

	Green	Yellow	Orange	Red
Input	Load a CSV file: <ul style="list-style-type: none"> From a URL Via a local file 			
Plot Representation	<p>Always display a three dimensional space.</p> <ul style="list-style-type: none"> * Default selected fields are the first three fields in CSV file. * Each row shall be visualized by a point shown in that space, with the coordinates of that point being determined by the value of selected fields. <p>For continuous and ordinal data: (e.g., integer [e.g., "1", "23", "323"] or real-valued data [e.g., 21.52])</p> <ul style="list-style-type: none"> * data should be displayed aligning with a labeled continuous line. * Regular "ticks" should be present to denote values in that line. 		<p>Whether to show NA values:</p> <ul style="list-style-type: none"> * Default: not showing points with missing data in selected field. It bears note that which points are not shown because of missing data will vary when different subsets of fields are considered * For each axis, the user can choose whether to show points with missing data values for a displayed field (e.g., "NA") * If shown: designate a special location along the axis associated with that field with missing data. 	<p>For categorical and nominal data (e.g., "Male"/"Female", or "Single"/"Married"/"Divorced"/"Widowed"):</p> <ul style="list-style-type: none"> * the axis should consist of a set of categories, where each category has a certain location associated with it, and is specified by a label.
User Actions	<p>Walk around in the space (when viewed in particular orientation), allowing the user to view the space from different angles.</p> <p>Change of displayed fields:</p> <ul style="list-style-type: none"> * each axis should have a drop-down menu supporting choosing of a field, as well as incremental search for a field (as each successive element of the name is typed). * Selection of a new field shall lead to the update of the visualized space. 	<p>Change scale:</p> <ul style="list-style-type: none"> * zooming in/out out of the space. * A given scale will limit the range of data shown within the virtual "room" provided by Oculus. <p>Change orientation:</p> <ul style="list-style-type: none"> * by rotating the space using the "joystick" control on the Oculus control. <p>Implement and visualize "Principal Components Analysis" (PCA) on the data:</p> <ul style="list-style-type: none"> ■ The user shall be able to request that a PCA be conducted on a user-selected subset of numeric (integer- or real-valued) fields within the data. <ul style="list-style-type: none"> ● Data points missing data on any selected field shall be omitted from the analysis and subsequent display (i.e., the only points considered in the PCA and shown once it is used for an axis or to set colour or size/shape are points that include values for all of the specified axes). We refer to data points that include all such fields as "qualifying" data points. ● Performing PCA in this fashion will determine certain value for each of the principal components associated with the qualifying data points. (e.g., $0.1 \cdot \text{age} + 0.2 \cdot \text{income} - 0.6 \cdot \text{income} + 5.0 \cdot \text{weightInKg}$) ■ Once a PCA has been performed: <ul style="list-style-type: none"> ● for any axis, colour or marker, the user can select "Principal component i" (where i is an integer ≥ 1) to use the value of the principal component for that axis, colour or marker (just as if it were one of the axes directly provided in the data). <p>Select one or more points simultaneously:</p> <ul style="list-style-type: none"> ■ Report characteristics: <ul style="list-style-type: none"> * Enumerate information on the points for fields selectable for this purpose. This will list the characteristics of each point for the selected. * For each of the selected points, the user will see the original value of the selected fields for that particular point. (even if principal components are being viewed). ■ Request summary information on the points: <ul style="list-style-type: none"> * list the average for each of the selected fields. 		<p>An easily accessible option (e.g., button) to reset the status of all data points with respect to</p> <ul style="list-style-type: none"> ○ Hidden status ○ Selection status <p>Setting point characteristics based on field values:</p> <ul style="list-style-type: none"> * points should have default settings (e.g., a default colour, or default size for point) * user should be able to select a field and set certain characteristics of a point based on the value of the field for the item associated with that point. <ul style="list-style-type: none"> ○ Colour <ul style="list-style-type: none"> ■ For continuous data: this will run from dark to bright, with a hue that can be otherwise selected by the user ■ For categorical and nominal data: this will choose different colours for each categorical ○ Marker (e.g., point) <ul style="list-style-type: none"> ■ For continuous data: Sets the size of a point ■ For categorical and nominal data: The shape of a point <p>Select one or more points simultaneously.</p> <ul style="list-style-type: none"> * Labeling: Label a selected point with a chosen colour and (optionally) a text label <p>Select one or more points simultaneously.</p> <ul style="list-style-type: none"> * Hide the point: Request that this point be hidden <p>The user shall be able to save away the visualization to a user-named file on their local component. This file will indicate:</p> <ul style="list-style-type: none"> ○ Which data set was loaded ○ Which axes/selected fields were shown ○ Any labeling of points (by colour and text label) ○ Any hiding of points ○ The selected fields used for any principal components analysis (if any) ○ Currently selected points <p>The user shall be able to load an existing visualization which will load in the dataset and perform appropriate labeling, etc.</p>