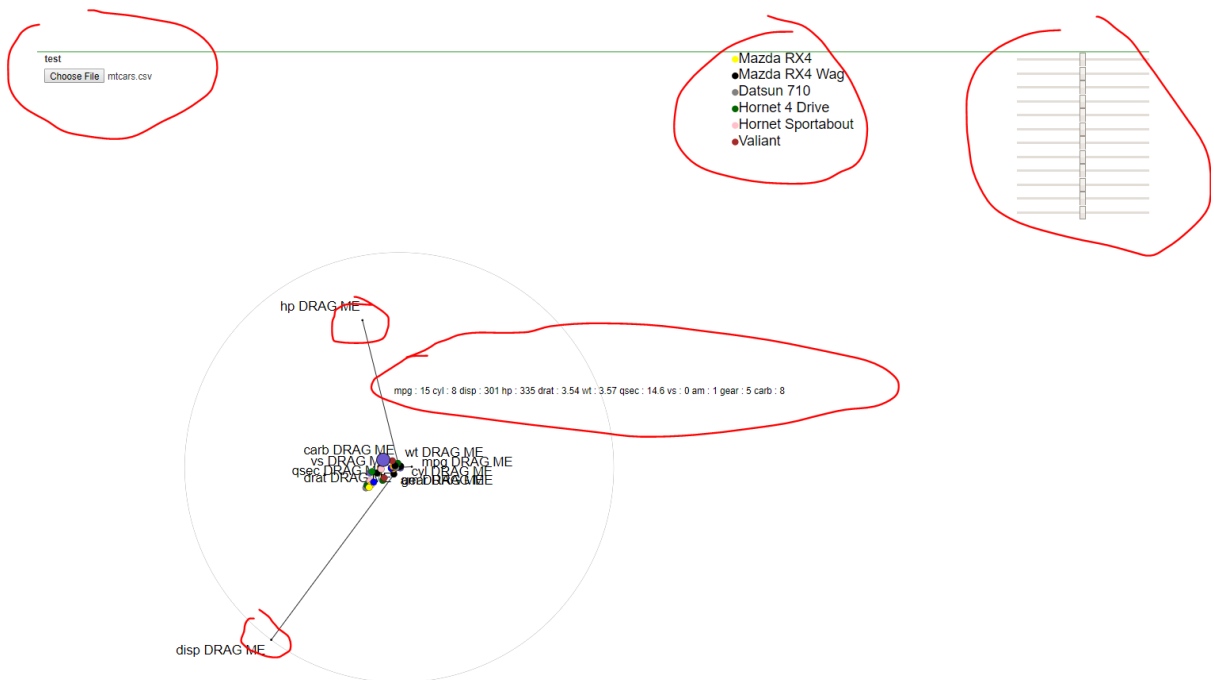
test  
Choose File No file chosen

iris-setosa  
iris-versicolor  
iris-virginica



b. Grading will follow the same requirements previously stated on items 1 to 4 with marks: 14, 5, 2, 2 and 7 for the dataset changing functionality (selecting a new csv). Here I am choosing famous dataset "mtcars.csv"





- c. You can do the same assumptions for the datasets as stated previously.  
Answers as above screenshots
- d. Bonus marks will be added to this or previous assignment with the lowest grade.  
Maximum grade is still 100.
- e. You can show both visualizations at the same time or provide a way to switch between them.
- f. For changing the CSV, you may use the standard browser file dialog to access the file.