PyViz Formation

FinTech

Lesson 6.1

Install PyViz for Class

- Please install PyViz for this class
  - Instructions can be found here

Class Objectives

By the end of today's class, you will be able to:

- Comprehend the why, what, and how of data visualization.
- Explain the use cases for different visualization libraries.
- Describe the PyViz origin story.
- Set up the PyViz ecosystem.
- Create interactive charts using hvPlot.
- Master hvPlot widgets for data exploration.
- Compose and overlay visualizations using hvPlot.
- Customize and interpret data visualizations.

PyViz aims to provide a single stop-and-shop space for all data visualization needs.

A
B
C
D
E
F
Test A
Test B
30 out of 100
65 out of 100
Test A
Test B
A
B
C
D
E
F
G
H
I
J
K
L
M

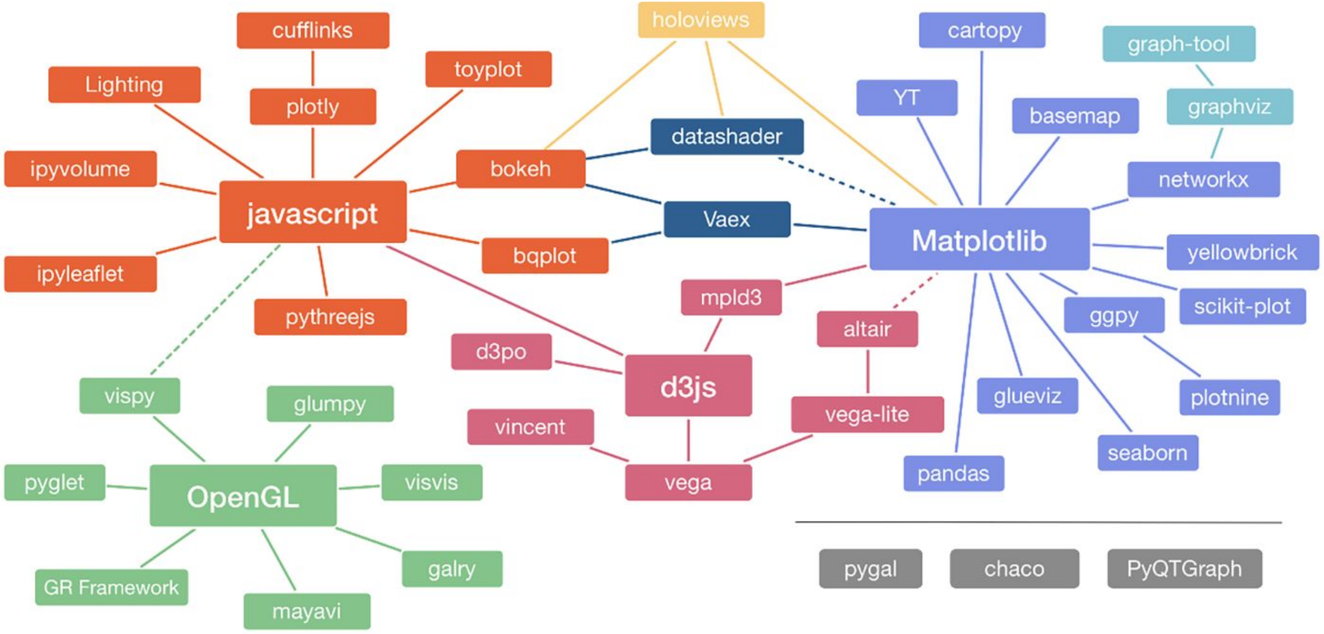
*Source: https://miro.medium.com/max/3120/1*6XAf0oi88MRCBbCd_cHcew.png*

PyViz

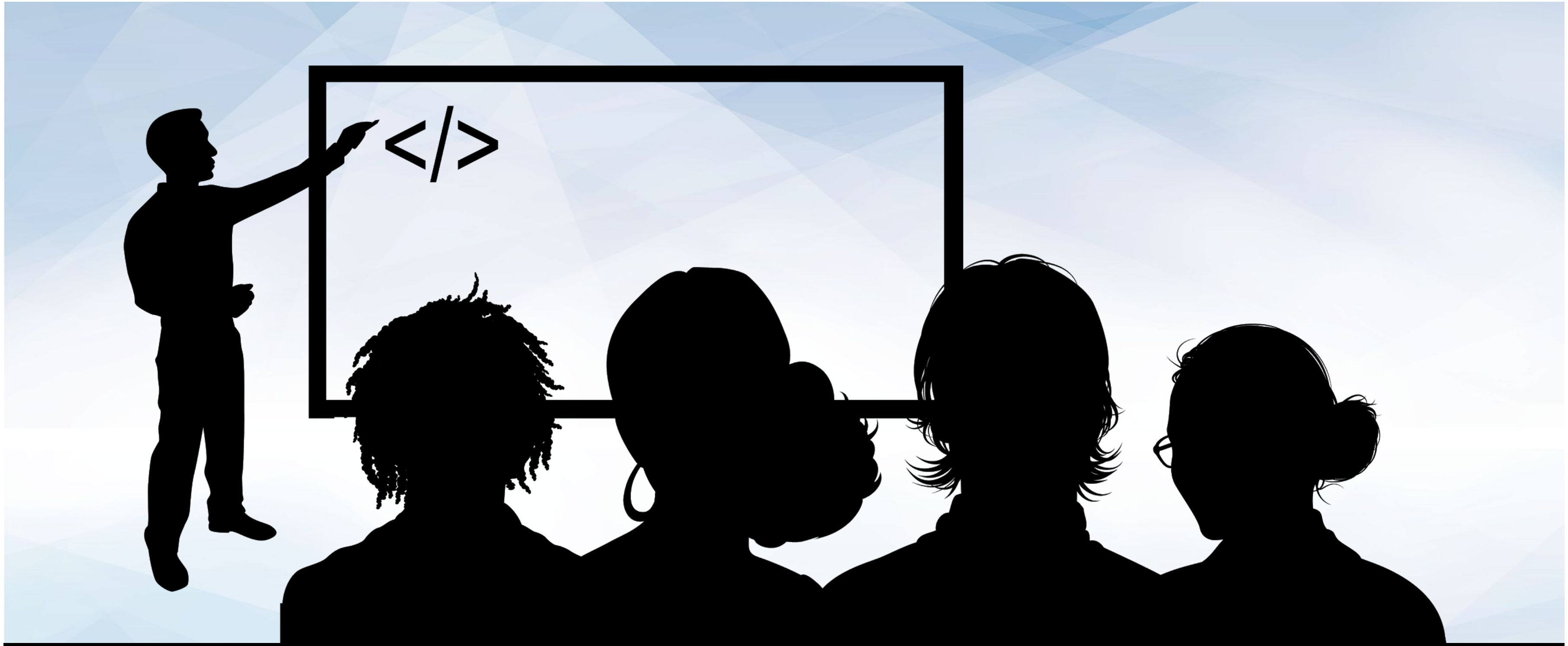
PyViz is a data visualization ecosystem that gives developers an easy way to access multiple data visualization libraries at one time.

PyViz

Each visualization technology in the PyViz ecosystem has the power and features to provide standalone visualizations. Each technology also has its strengths and weaknesses, which will be explored later.



Source: *http://blog.pyviz.org/images/pyviz_graph.png*



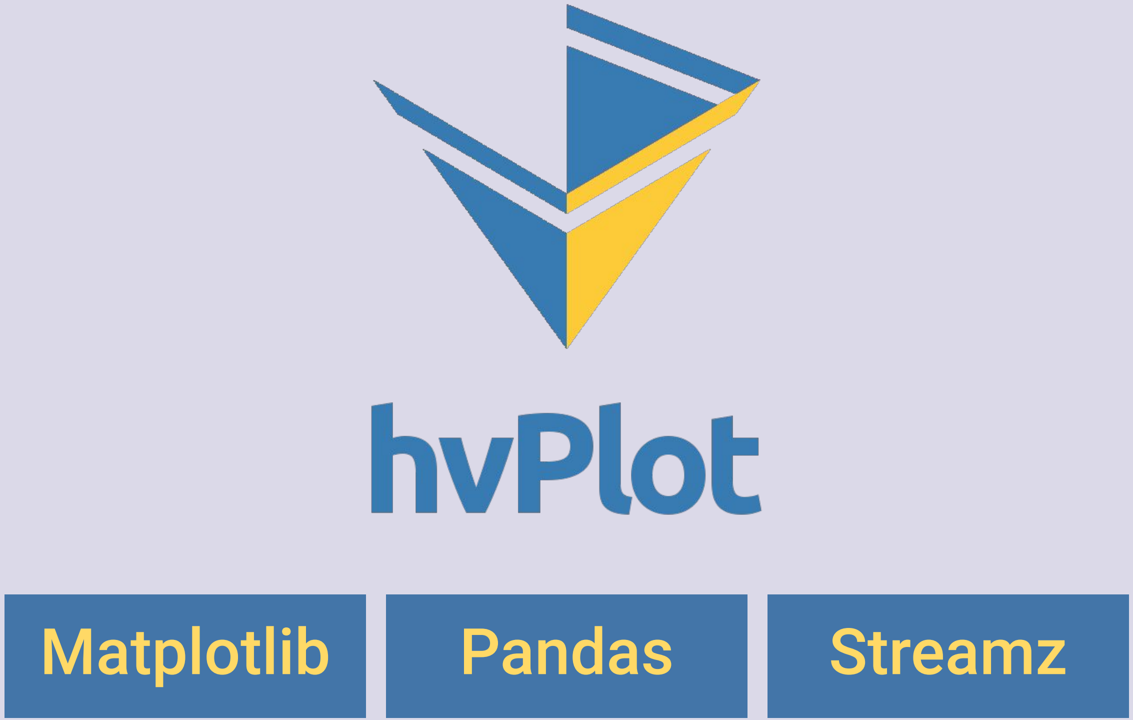
Instructor Demonstration

PyViz

hvPlot

hvPlot

- hvPlot is a technology that brings plots to life.
- hvPlot abstracts over Python visualization libraries like Matplotlib, Pandas, and Streamz. The abstraction allows hvPlot to utilize the standalone plotting mechanisms of these technologies.



hvPlot

Matplotlib

Pandas

Streamz

hvPlot

This abstraction also allows hvPlot to transform static plots (e.g., Matplotlib plots) into interactive sandboxes for data exploration and analysis.

hvPlots allow for:

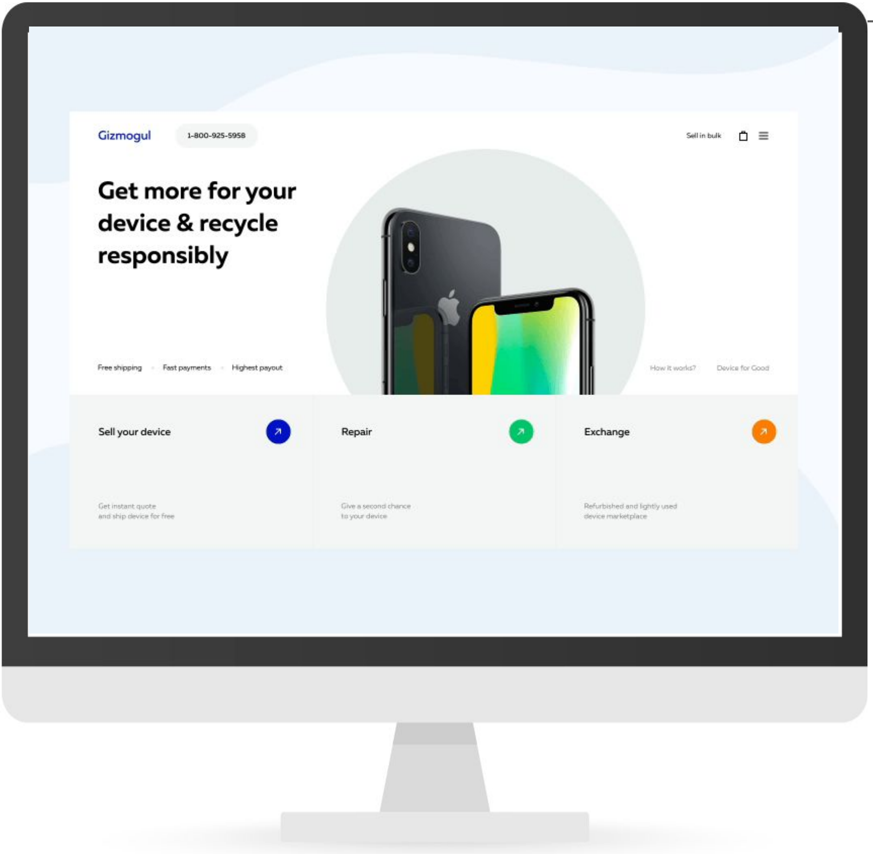
Panning

Zooming

hvPlot

This abstraction also allows hvPlot to transform the static plots (e.g., Matplotlib plots) into interactive sandboxes for data exploration and analysis. hvPlots allow for:

Hovering



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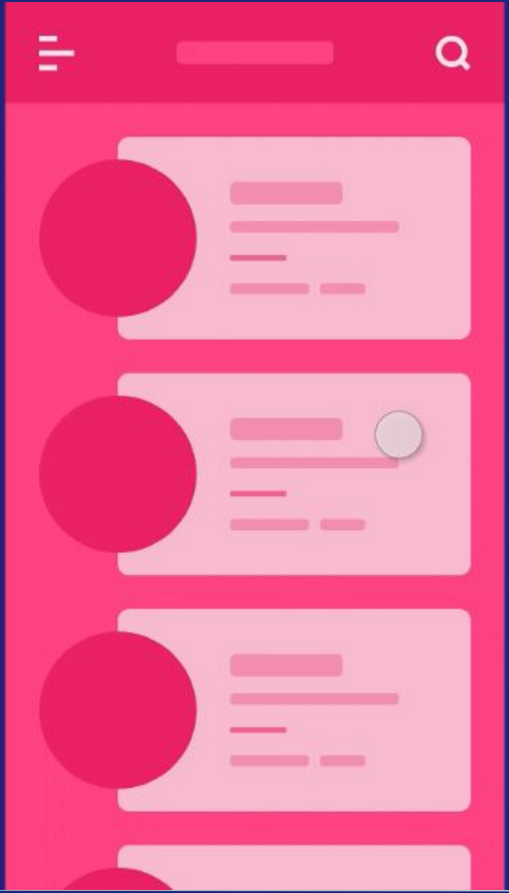
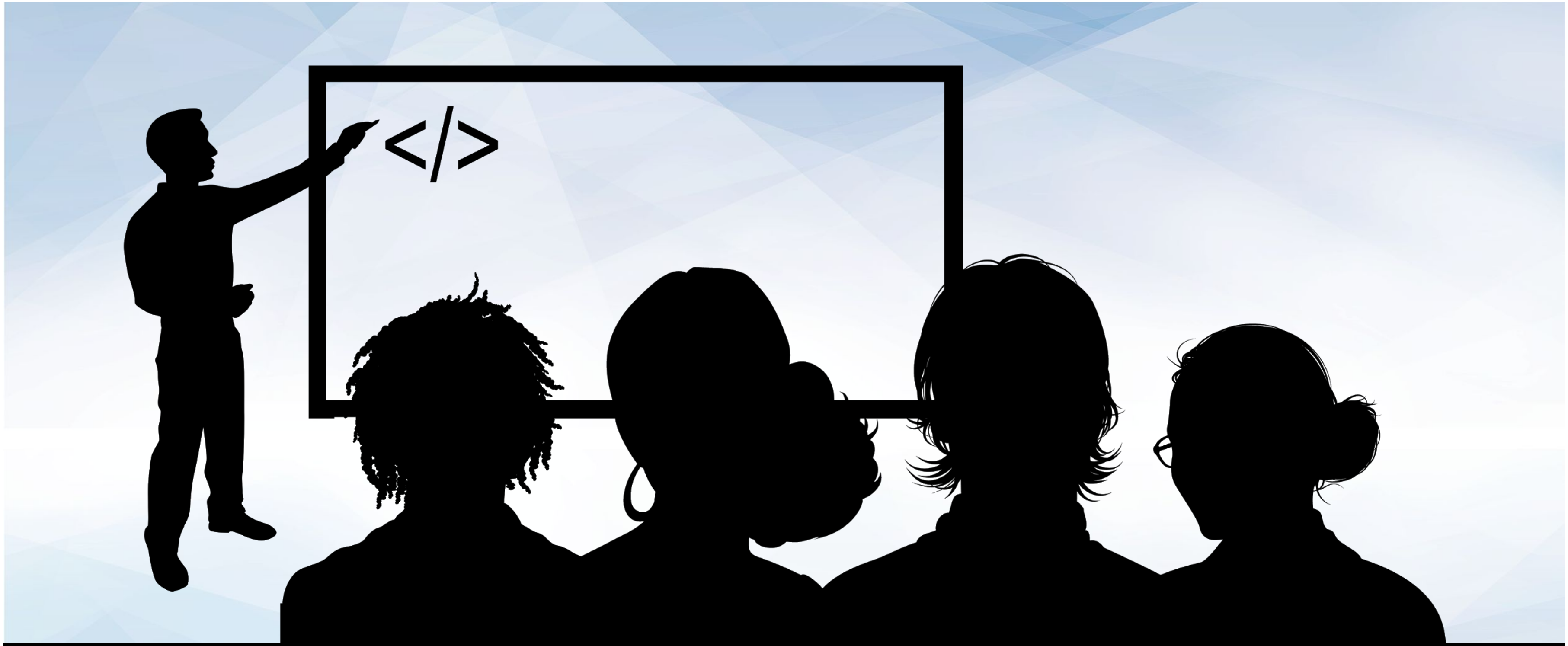
hvPlot

This abstraction also allows hvPlot to transform the static plots (i.e., Matplotlib plots) into interactive sandboxes for data exploration and analysis. hvPlots allow for:

- Clicking
- Filtering





Instructor Demonstration

hvPlot

Activity:

Plotting a Visual Takeover

In this activity, you will revisit plots you made earlier using Matplotlib and recreate them as hvPlots.

(Instructions sent via Slack.)

Suggested Time:
15 Minutes

Time’s Up! Let’s Review.

Countdown timer

15:00

(with alarm)

Interactive Visualizations

Interactive visualizations are charts and graphs that can be manipulated by user interaction. Example interactions include clicking, panning, and zooming, all of which come out of the box with hvPlot.

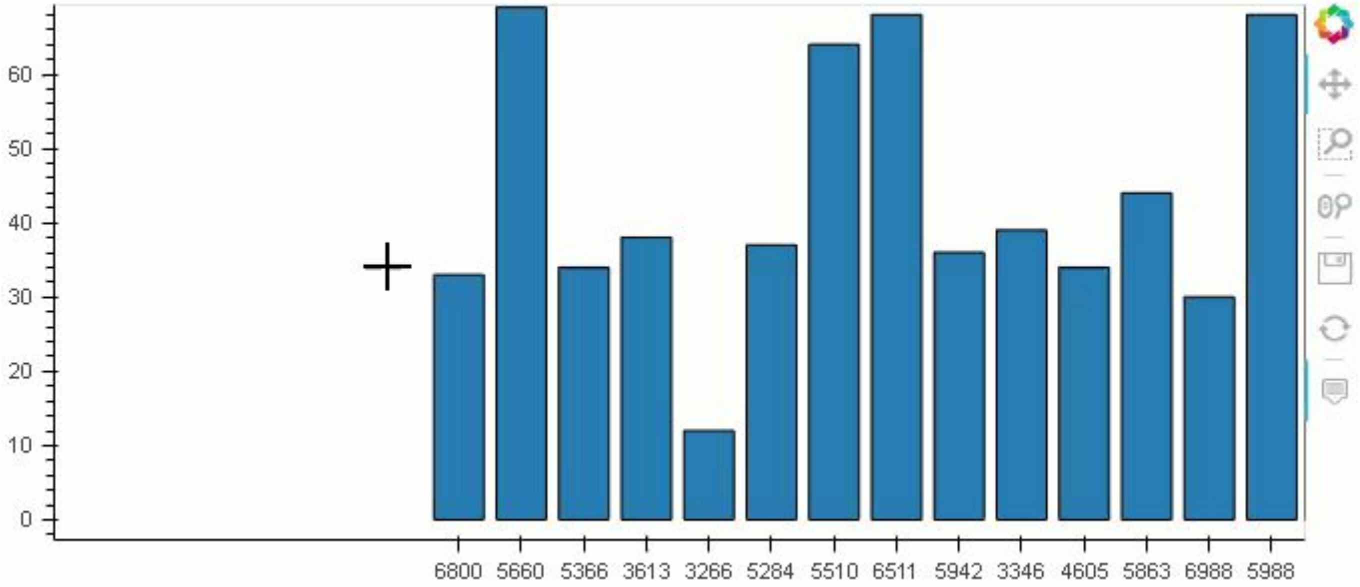
Interactive Visualizations

The widget bar is used to set the mode of interaction. The available modes are:

- Pan
- Box zoom
- Save
- Reset
- Hover

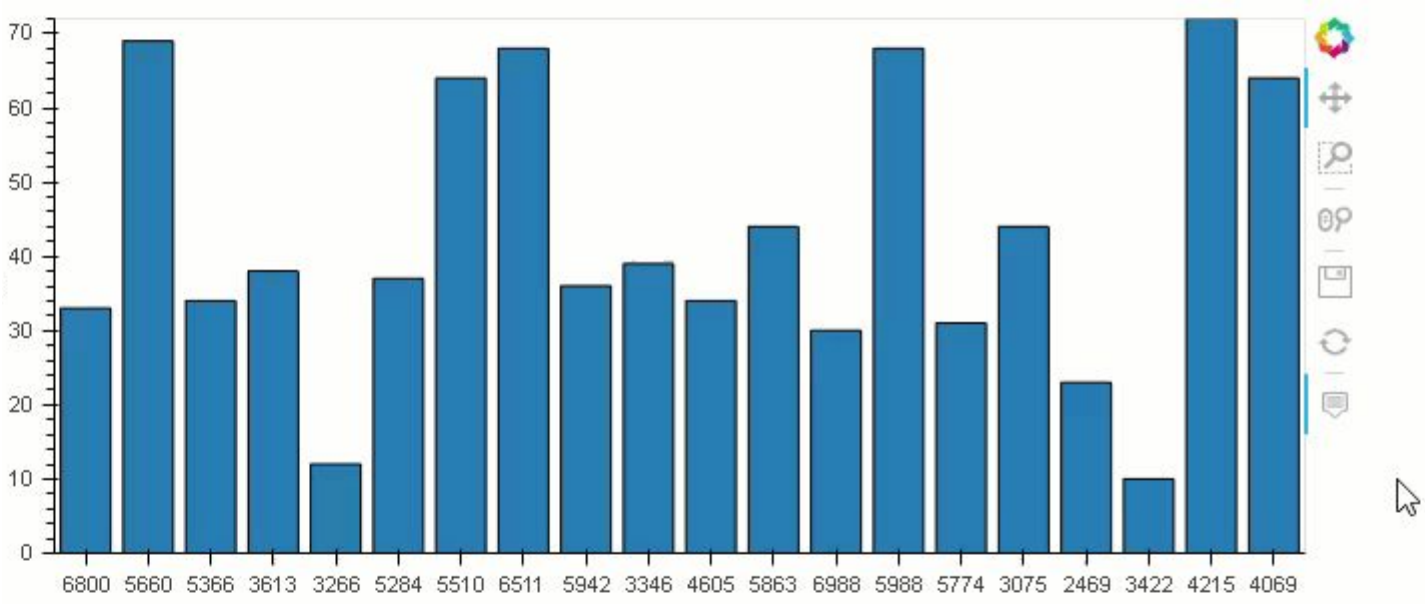
Panning

Panning lets users move data onscreen in all directions, which is valuable when viewing data across time, outlying data points, or even high volume. Instead of zooming out to see all data, panning brings data into the forefront of the visualization.



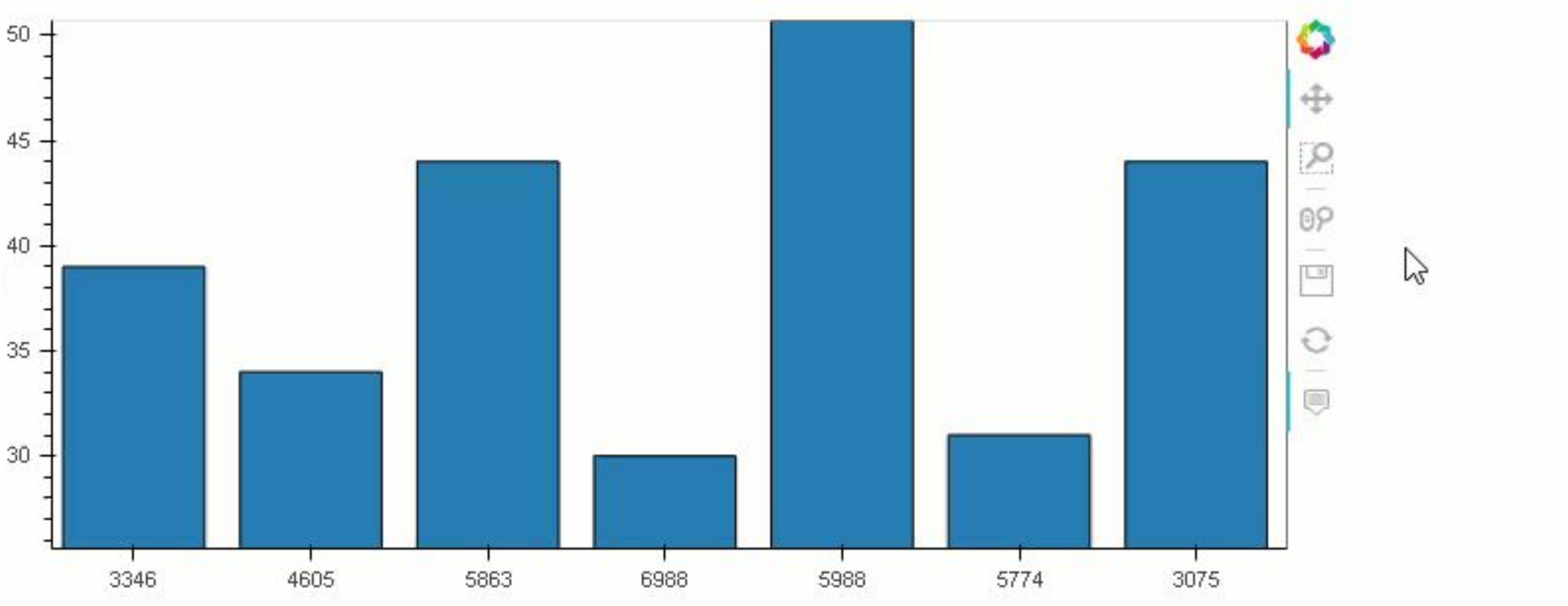
Box Zoom

The box zoom interaction zooms into data points based off of a selection drawn.



Wheel Zoom

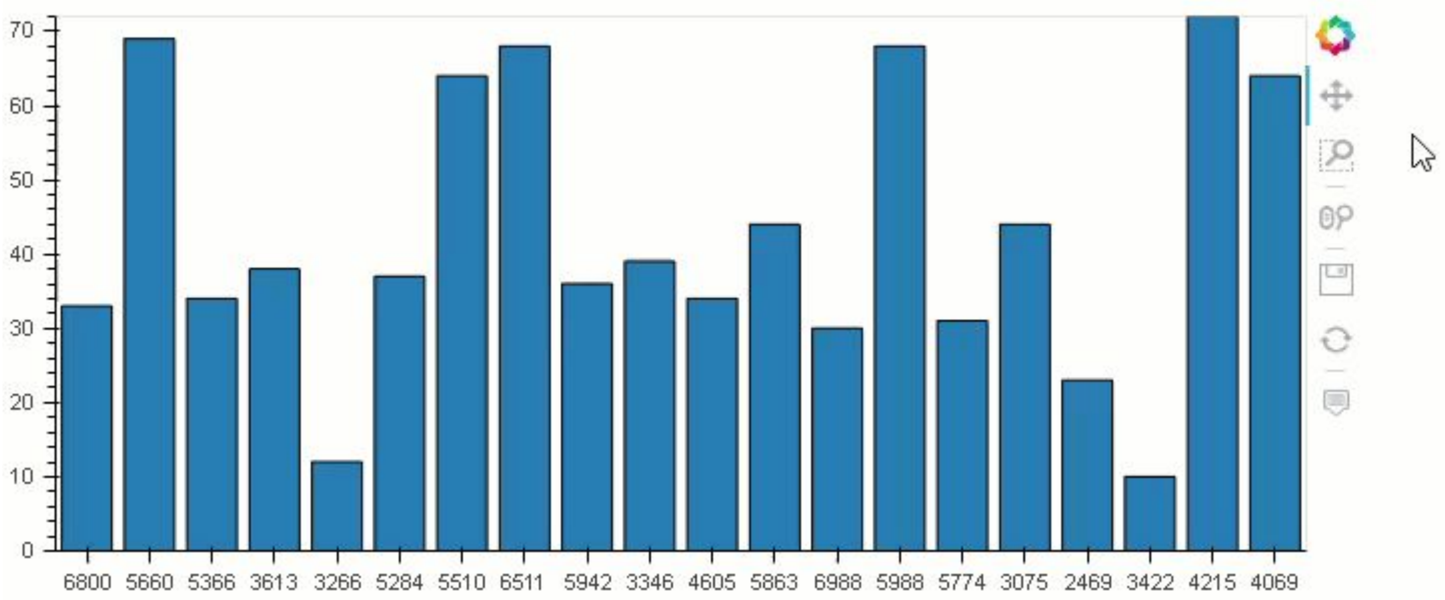
Wheel zoom works similar to box zoom; however, the click wheel is used to magnify data points.



Another way to interact with visualizations is to save them. hvPlot allows visualizations to be saved as html documents for later use.

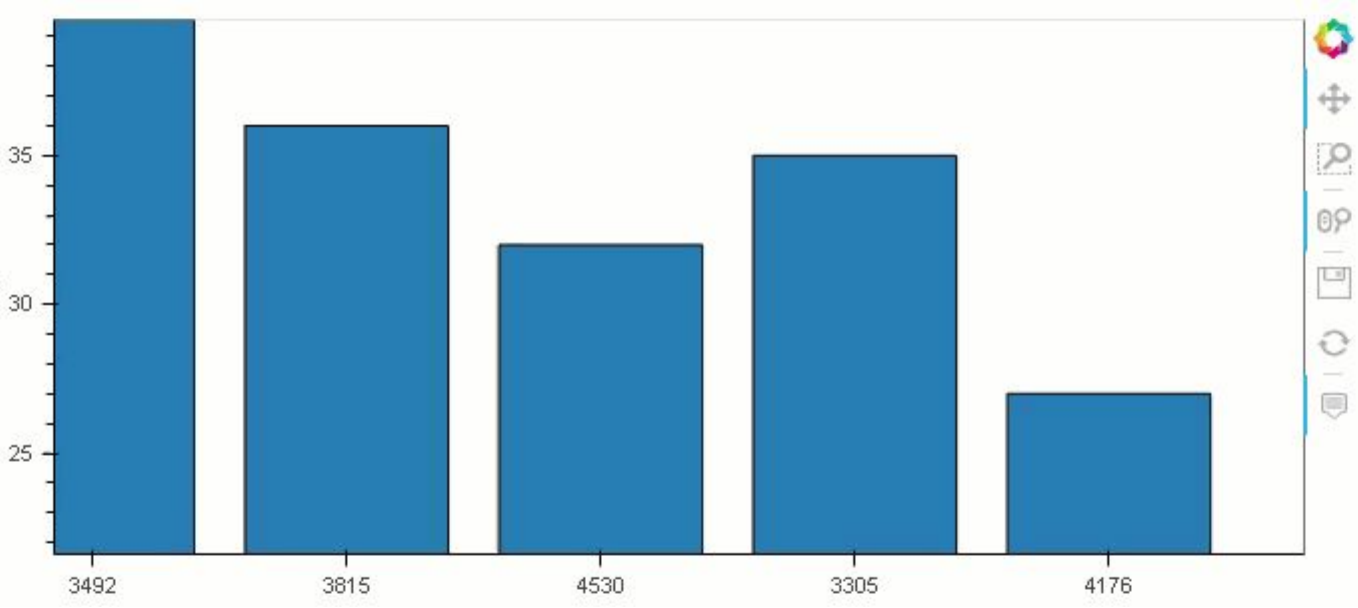
Hovering

Hovering is also a key interaction. Hovering over a value in a visualization shows the actual value for that data point.



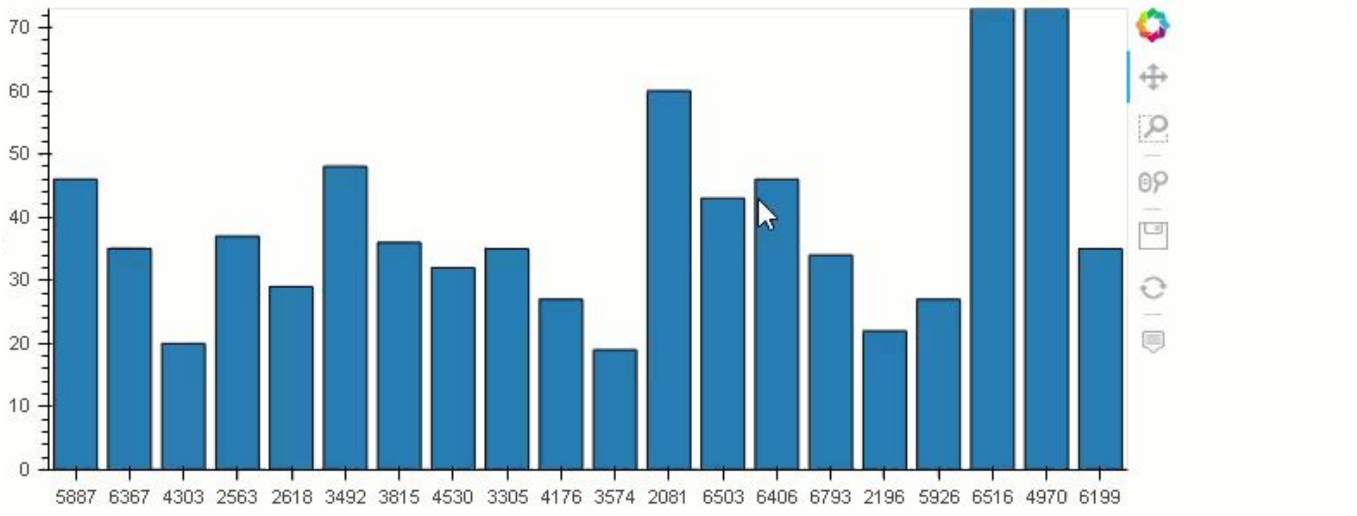
Reset

hvPlot also includes a reset widget button, which resets all visualization interactions. If the visualization was previously zoomed in at 110%, the reset would bring the zoom percentage back to 100%.



Combinations

Widget activities can be combined. Clicking pan, wheel, and hover buttons lets users pan, zoom, and get details by hovering all at the same time. However, certain widgets cannot be used with other widgets. For example, users cannot pan and box zoom at the same time. One action has to occur first, and then the second widget option can be chosen.



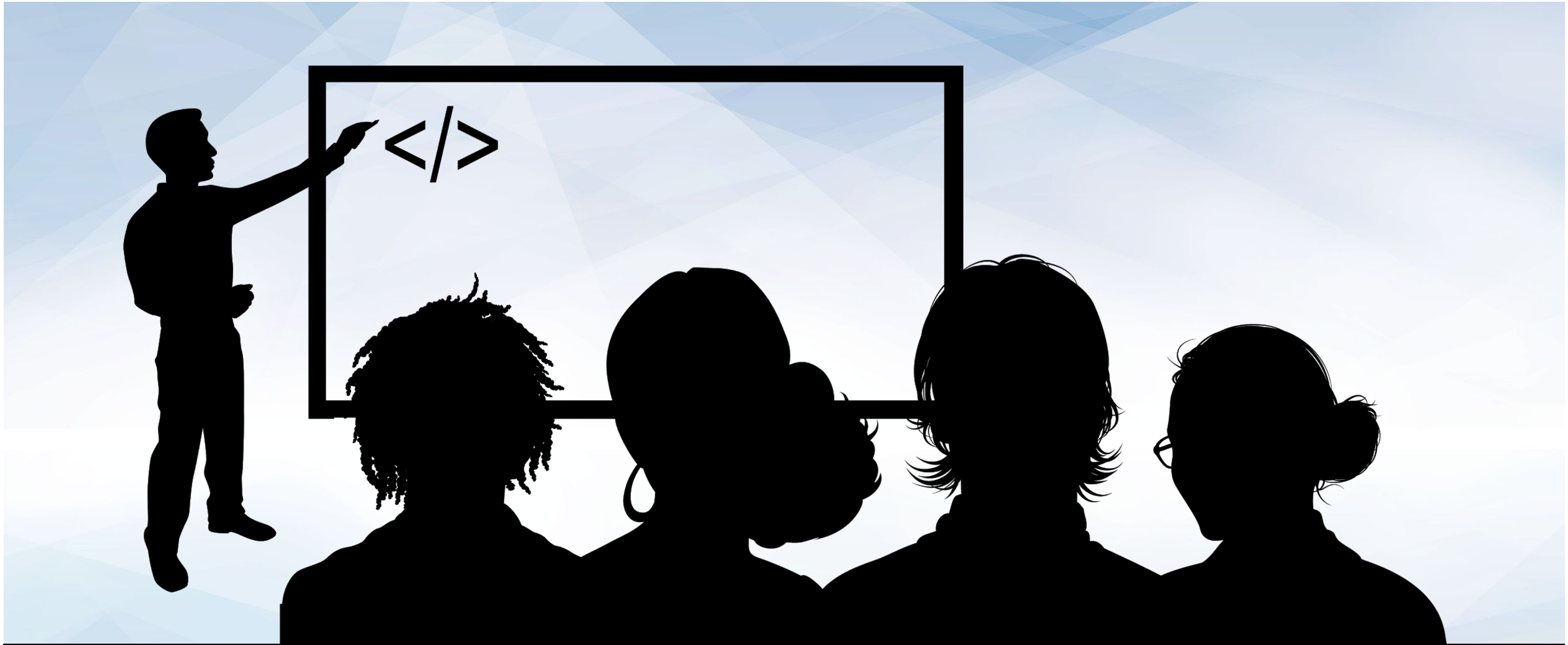
Activity: hvPlot Widgets

In this activity, you will play around with hvPlot widgets to get more accustomed to the different types of interactions supported with hvPlots.

Suggested Time:
15 Minutes

Time's Up! Let's Review.

Composing Plots



Instructor Demonstration

Composing Plots

Activity:

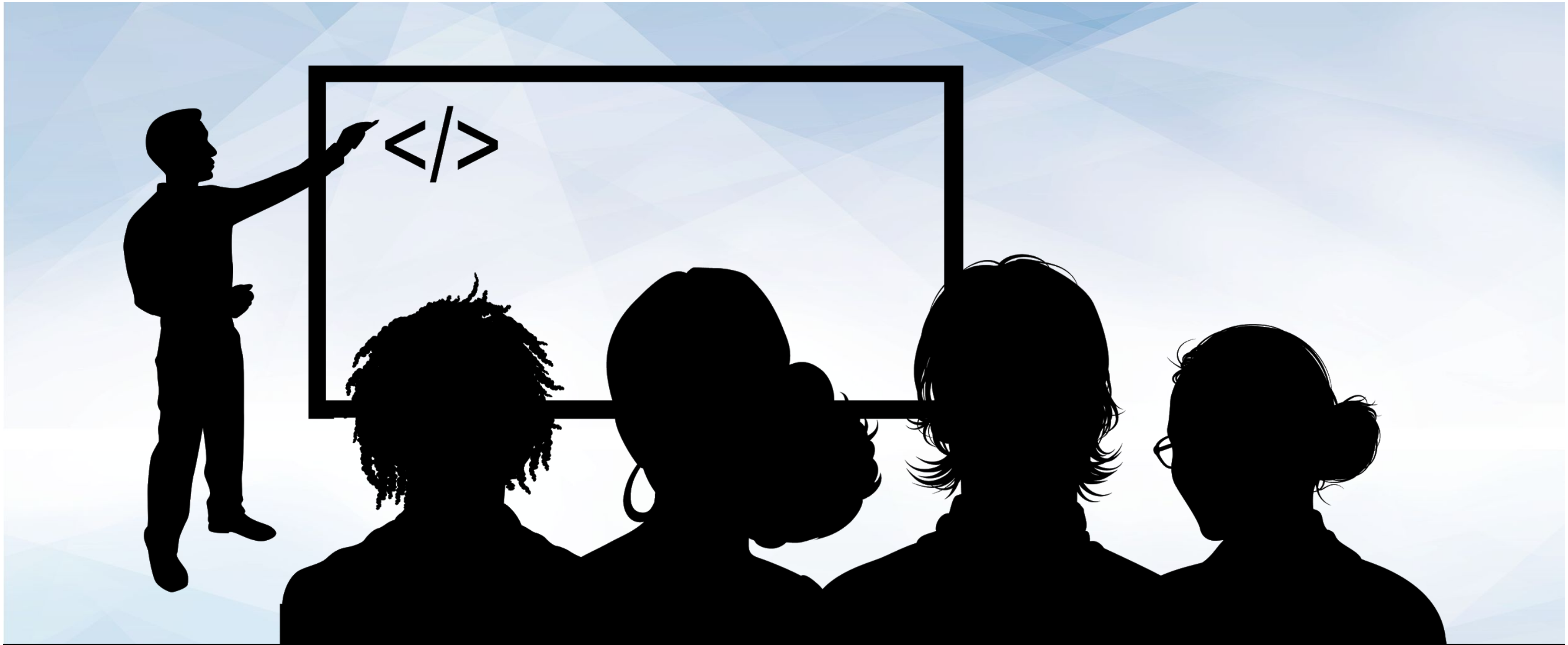
Composing Masterpieces

In this activity, students will use information they learned in the instructor demo to customize hvPlots, using a range of options to customize the color, labels, and axis alignments.

Suggested Time:

10 Minutes

Time’s Up! Let’s Review.



Instructor Demonstration

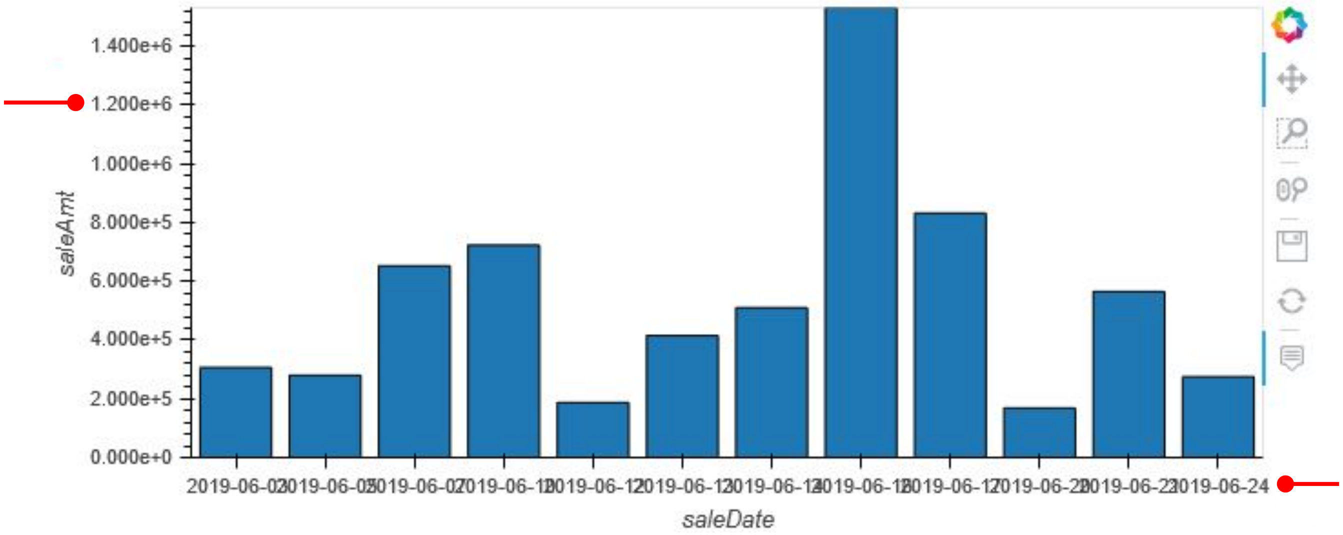
[Visualization Options]

Visualization Options

hvPlots do not always come out perfect. Customization options give users the ability to customize the look and feel of their visualizations.

```
# Plot data without rotation
sale_prices_by_year.hvplot.bar(x='saleDate',y='saleAmt')
```

ylabels are not formatted properly



xlabels are hard to read

Activity: Picture Perfect

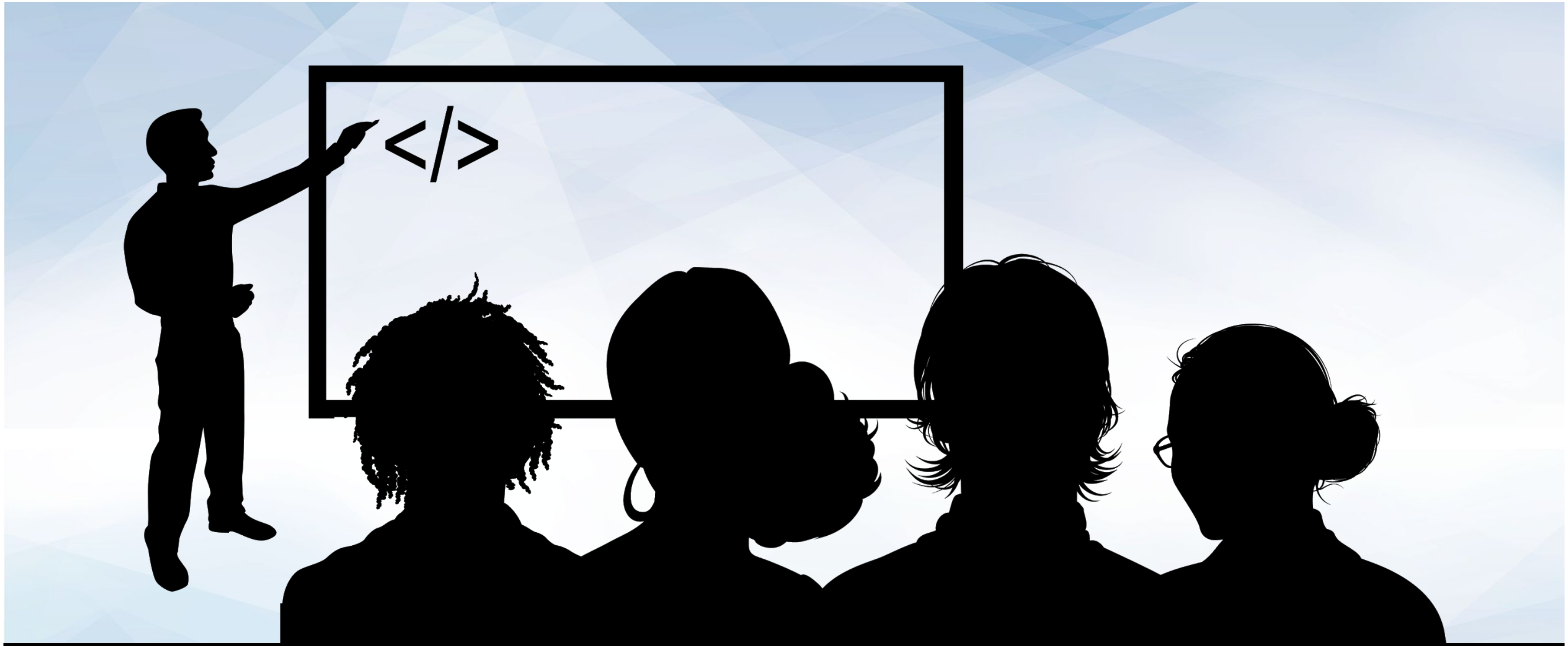
By the end of this activity, you will have employed hvPlot customization attributes and options to perfect and add finishing touches to your visualizations.

(Instructions sent via Slack.)

Suggested Time:
15 Minutes

Time’s Up! Let’s Review.

Plotting with Flair



Instructor Demonstration

Plotting with Flair

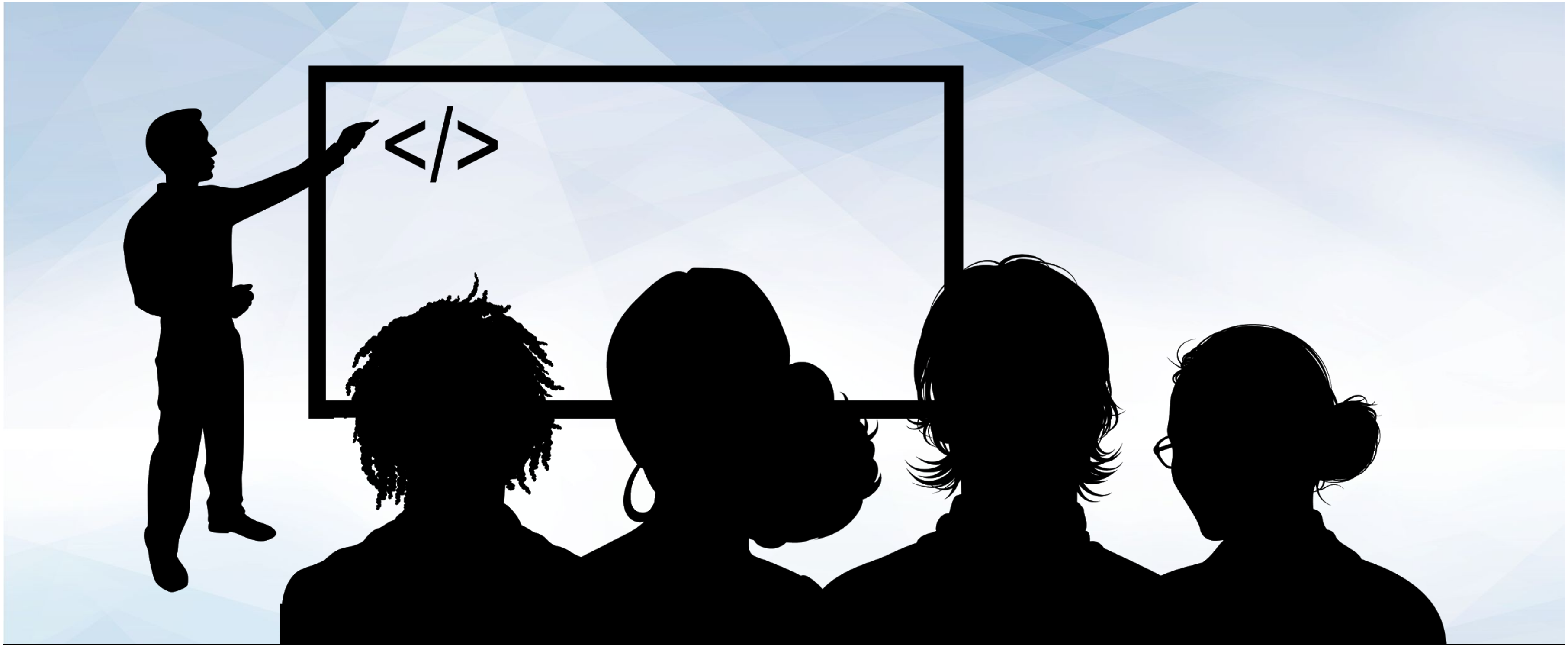
Challenge:

The Immaculate Portfolio

(Instructions sent via Slack.)

Suggested Time:
10 Minutes

Time’s Up! Let’s Review.



Instructor Demonstration

Review Homework

Recap & Questions