**Creates GUI Component**

\_\_init\_\_

* Initialize component and store app\_state
* Declares all the GUI component variables
* Calls **create\_components**
* Calls **setup\_layout**

create\_widgets

* Initializes all of the GUI component variables
* Adds bindings to required GUI components
* Adds the styling arguments to GUI components

setup\_layout

* Creates a row and column configuration for the GUI
* Adds all of the GUI components to itself

**Creates PCA Plot During Runtime**

visualize\_pca

* Shows an error message and exits if the df has not been cleaned
* Calls **main.run\_analysis**
* Gets the transformed data from the pca\_results and converts it to a df
* Calls **get\_target**
* Calls **main.create\_blank\_fig**
* Creates a title and x and y label for the ax
* **If a target is selected**
  + Gets unique target values
  + Assigns group target colors using plt.cm.tab10
  + Creates a scatter plot of each group using the assigned colors
  + Adds a legend to the ax
* **Else**
  + Creates a scatter plot
* Calls **main.update\_figure**

get\_target

* Gets the user inputted target mode
* Strips the target and sets it to lowercase
* **If none is selected as the target mode**
  + Return None
* **If bbch is selected as the target mode**
  + **If target mode is in the df**
    - Return ‘bbch’
  + **Else**
    - Show an error message and return None
* **If input specific target is selected as the target mode**
  + Gets the user specified target from the app\_state
  + Shows an error message and returns None if the target is empty or whitespace
  + Shows and error message and returns None if the target is not found in the df
  + Returns the target
* **Else**
  + Shows an error message that an application error has occurred
  + Returns None

**Event Handlers**

toggle\_target\_entry

* Sets the custom target entry box to normal if the target mode is “Input Specific Target”
* Otherwise sets the target entry box to disabled

on\_entry

* Saves value in widget to original\_value

on\_exit

* Gets the current value in the widget
* Sets the minimum value based on the attribute name
* Sets the widget to the default value if the current value is smaller than the minimum
* If the attribute is ‘pca\_num’ sets the widget to the default value if it is too large
* Sets df\_updated to True if the current value differs from original\_value, the entry value

validate\_int

* Returns True if the proposed\_value is blank or a digit
* Returns False otherwise

validate\_non\_neg\_float

* Returns True if the proposed\_value is blank, ‘.’, or a number greater than 0
* Ignores exceptions
* Returns False otherwise