



INTERACTIVE DATA VISUALIZATION WITH BOKEH

A Case Study



The Gapminder Data Set

```
In [1]: data.head()
```

```
Out[1]:
```

	Country	fertility	life	population	child_mortality	gdp	\
Year							
1964	Afghanistan	7.671	33.639	10474903.0	339.7	1182.0	
1965	Afghanistan	7.671	34.152	10697983.0	334.1	1182.0	
1966	Afghanistan	7.671	34.662	10927724.0	328.7	1168.0	
1967	Afghanistan	7.671	35.170	11163656.0	323.3	1173.0	
1968	Afghanistan	7.671	35.674	11411022.0	318.1	1187.0	

	region
Year	
1964	South Asia
1965	South Asia
1966	South Asia
1967	South Asia
1968	South Asia

A Data Exploration Tool

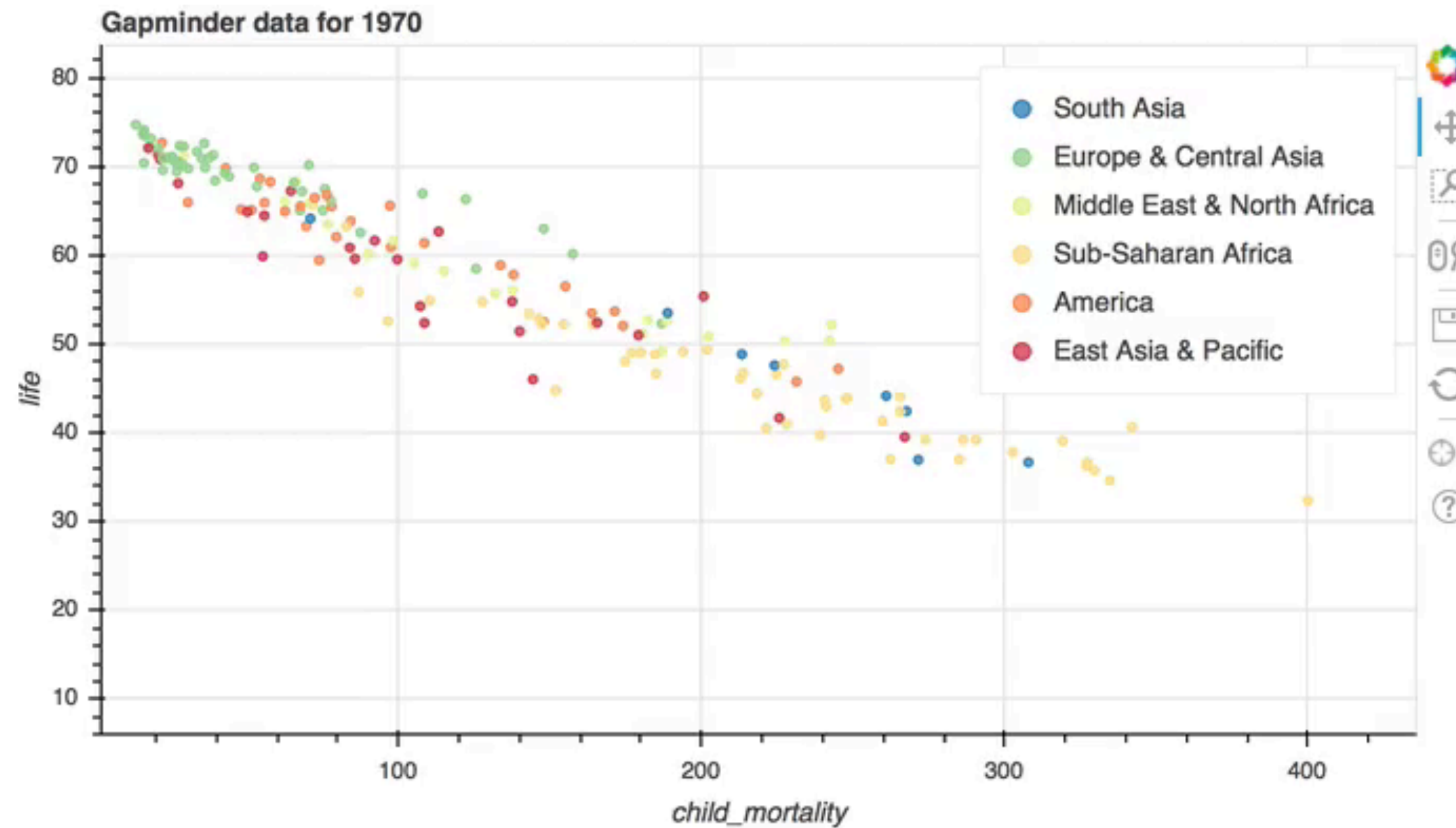
Year: 1970

x-axis data

child_mortality

y-axis data

life





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Let's practice!



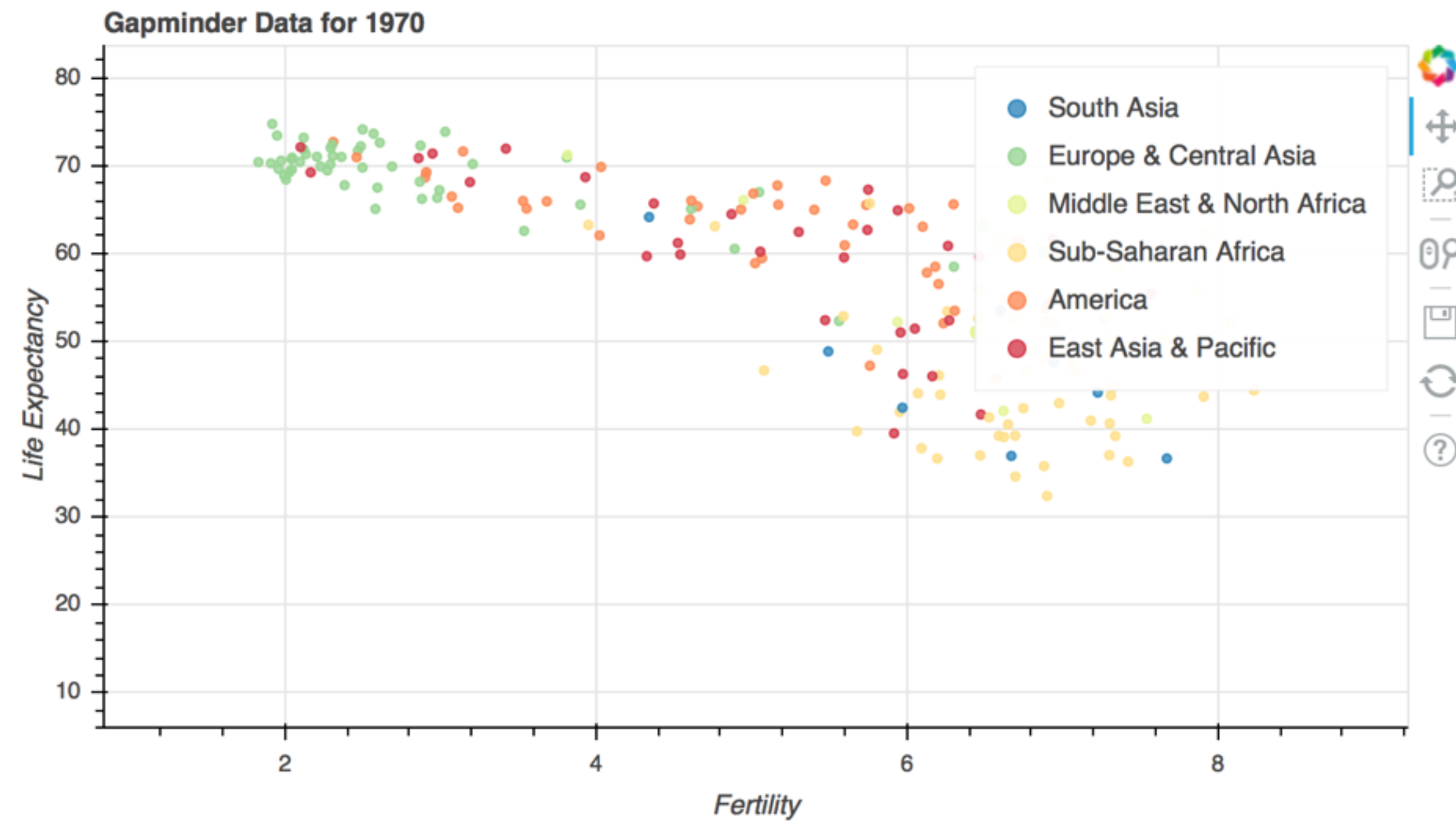
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Starting a Basic App

Adding just a plot

```
In [1]: from bokeh.io import curdoc  
  
In [2]: # Create plots and widgets  
  
In [3]: # Add callbacks  
  
In [4]: # Arrange plots and widgets in layouts  
  
In [5]: curdoc().add_root(layout)
```

Adding just a plot





Adding a slider

```
# Define a callback taking attr, old, new
def update_plot(attr, old, new):
    yr = slider.value
    new_data = {
        # Update date here    }
    source.data = new_data

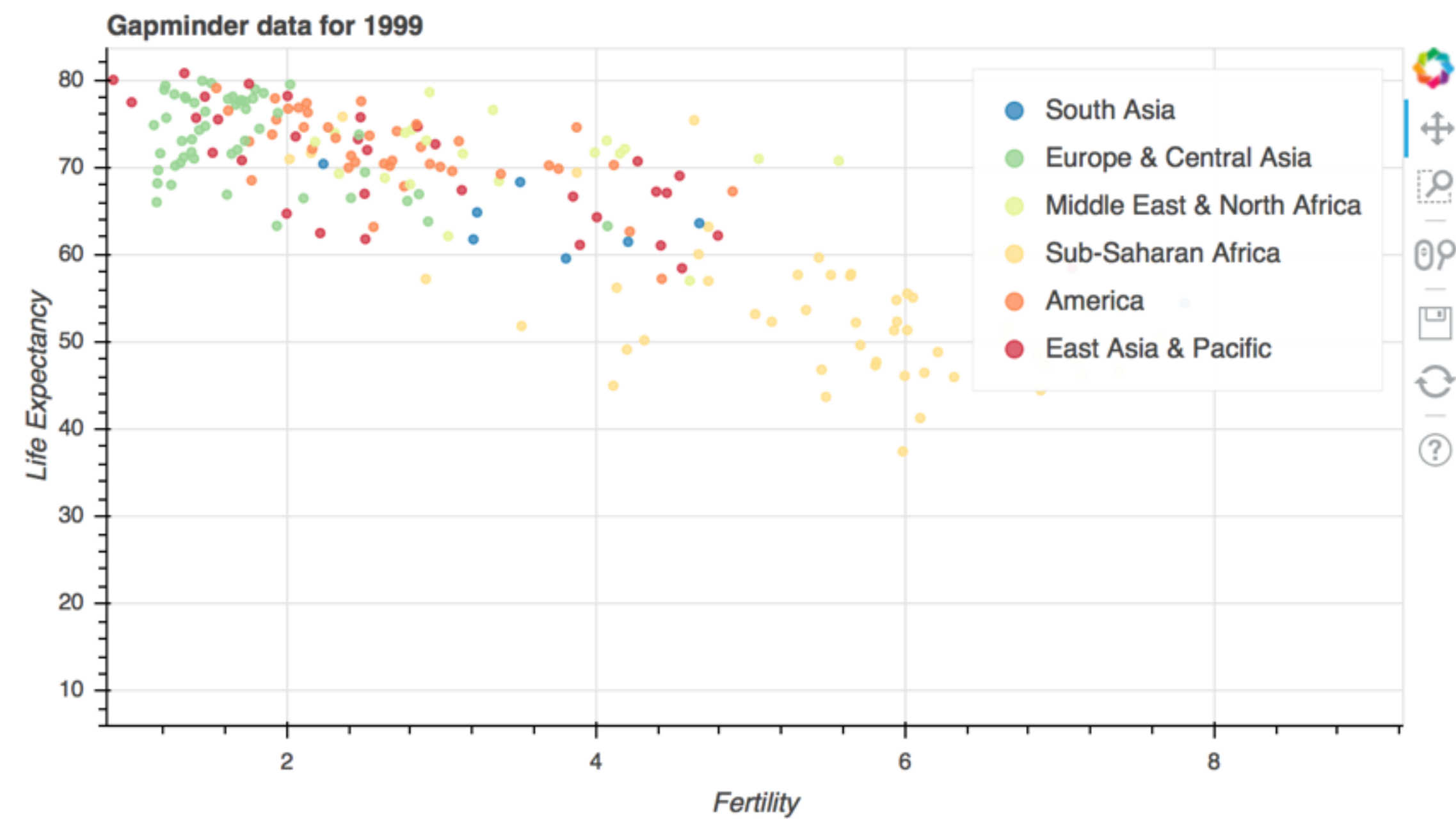
    plot.title.text = # new title text

# Create a slider
slider = Slider(start=1970, end=2010, step=1,
                value=1970, title='Year')

# Add a callback to its value
slider.on_change('value', update_plot)
```

Result for this section

Year: 1999





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Adding More Interactivity



Adding a Hover Tool

? hover.py

```
from bokeh.models import HoverTool

# HoverTool tooltips accepts a list of tuples
hover = HoverTool(tooltips=[
    ('species name', '@species'),
    ('petal length', '@petal_length'),
    ('sepal length', '@sepal_length'),
])

# Include hover in the list of plot tools
plot = figure(tools=[hover, 'pan', 'wheel_zoom'])
```



Adding a Dropdown Menu

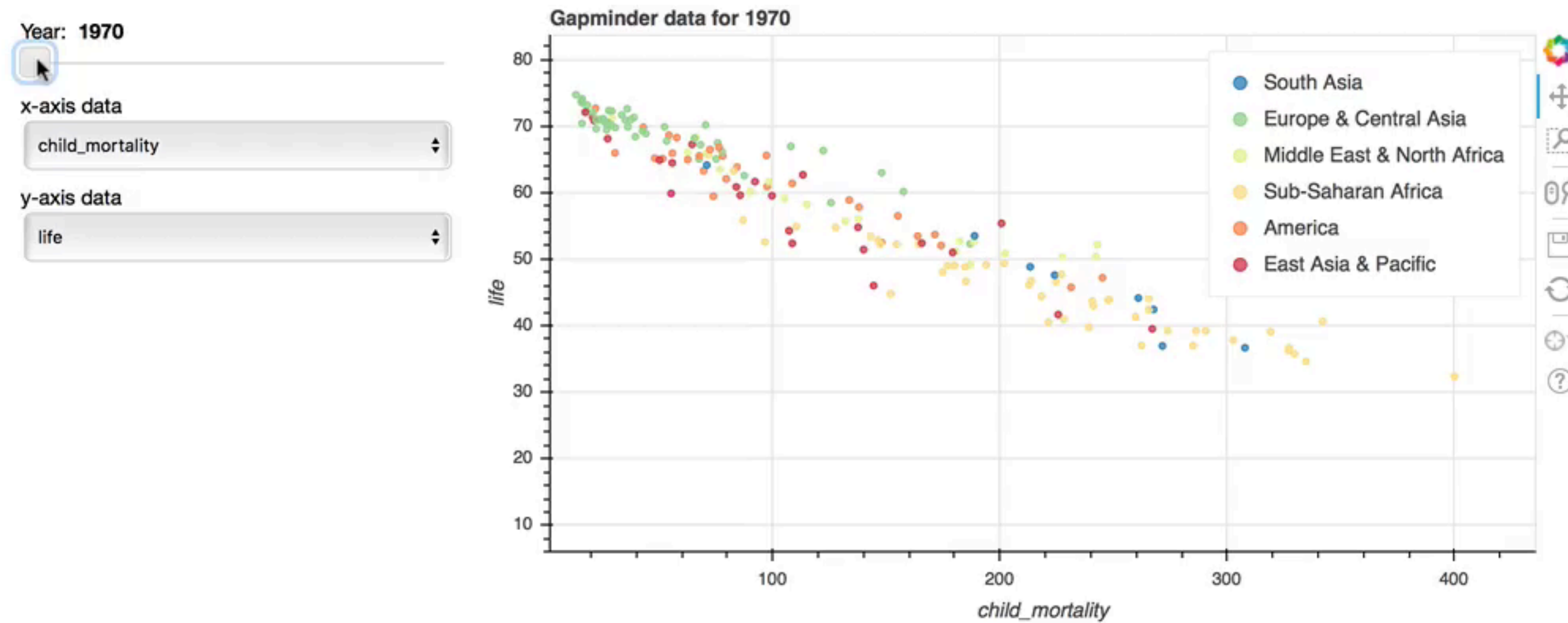
```
from bokeh.models import Select

# Define a callback taking attr, old, new
def callback(attr, old, new):
    # Update the plot here

# Create a Select widget
menu = Select(options=['foo', 'bar', 'baz'],
              value='foo', title='A menu of options')

# Add a callback to its value
menu.on_change('value', callback)
```

The final result





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Wrap Up



Recap and Next Steps

- The bokeh.plotting interface for basic plotting
- How to customize plots and add layouts and interactions
- The bokeh.charts interface for very high level charts
- The power of the bokeh server for creating richly interactive visualization applications.

<https://bokeh.github.io>



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Congratulations!