SNS COLLEGE OF ENGINEERING

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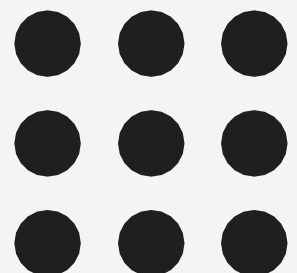
Department of Artificial Intelligence and Data Science

Course Name – 19AD501 Big Data Analytics

III Year / V Semester

Unit 4 – Data Preparation

Topic - Data Visualization using matplotlib

Data Visualization Using Matplotlib

Matplotlib is a cross-platform, open source, data visualization and graphical plotting library for Python and its numerical extension NumPy. As such, it offers a viable open source alternative to MATLAB.

Developers can also use matplotlib's APIs (Application Programming Interfaces) to embed plots in GUI applications.

A Python matplotlib script is structured so that a few lines of code are all that is required in most instances to generate a visual data plot. The matplotlib scripting layer overlays two APIs:

- The **pyplot** API is a hierarchy of Python code objects topped by **matplotlib.pyplot**

- An **OO** (Object-Oriented) API collection of objects that can be assembled with greater flexibility than pyplot. This API provides direct access to Matplotlib's backend layers.

Data Visualization Using Matplotlib
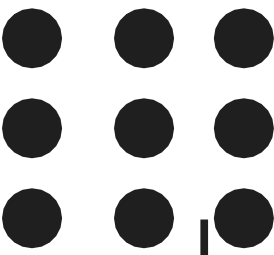
Matplotlib is a multi-platform data visualization library built on NumPy arrays and designed to work with the broader SciPy stack.

It was introduced by John Hunter in the year 2002.

Matplotlib consists of several plots like **line, bar, scatter, histogram** etc.

Data Visualization Using Matplotlib

Matplotlib and Pyplot in Python

matplotlib.pyplot.figure:

Figure is the top-level container. It includes everything visualized in a plot including one or more Axes.

matplotlib.pyplot.axes:

Axes contain most of the elements in a plot: Axis, Tick, Line2D, Text, etc., and sets the coordinates.

It is the area in which data is plotted. Axes include the X-Axis, Y-Axis, and possibly a Z-Axis, as well.

Data Visualization Using Matplotlib

Importing matplotlib :

The following code is used to import

from matplotlib import pyplot as plt

or

import matplotlib.pyplot as plt

How to Create Matplotlib Plots

This section shows how to create examples of different kinds of plots with matplotlib.

Matplotlib Line Plot

In this example, pyplot is imported as plt, and then used to plot three numbers in a straight line:

```
import matplotlib.pyplot as plt
# Plot some numbers:
plt.plot([1, 2, 3])
plt.title("Line Plot")
# Display the plot:
plt.show()
```
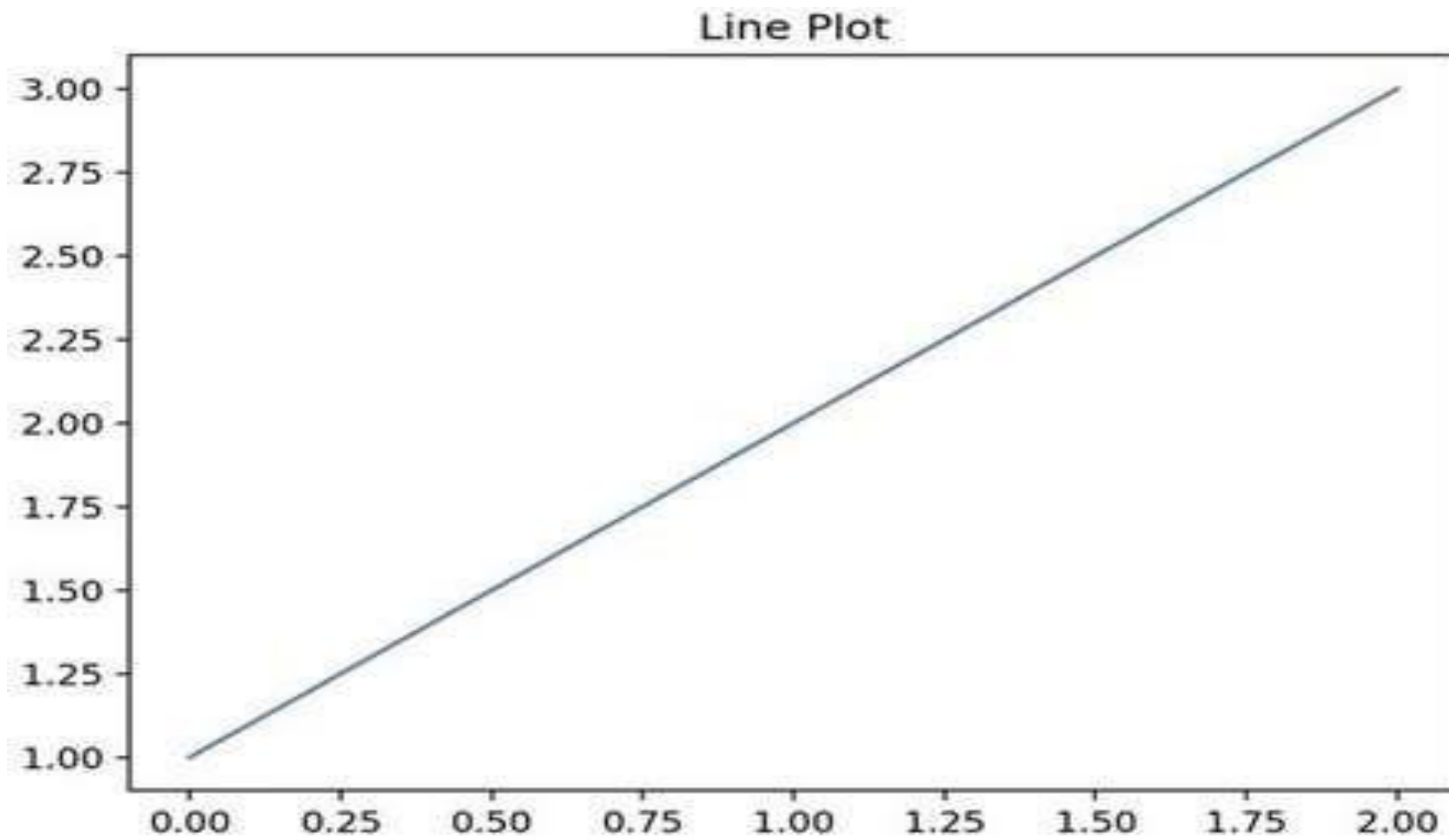
Data Visualization Using Matplotlib

Matplotlib Pie Plot

In this example, pyplot is imported as plt, and then used to create a chart with four sections that have different labels, sizes and colors:
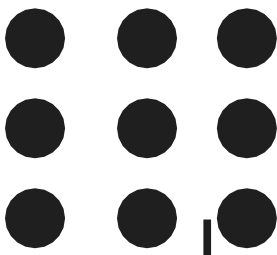
```
import matplotlib.pyplot as plt
# Data labels, sizes, and colors are defined:
labels = 'Broccoli', 'Chocolate Cake', 'Blueberries', 'Raspberries'
sizes = [30, 330, 245, 211]
colors = ['green', 'brown', 'blue', 'red']
# Data is plotted:
plt.pie(sizes, labels=labels, colors=colors)
plt.axis('equal')
plt.title("Pie Plot")
plt.show()
```
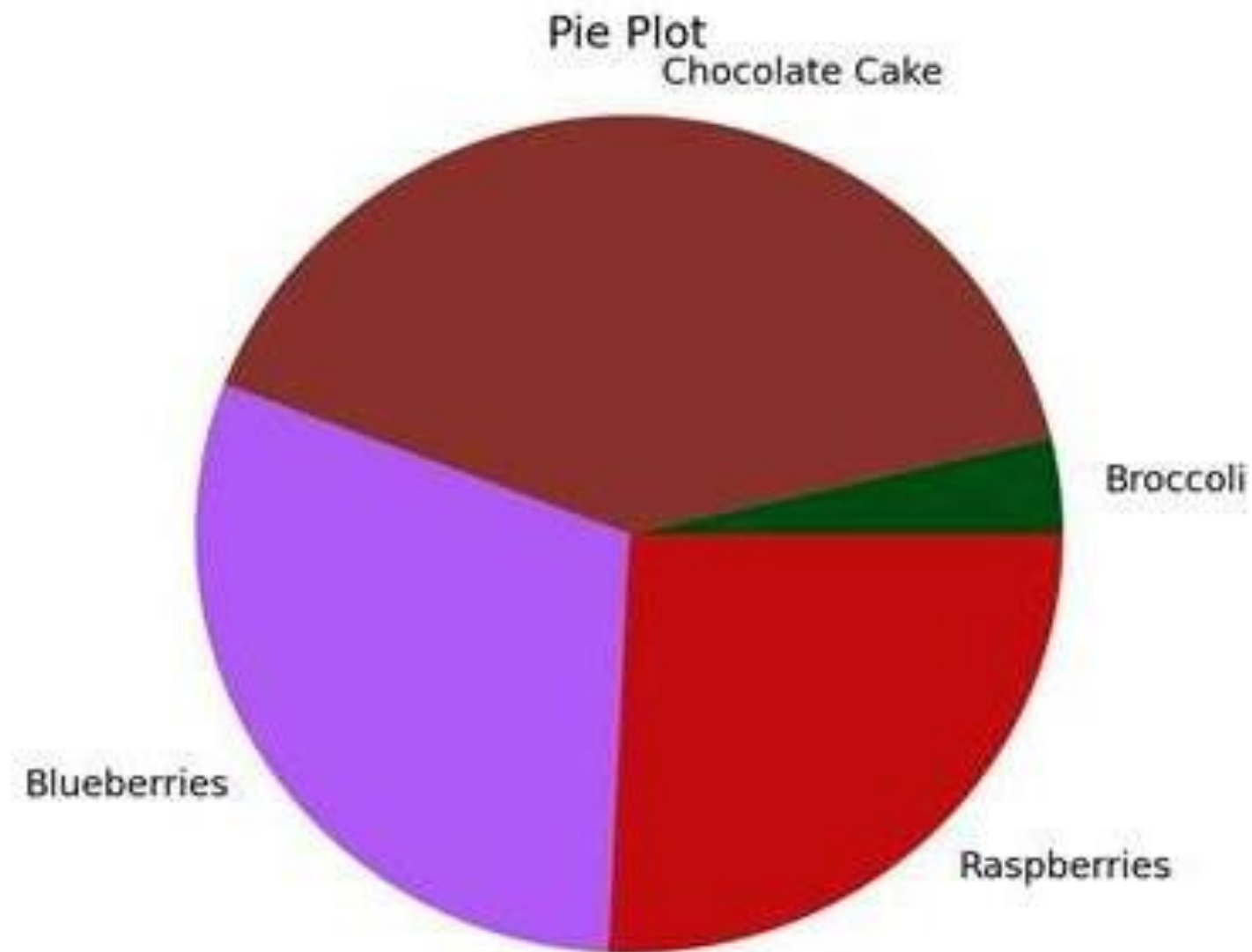
Data Visualization Using Matplotlib

Matplotlib Pie Plot

Data Visualization Using Matplotlib

Matplotlib Bar Plot

In this example, pyplot is imported as plt, and then used to plot three vertical bar graphs:

import matplotlib.pyplot as plt

import numpy as np

Create a Line2D instance with x and y data in sequences xdata, ydata:
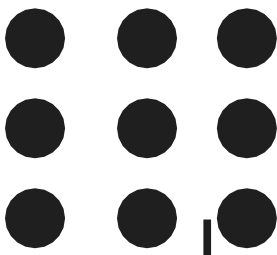

x data:

xdata=['A','B','C']

y data:

ydata=[1,3,5]

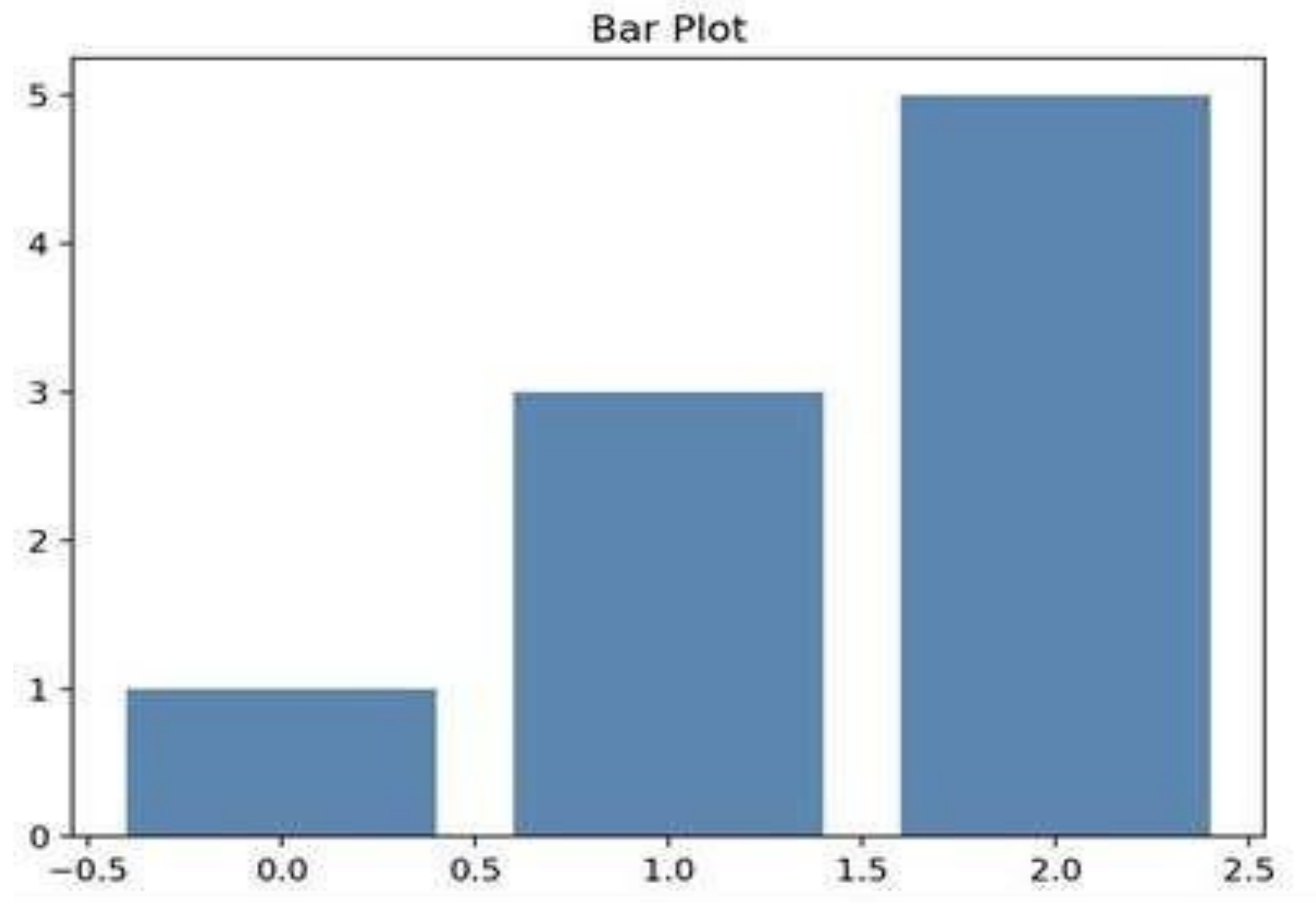plt.bar(range(len(xdata)),ydata)

plt.title("Bar Plot")

plt.show()

Data Visualization Using Matplotlib

Matplotlib Bar Plot

THANK YOU