Data Visualization Sample Code (for Teacher Demonstration)

Line Graph

- Purpose: Shows the trend of neural signal amplitude over time.
- Example: Visualize the amplitude of neural signals for wrist movements over a 10-second interval.
 Code snippet (Python, using graphics.py):

```
from graphics import *
win = GraphWin("Line Graph", 500, 500)
win.setCoords(0, 0, 10, 100)
data = [10, 20, 40, 30, 50, 60, 70, 65, 80, 75] # Example neural data
for i in range(len(data) - 1):
    line = Line(Point(i, data[i]), Point(i+1, data[i+1]))
    line.draw(win)
win.getMouse() # Pause to view the graph
win.close()
Interpretation: Peaks represent maximum poural activity while dips suggest reduced activ
```

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2. Bar Chart

- **Purpose**: Compare the amplitude of neural signals for different movements.
- **Example**: Display the average amplitude for finger movements versus wrist movements. **Code snippet**:

```
from graphics import *
win = GraphWin("Bar Chart", 500, 500)
win.setCoords(0, 0, 5, 100)
categories = ["Finger", "Wrist"]
values = [65, 85]  # Example average amplitudes
for i, val in enumerate(values):
    bar = Rectangle(Point(i + 1, 0), Point(i + 2, val))
    bar.setFill("blue")
    bar.draw(win)
    label = Text(Point(i + 1.5, -5), categories[i])
    label.draw(win)
win.getMouse()
```

```
win.close()
```

Interpretation: The taller bar indicates higher activity (e.g., wrist movements generate more neural activity).





Date:

3. Scatter Plot

- **Purpose**: Show relationships between two variables, such as neural signal amplitude and time.
- **Example**: Scatter plot showing the distribution of neural signal amplitudes for different time points. **Code snippet**:

```
from graphics import *
win = GraphWin("Scatter Plot", 500, 500)
win.setCoords(0, 0, 10, 100)
data = [(1, 15), (2, 20), (3, 35), (4, 25), (5, 45), (6, 40)] # Example (time,
amplitude)
for point in data:
    dot = Circle(Point(point[0], point[1]), 0.2)
    dot.setFill("red")
    dot.draw(win)
win.getMouse()
win.close()
```

• Interpretation: Clustering of points in certain regions can indicate periods of consistent activity.

These visualizations provide insights into how neural data behaves across different scenarios, assisting in identifying patterns, trends, or anomalies. (Python script is provided with the activity.)

Summary of Data Representation in the Graphs:

- Line Graphs: Could display the time-series neural signal from either EEG or EMG data, showing changes in signal amplitude (voltage) over time.
- **Bar Charts**: Could show the **average signal amplitude** for different types of muscle or brain activity (e.g., finger vs. wrist movements, or brain activity under different conditions).
- Scatter Plots: Could display the distribution of neural signal amplitudes at specific time points or under different conditions, showing relationships between different neural variables.



