# Lots of Lines Manual….

INTRODUCTION

What is Lots of Lines? Lots of Lines is a data visualization application designed to display multidimensional data in a lossless format, making it seamless and easy to use. Individuals can push spreadsheet data to the visualization application, which will draw the provided data using 4 visualization methods. Users can then interact with the provided dataset by selecting points of interest, and hiding outliers. Lots of Lines provides a toolset which users may explore their data, making it easy to notice trends and outliers!

Getting Started

In order to get started. The very first step required is to download the application! After the application has been installed, the user must have his/her own data/csv file to load into the program.
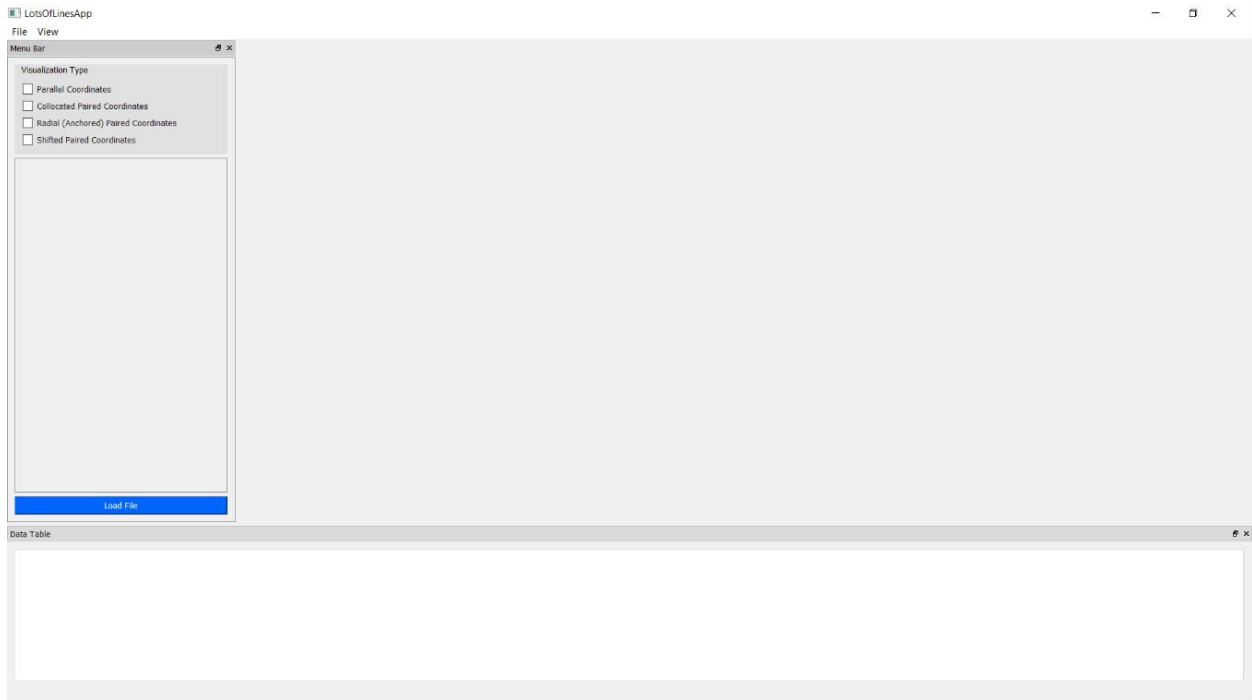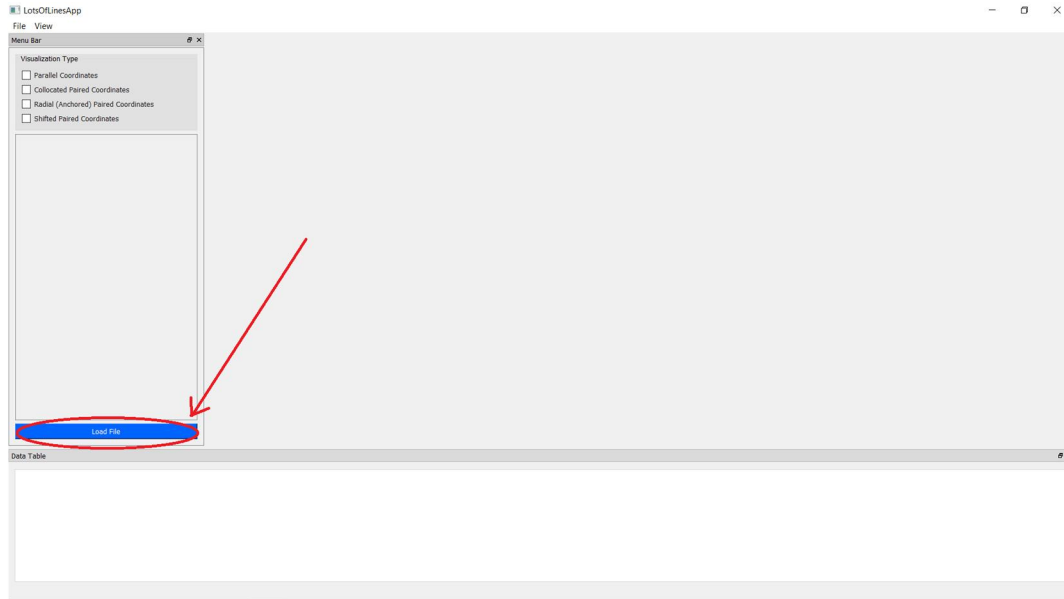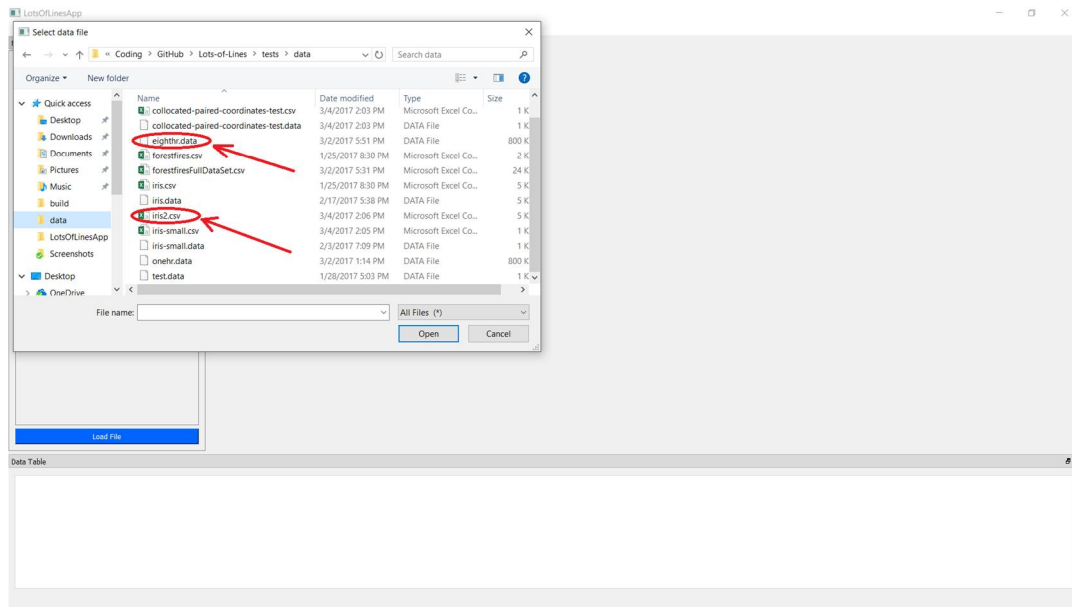

Blank Application

Loading File

Step 1:

Select the Load File Button at the bottom of the Menu Bar on the far left of the application.
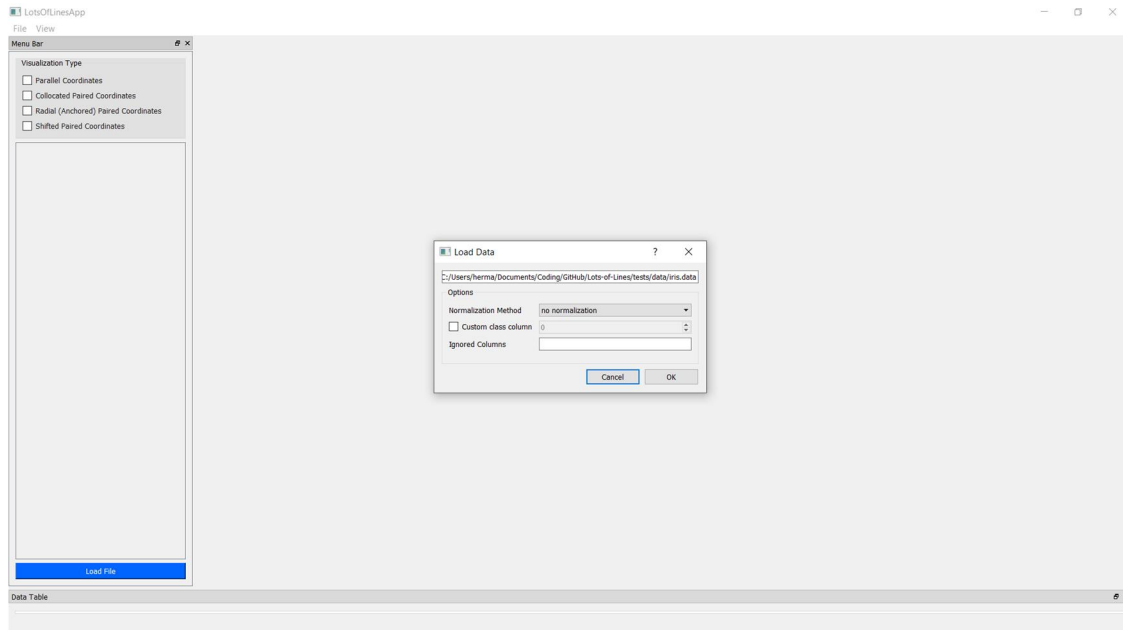

Step 2:

Once the user has selected the Load File button. There will be an event page prompted, and the data/csv file downloaded (previously) should be selected.
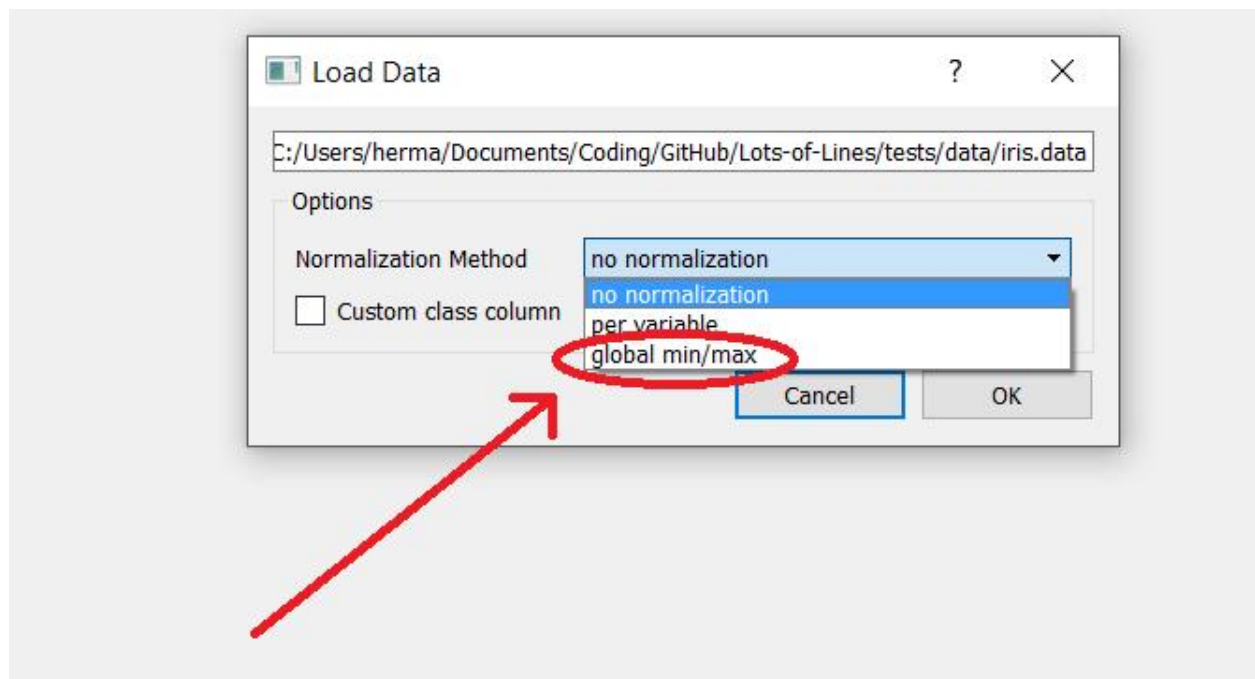
Step 3:

After the file has been loaded. The user will be prompted to select which normalization, which columns to ignore, and which column is selected as the class, which in turn, determines the colors of the graph.


Below explains all of the parts in the event window for how to load the data into Lots of Lines.

If the **global min/max** normalization is selected, the users' data will be loaded from the set where the global maximum value for the data is set to 1 and minimum -1.
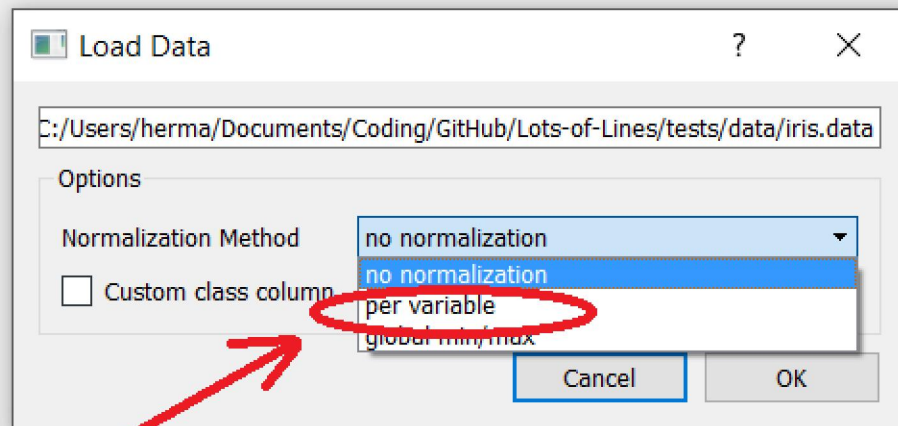
If the **per variable** normalization is selected, the users' data maximum and minimum will be taken from each column (variable) and the graph will be loaded based off that.
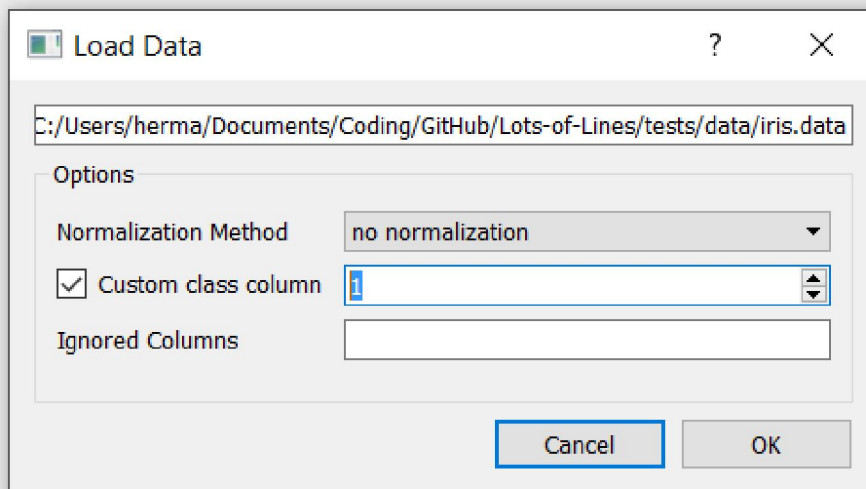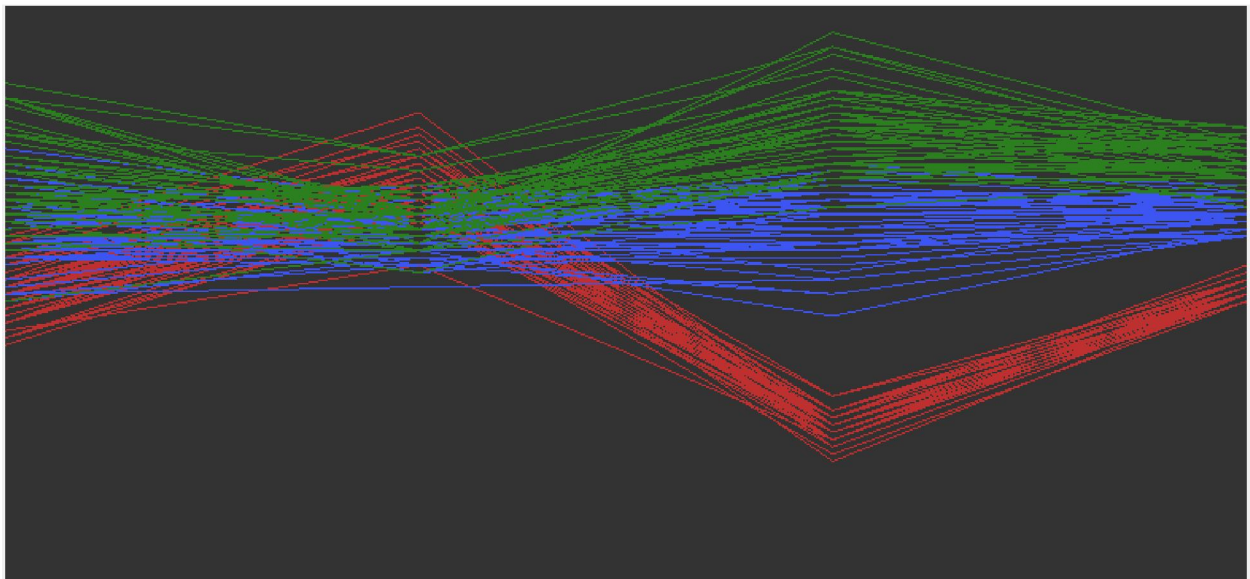

The user may also select the **Custom class column** check box, and then select which column (of the dataset) would best fit for their needs.

Below is an example of the Custom Class (fit to horizontal, shifted axis to center line) in comparison to the Default Class (fit to horizontal, shifted axis to center line) visualization.
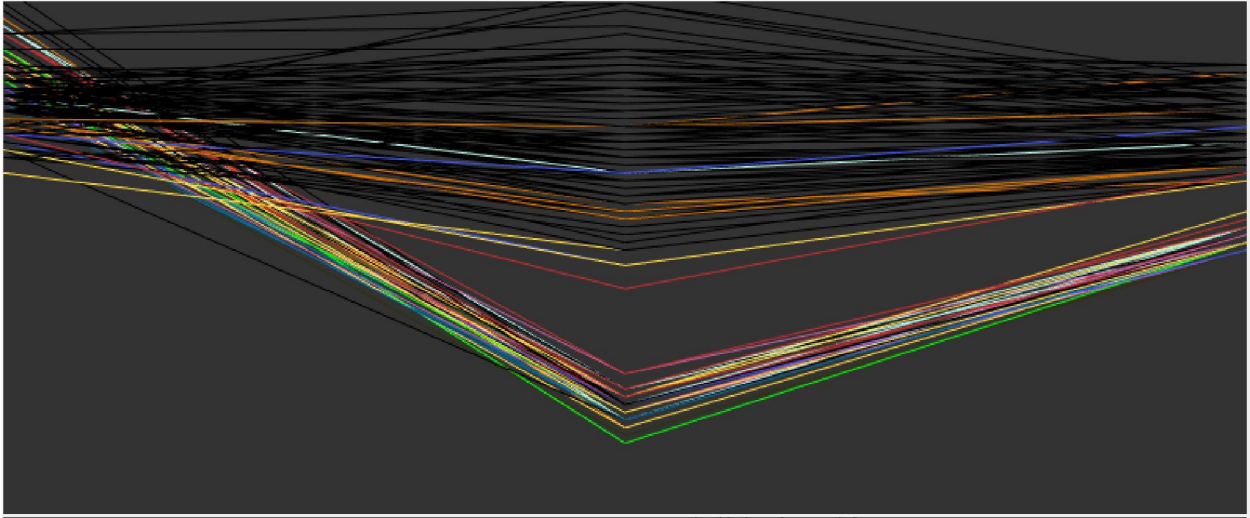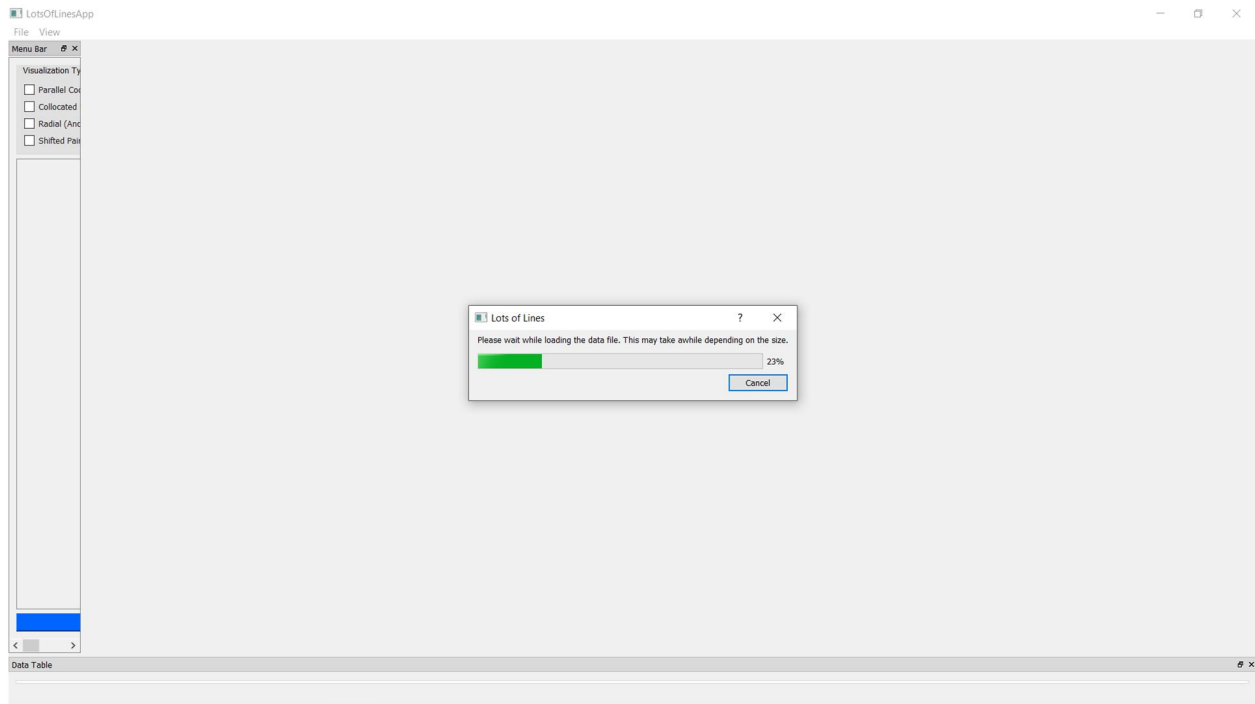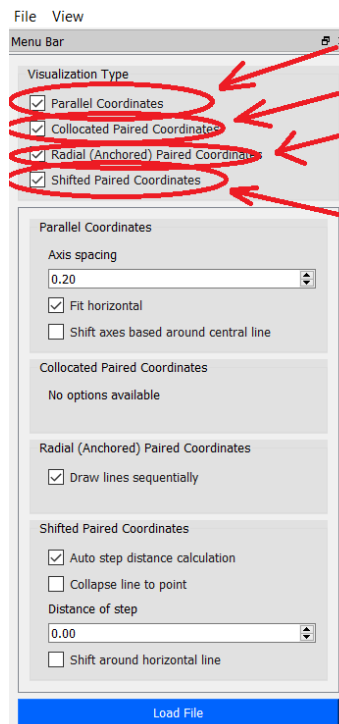
Custom Class

Normal Class

Once the user has selected his preferences of the dataset, the user will have to wait until the dataset is loaded into the program. However, a progress bar will let the user know how close the program is to loading the file.
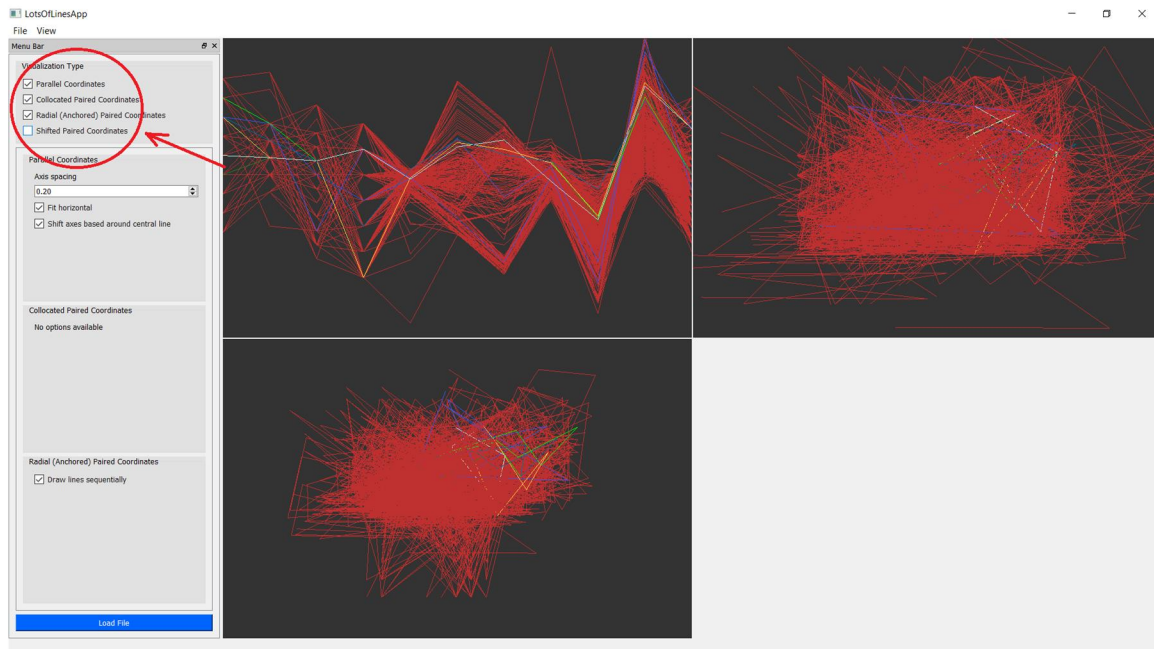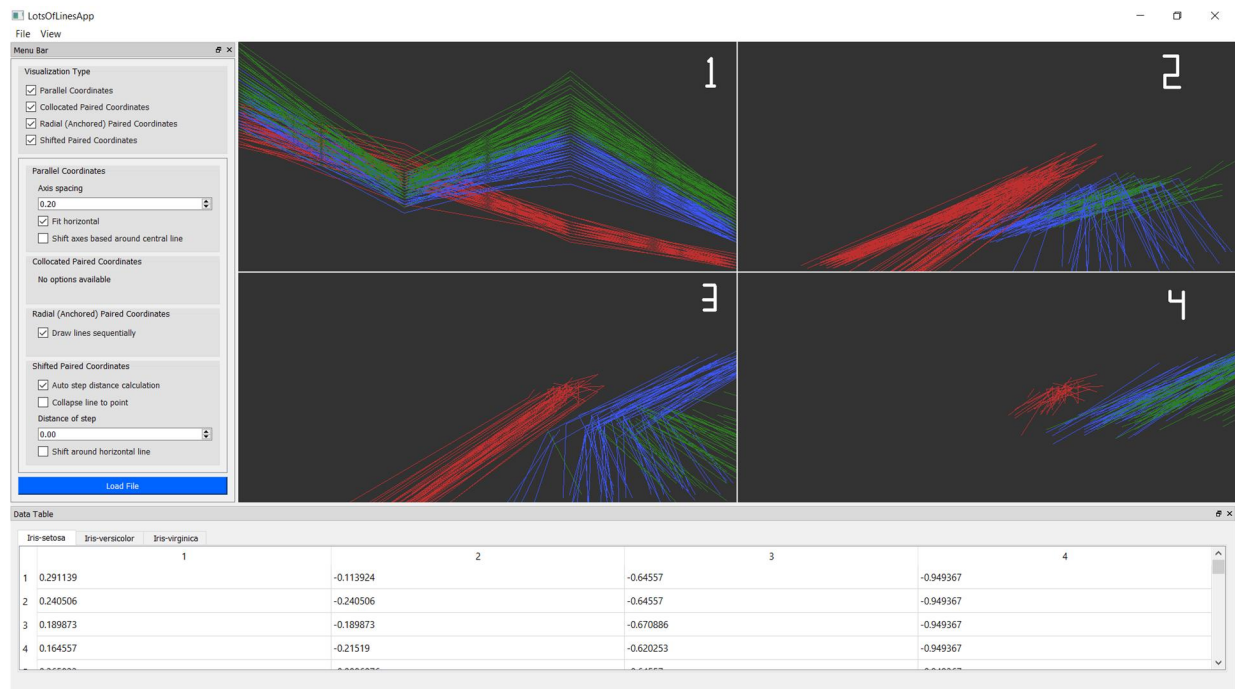

Step 4:

Once the file has been loaded into the program, the user may select between 4 different visualizations, Parallel Coordinates, Collocated Paired Coordinates, Radial (Anchored) Paired Coordinates, and Shifted Paired Coordinates.
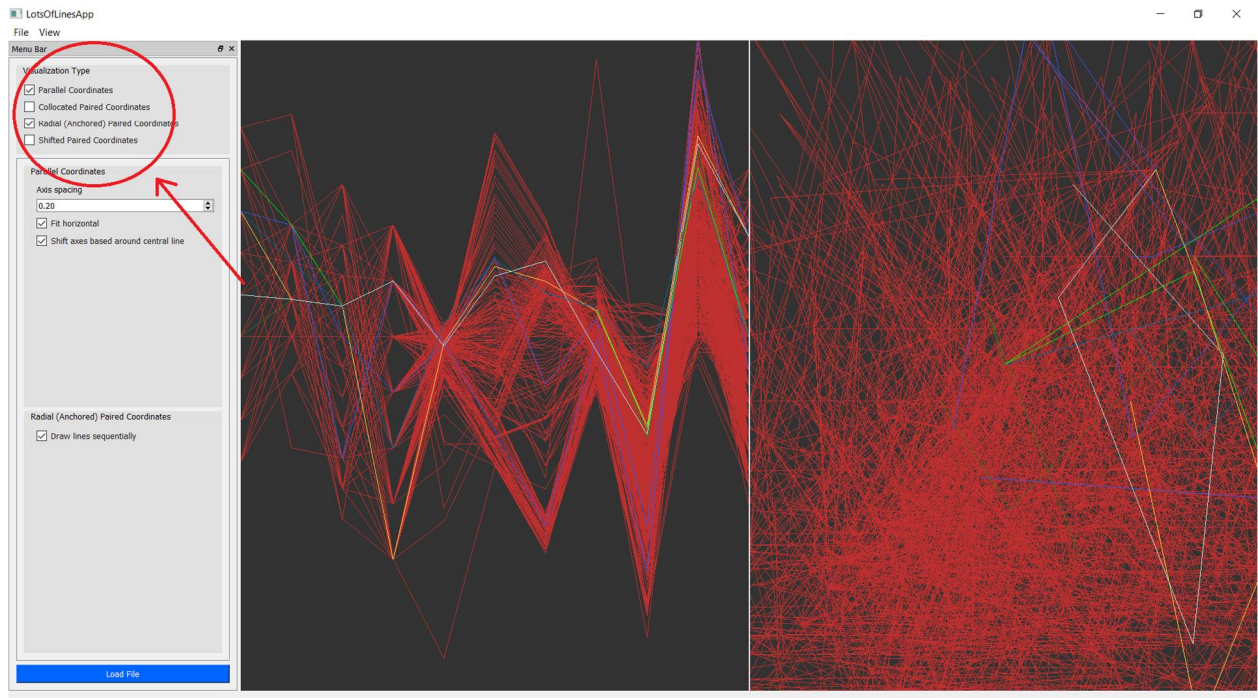
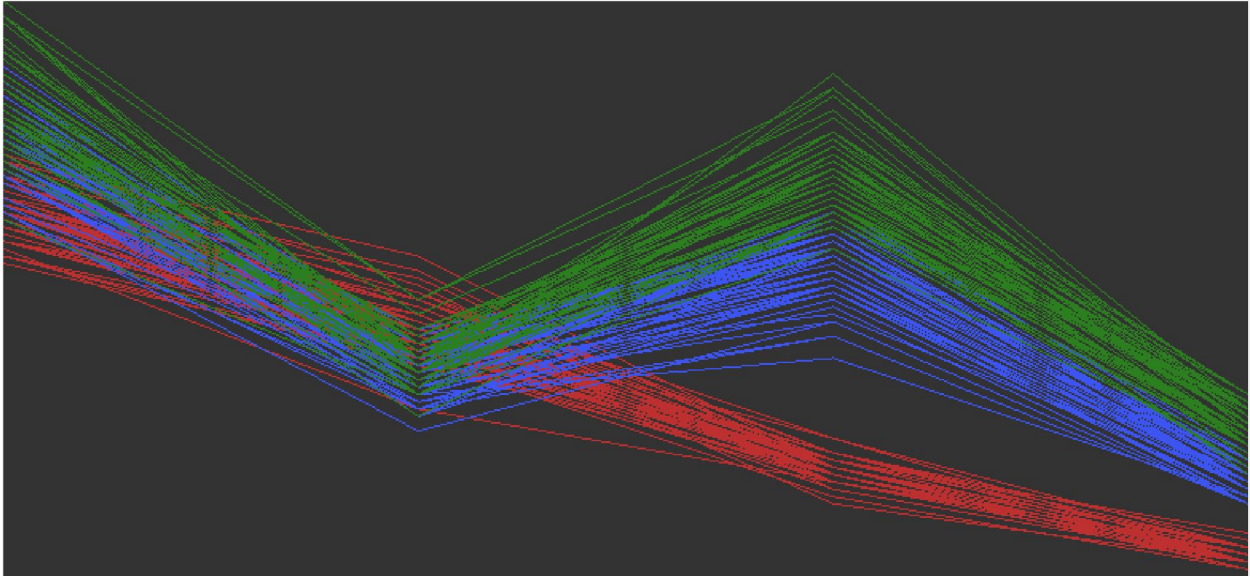Example showing two visualizations

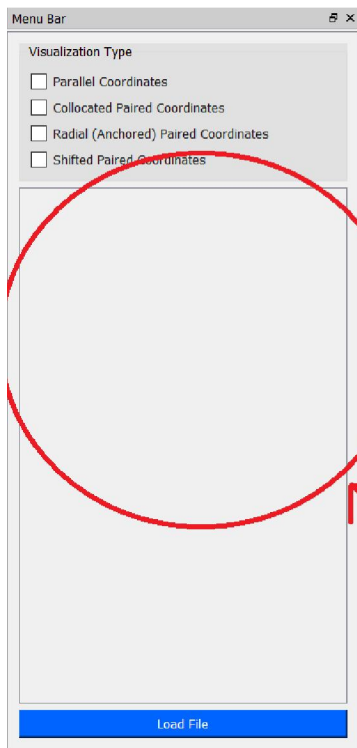
Example showing three visualizations

This is an example of all four visualization methods, in order, from 1 (Parallel Coordinates) to 4 (Shifted Paired Coordinates).

Choosing Visualizations
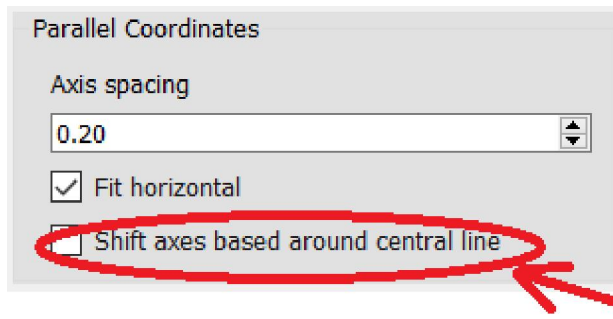
Parallel Coordinates:

This is an example of a generic Parallel Coordinates

If the user decides to select Parallel Coordinates, the Menu bar on the left will populate here.

The menu bar will populate with these actions…

Parallel Coordinates

Axis spacing

| 0.20 | ⬍ |

☑ Fit horizontal

~~☐ Shift axes based around central line~~

The user may select shift axis based around a central line, and the program will shift the coordinates of the visualization based on the central, horizontal line.

In doing so, the visualization changes drastically. Below is an example (using the Iris dataset) of the Parallel Coordinates, with the axis shifted around a central line.

Parallel Coordinates

Axis spacing

| 0.20 | ⬍ |

☑ Fit horizontal

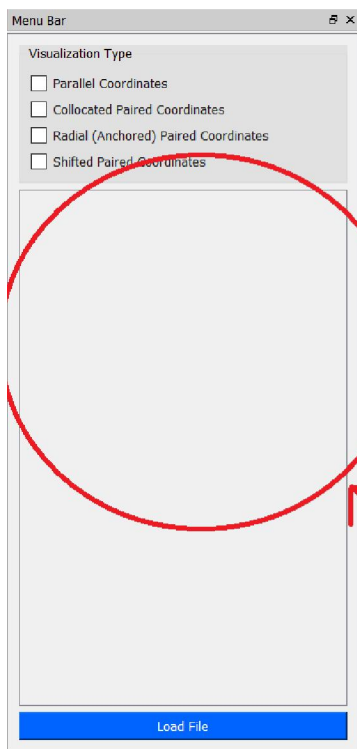☐ Shift axes based around central line
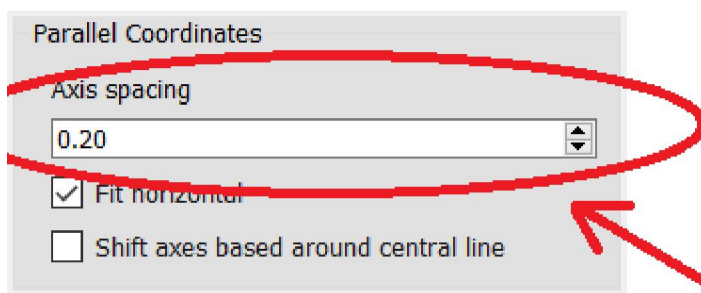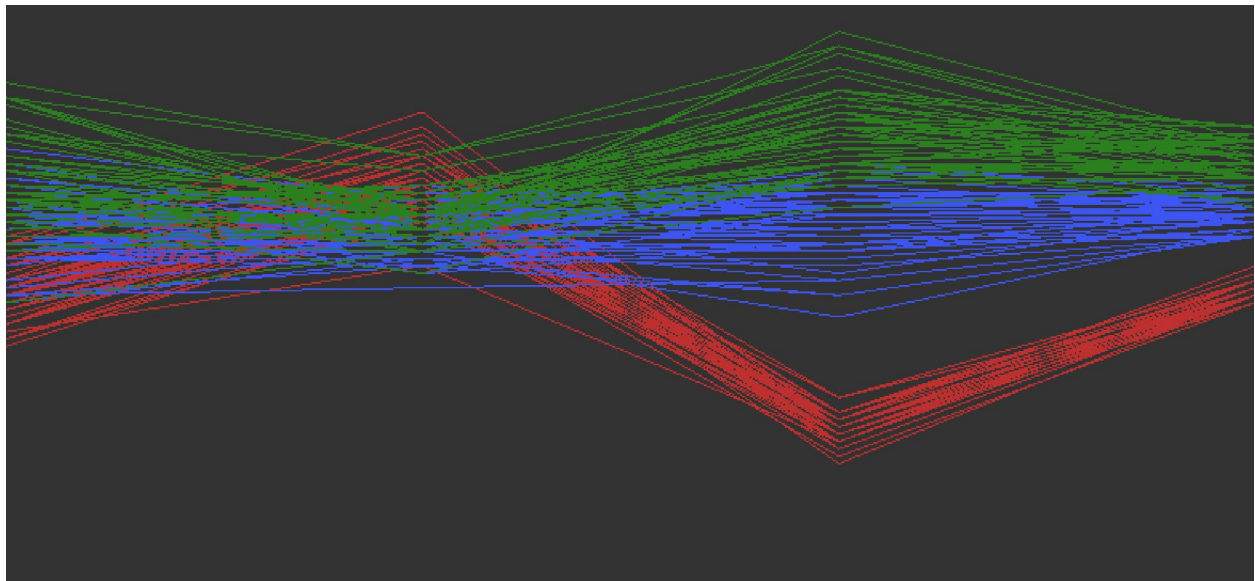
The user may also select how big of a space will be between each axis in the visualization. This can make it easier to see which lines you would like to select.
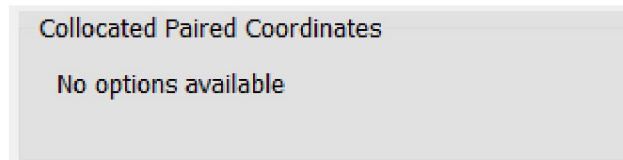
Collocated Coordinates:
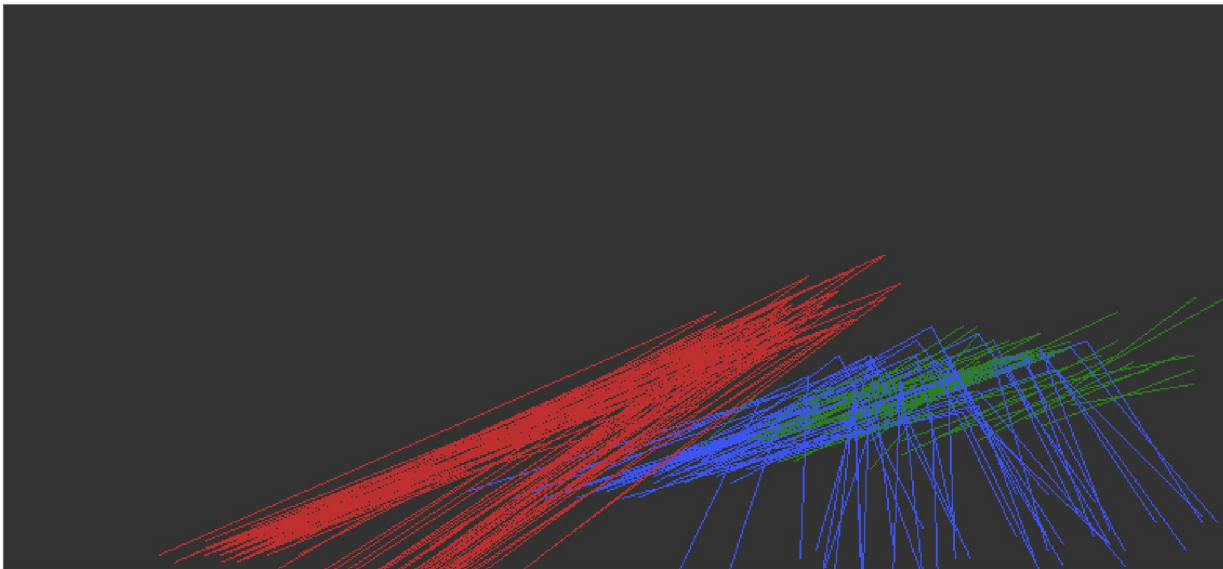
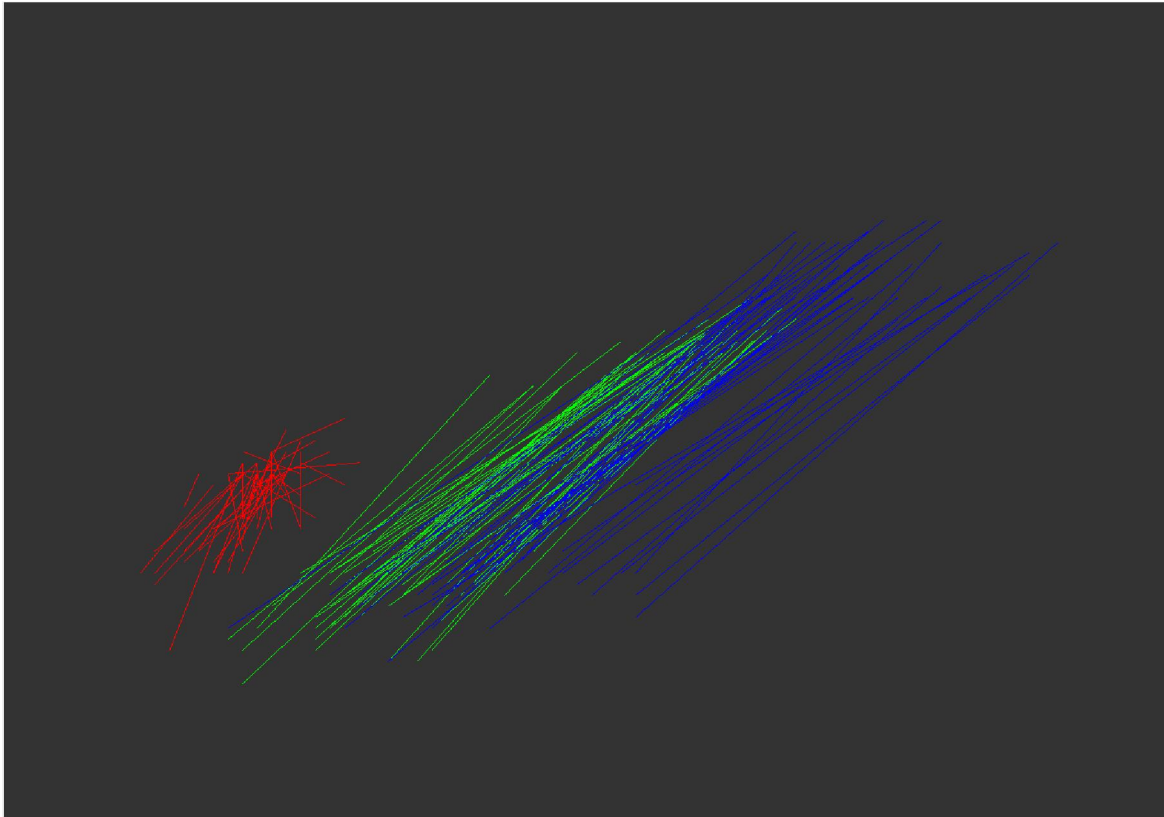This is an example of a generic Collocated Coordinates

If the user selects Collocated Coordinates on the menu bar. The Collocated Coordinates functionality will populate here.
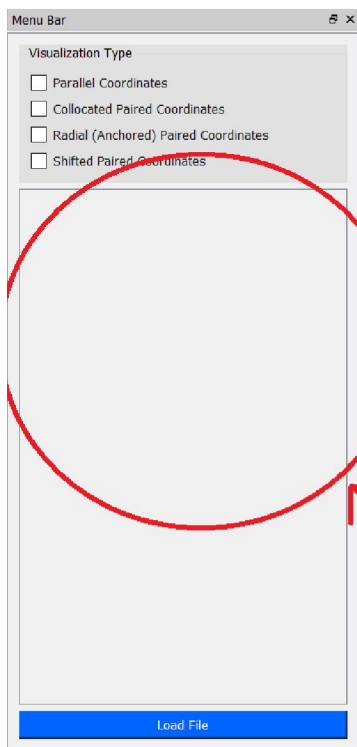
The menu bar will populate with these actions...
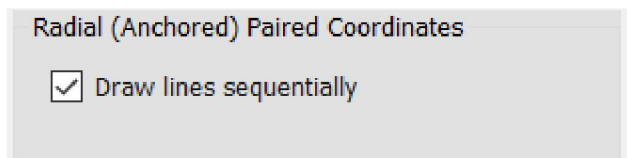
Radial Paired (Anchored) Coordinates:

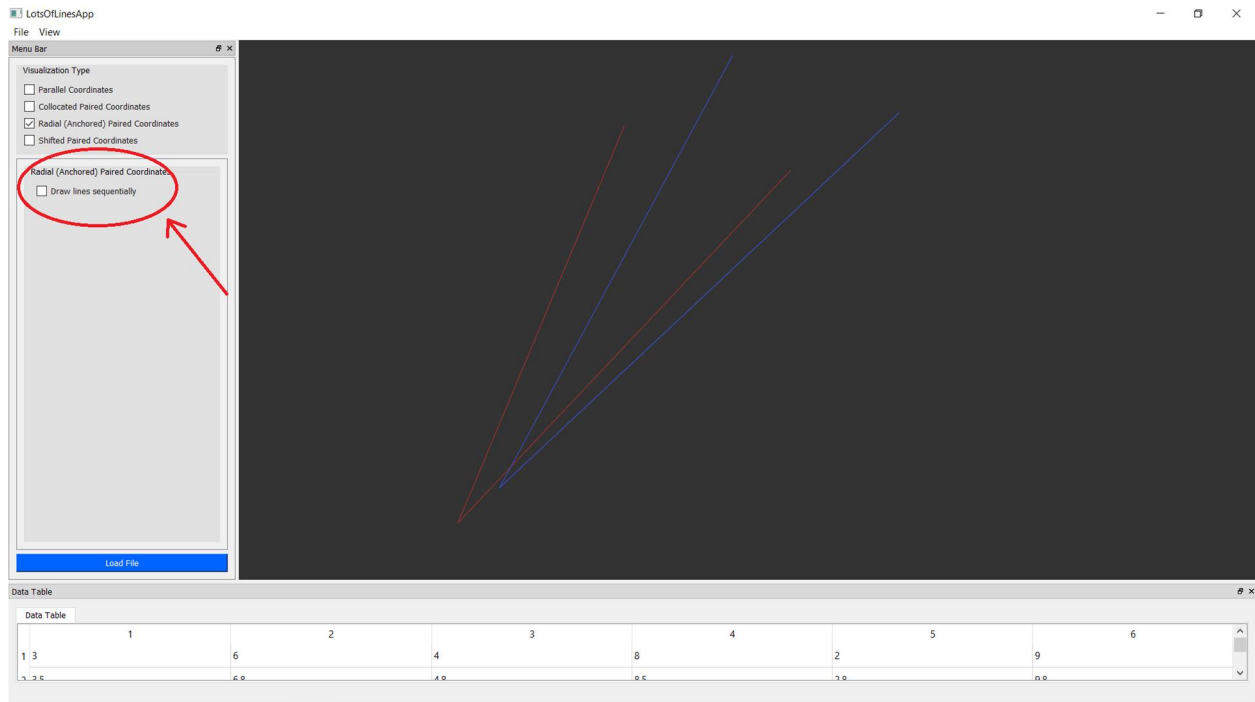This is a generic example of an Anchored Coordinates visualization.

If the user selects Radial Paired (Anchored) Coordinates on the menu bar. The Radial Paired (Anchored) Coordinates functionality will populate here.
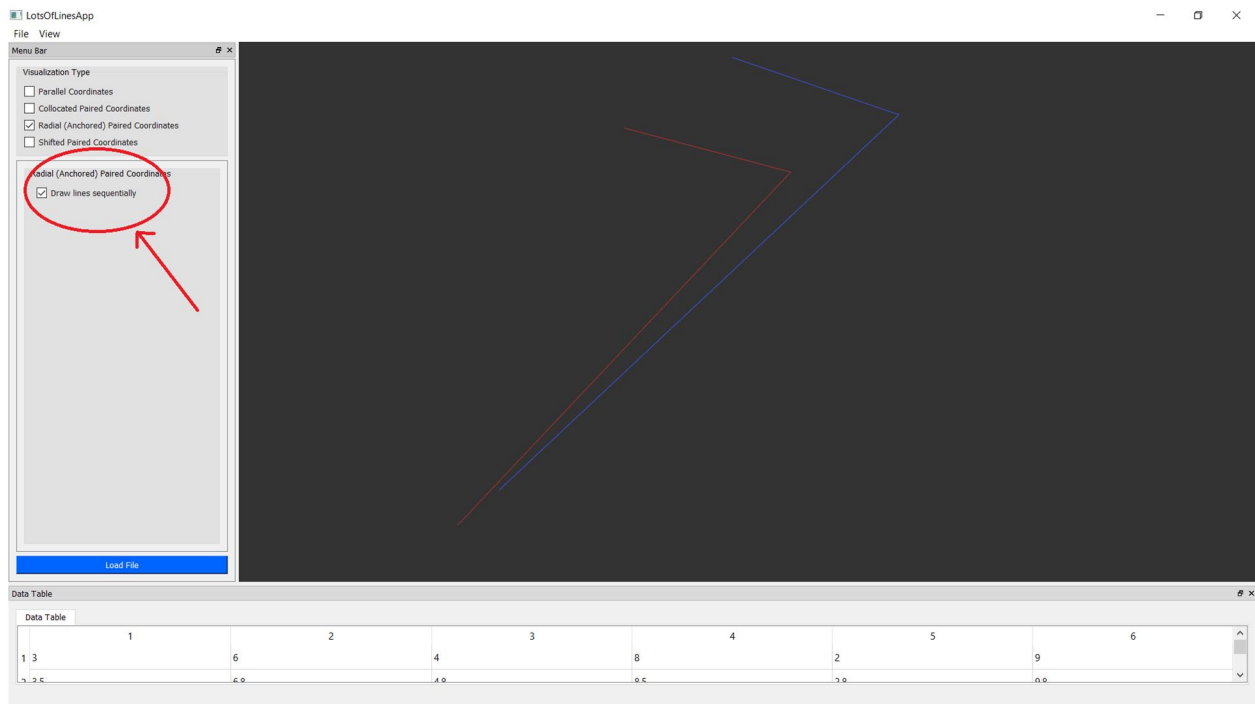
The menu bar will populate with these actions…

If the user selects the Draw Lines sequentially the visualization changes based of the coordinate in front the line being rendered. Draw lines sequentially will change how radial connects the points, by drawing the point sequentially rather than from the origin.
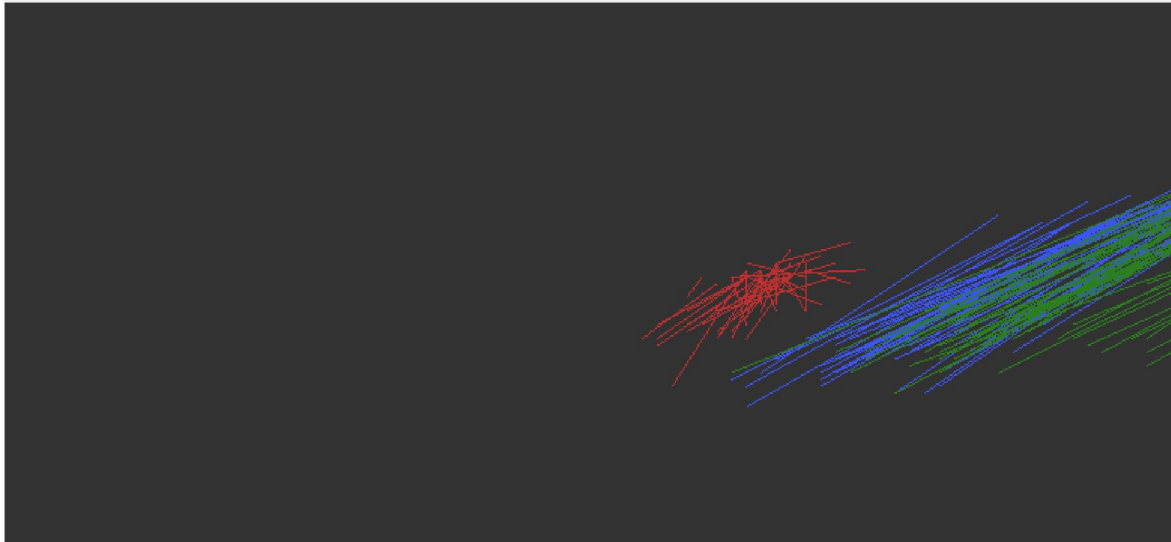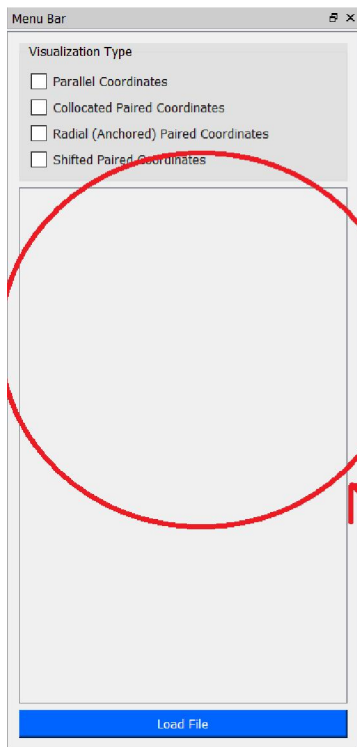

Non-sequential Radial (Anchored) Coordinates

Sequential Radial (Anchored) Coordinates

Shifted Paired Coordinates:

This is a generic example of a Shifted Paired Coordinates visualization.
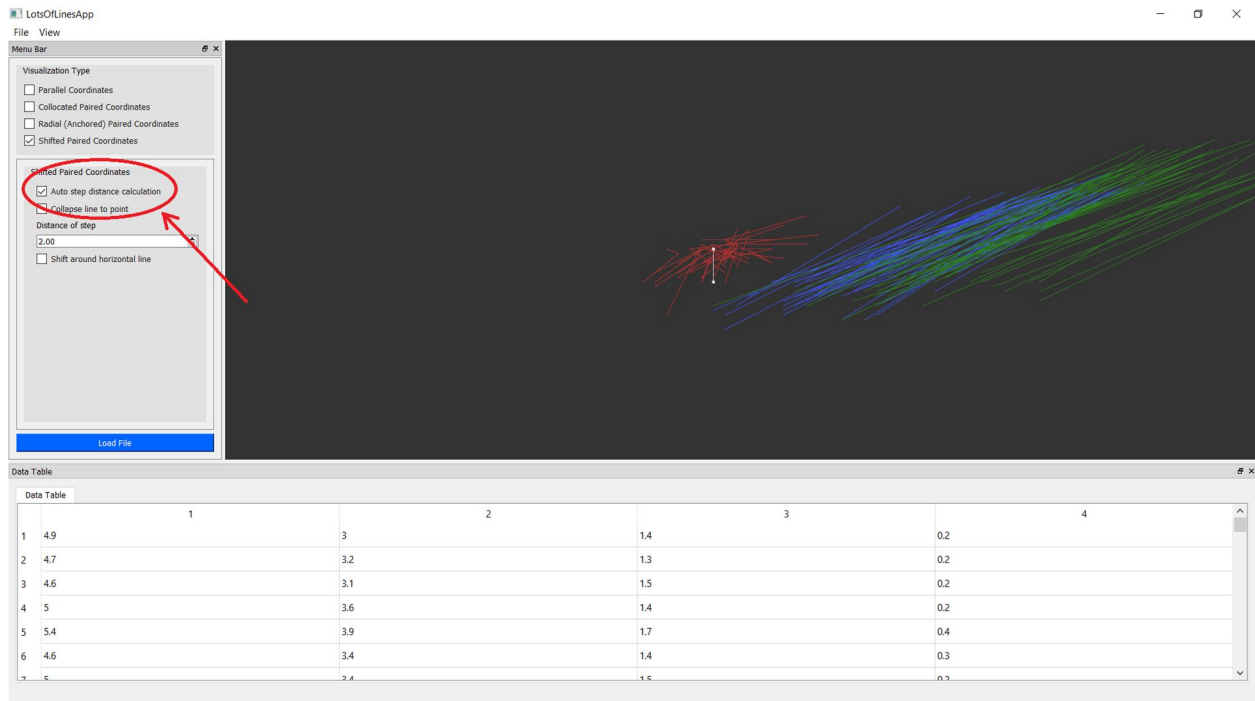

If the user selects Shifted Paired Coordinates on the menu bar. The Shifted Paired Coordinates functionality will populate here.
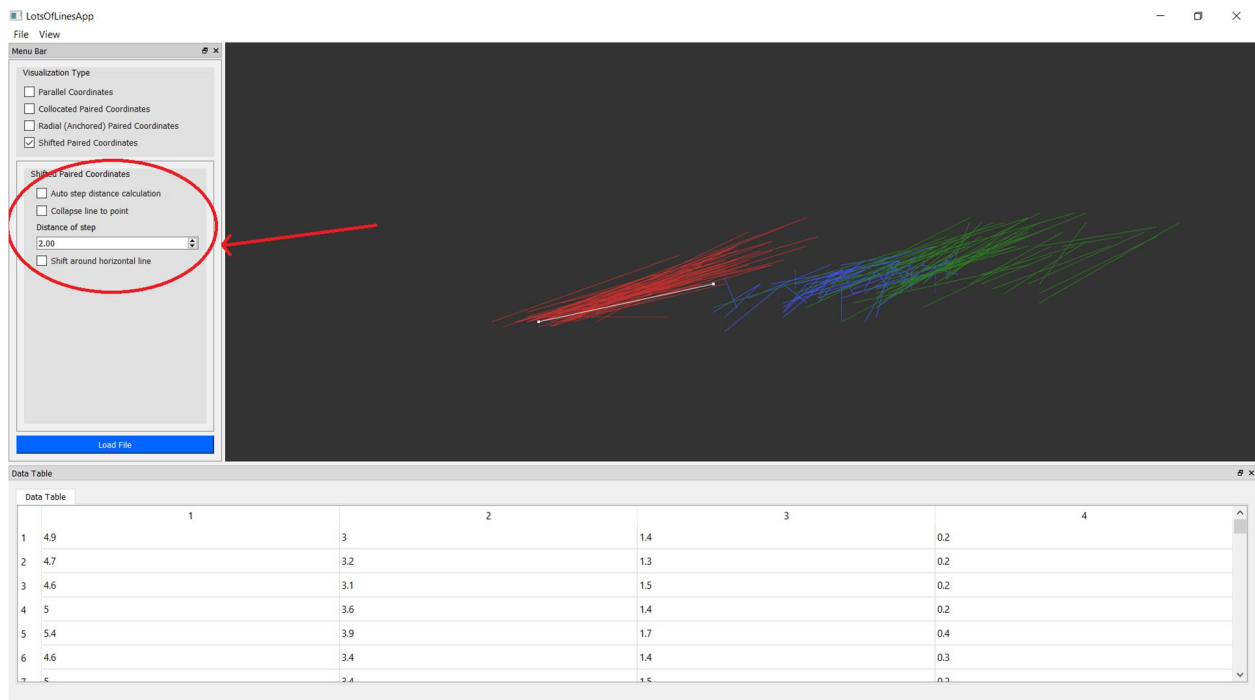
The menu bar will populate with these actions...

Auto step distance calculation will automatically be selected when the user selects Shifted Paired Coordinates. Auto step takes precedence of Distance of step and creates an automatic step distance based off the two first vector points. Distance of step can specify the unit of distance for a step.

The user may choose to have a set distance for each line, in doing so, it drastically changes the way the data is displayed. However, in order to do so, you must deselect the auto step distance calculation.
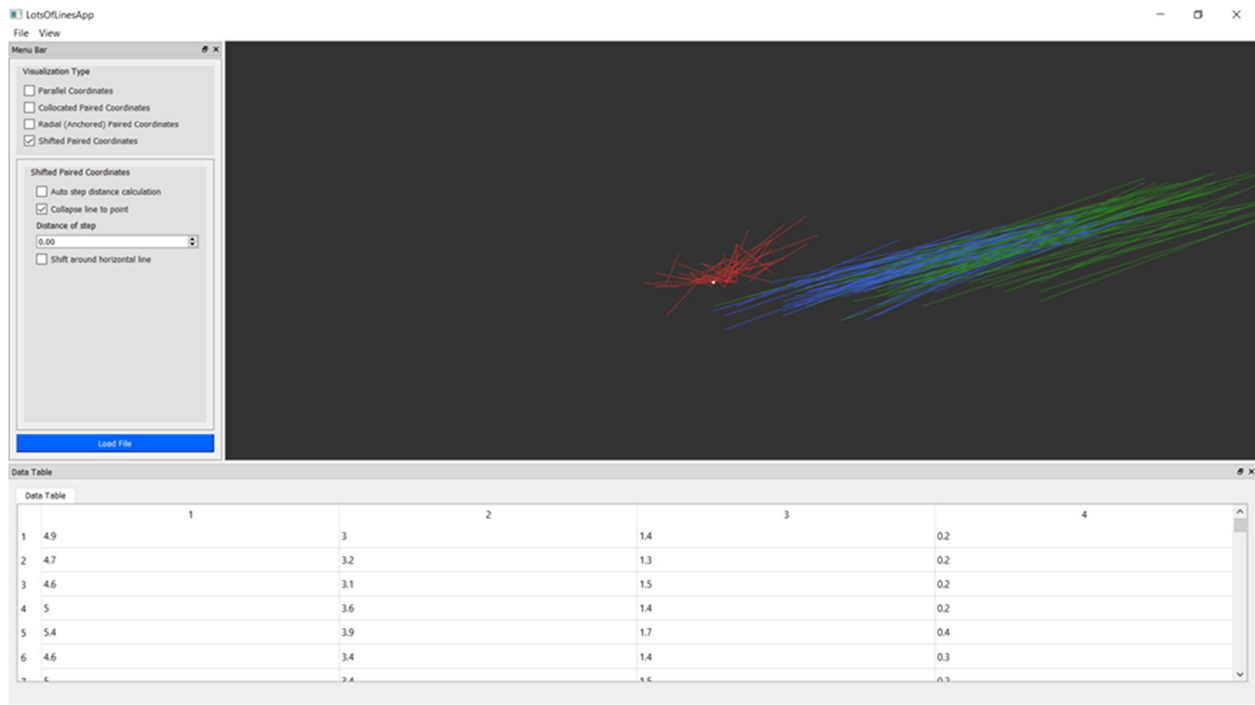
If the user selects the Collapse line to point the visualization changes based of the coordinate (line) selected, and shifts everything around it. The selected vector (defaults to first) is collapsed to a point and the shift of the rest of the dataset based off of the selected vector.
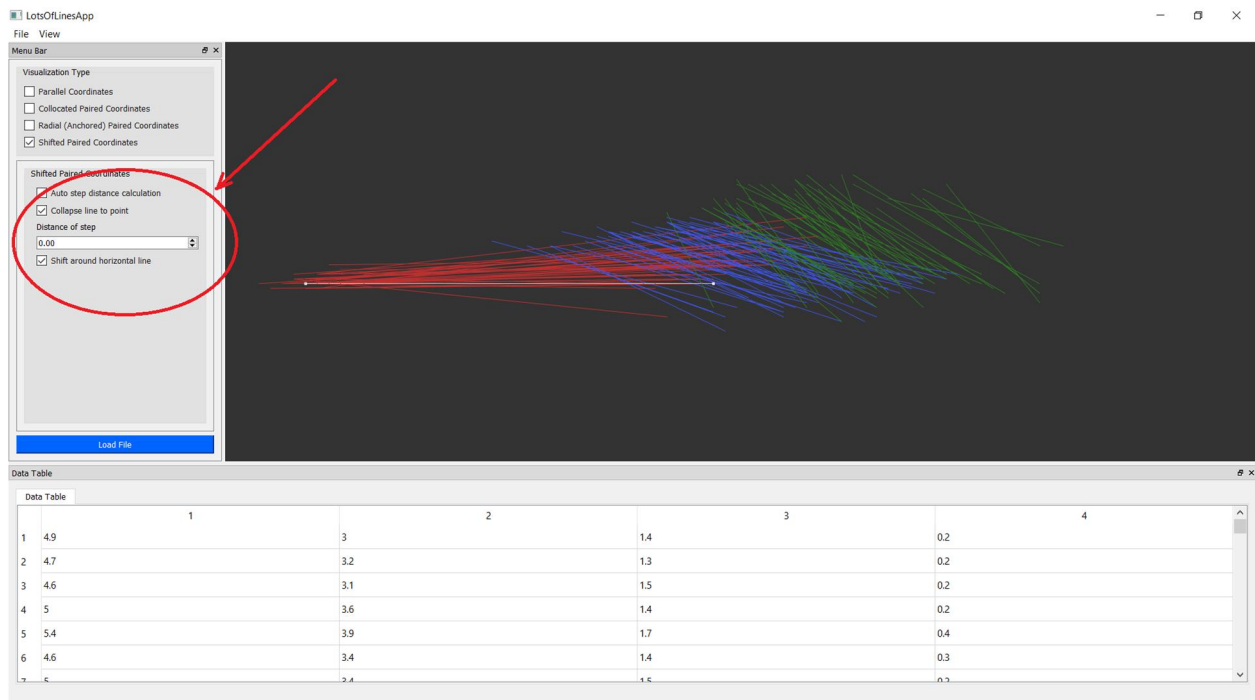

With shift around horizontal line selected, the rest of the data is shifted based off of the change to the

selected line made horizontal. It acts similarly to how Collapse line, however, the shift is based off of a line rather than a single point. Horizontal line selection will take precedence over Collapse line to point.

Extra Information

Selection:

The user may select individual, as well as multiple lines within a visualization. A user may do so by right clicking on the line he/she would like to select the closest line to the point clicked. A user my also right-click and drag to select multiple lines
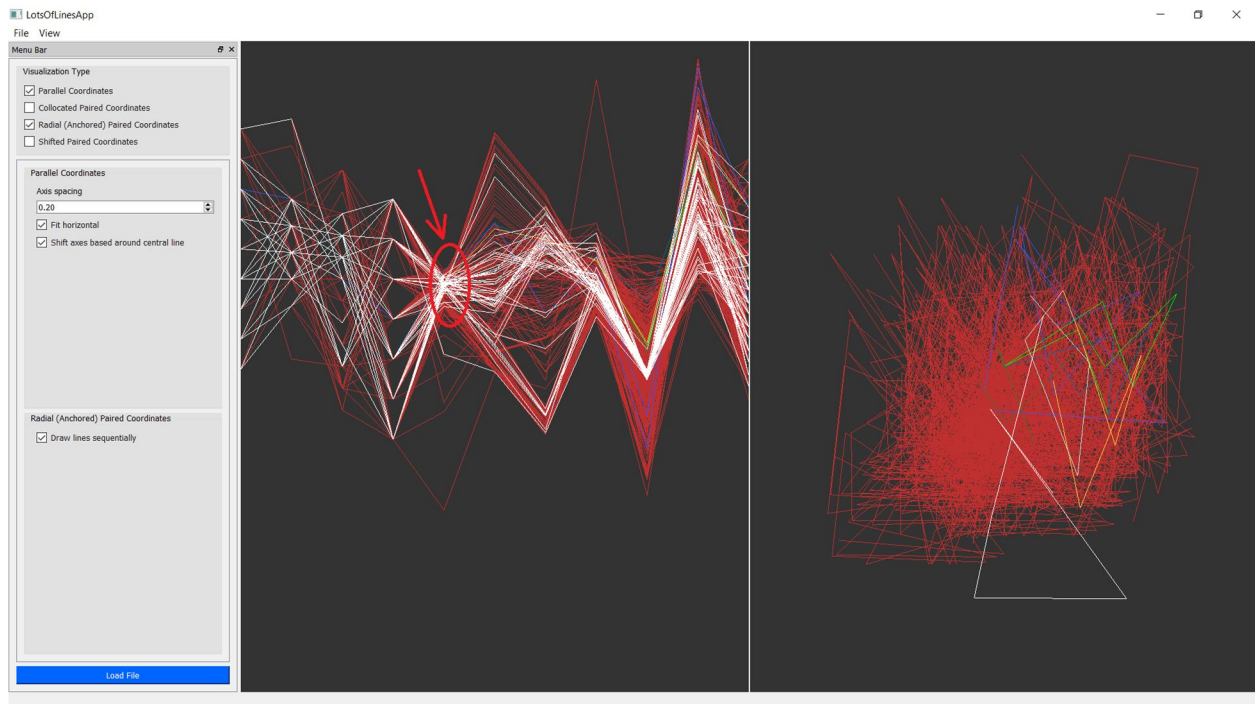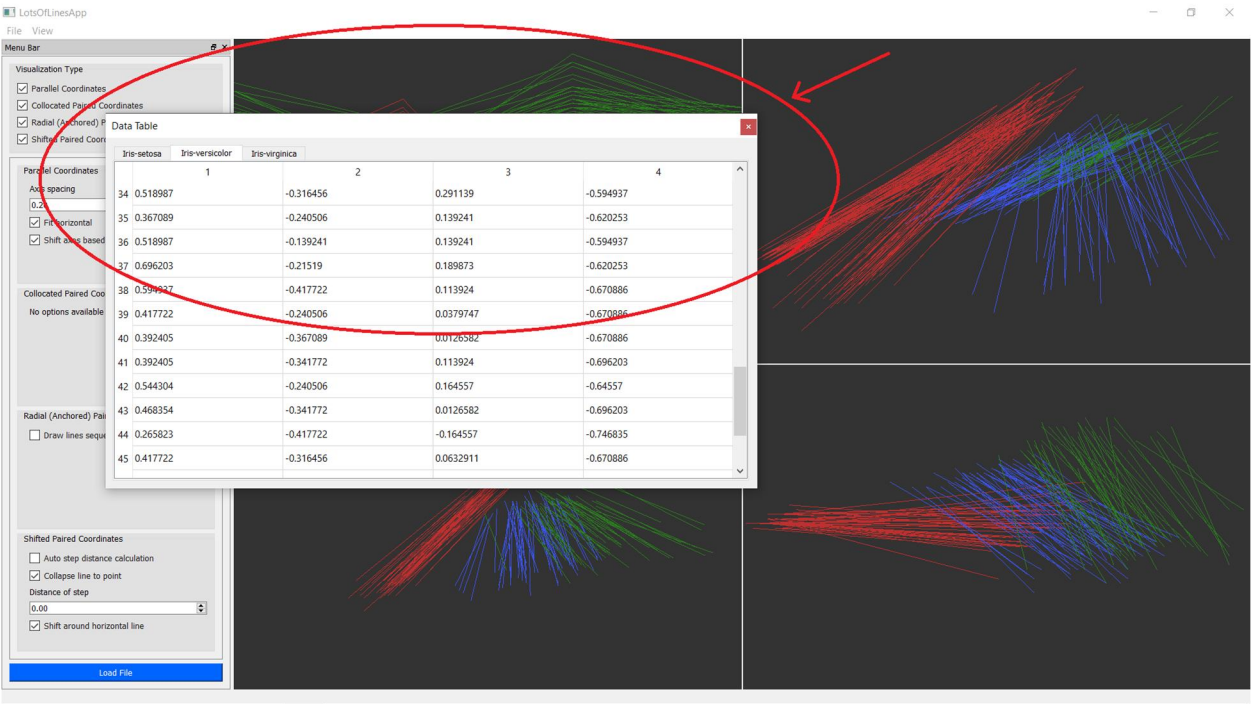

The white lines in both of the visualizations represent a line that has been selected by the user.

Dock Able Menu/Data Bar:
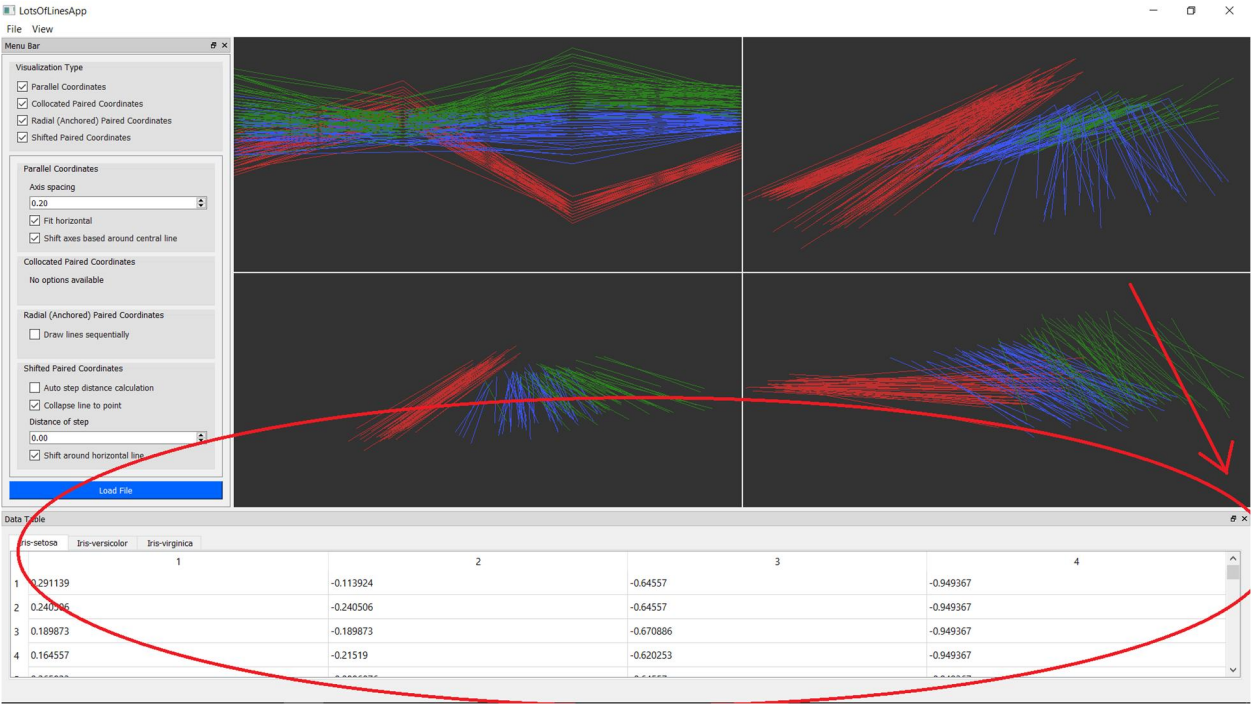
Dock Data Table

Undocked Data Table

The user may also hide both the menu and the Data Table by pressing the X on the top right of each of their respective boxes. If the user wishes to see the Table again, he/she may select View button on the top left of the applicatication and select Menu, or Data Table.