plotting_intermediate_fun

May 28, 2024

0.0.1 Exercise 1: Customizing Line Plots

Objective: Enhance a line plot with custom styles, annotations, and shading.

Instructions:

1. Generate a sine wave and a cosine wave using `numpy`.
2. Plot both waves on the same figure with different line styles and colors.
3. Add a legend to distinguish between the sine and cosine waves.
4. Annotate the local maxima and minima using `plt.annotate()`.
5. Use `plt.fill_between()` to shade the area between the waves.

0.0.2 Exercise 2: Creating Subplots with Shared Axes

Objective: Create a figure with multiple subplots sharing the same x or y-axis.

Instructions:

1. Generate three different datasets using `numpy` (e.g., linear, quadratic, and logarithmic relationships).
2. Create a 1x3 subplot layout with shared y-axis.
3. Plot each dataset on a separate subplot and link their y-axes.
4. Customize each subplot with a grid, title, and axis labels.
5. Adjust the layout to prevent overlapping using `plt.tight_layout()`.

0.0.3 Exercise 3: Interactive Plotting with Widgets

Objective: Create an interactive plot that updates with user input.

Instructions:

1. Use `ipywidgets` to create a dropdown menu that lets the user select between different types of plots (e.g., line, scatter, bar).
2. Depending on the selection, update the plot dynamically to display the chosen plot type.
3. Include interactive widgets for customizing plot parameters like color and marker style.
4. Ensure the plot updates in real-time as the user interacts with the widgets.

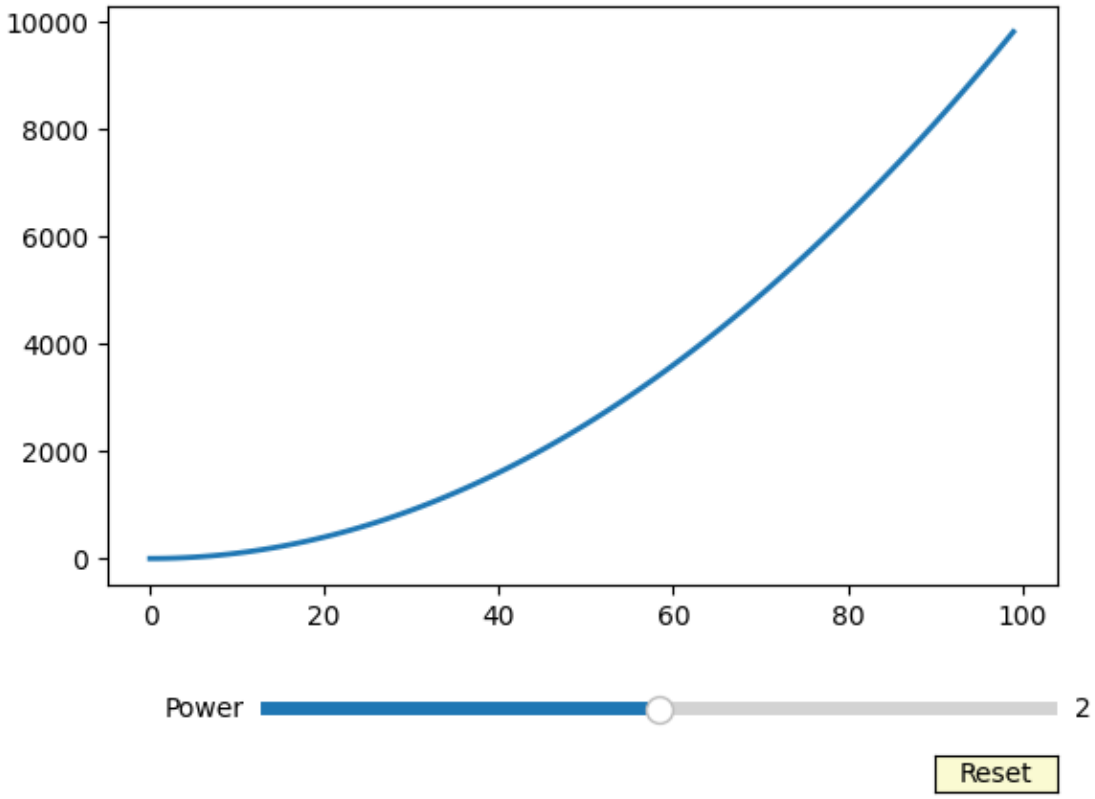
0.0.4 Exercise 4: Advanced Visualization: Heatmaps and Correlation

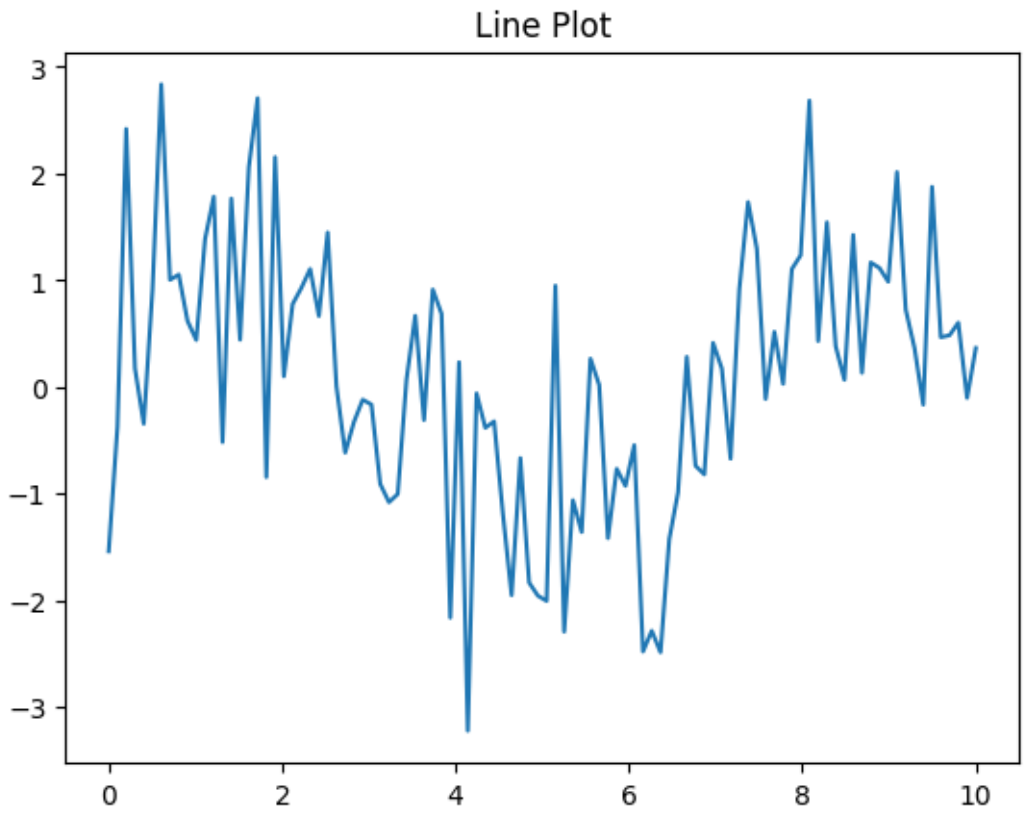
Objective: Visualize the correlation matrix of a dataset as a heatmap.

Instructions:

1. Generate a synthetic dataset with multiple features using `numpy` or `pandas`.

2. Calculate the correlation matrix of the dataset.
3. Use `seaborn` or `plt.imshow()` to create a heatmap of the correlation matrix.
4. Customize the heatmap with a color bar, tick labels, and a diverging colormap.
5. Add annotations to each cell in the heatmap to display the correlation coefficients.



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Time taken: 0.138840913772583 seconds
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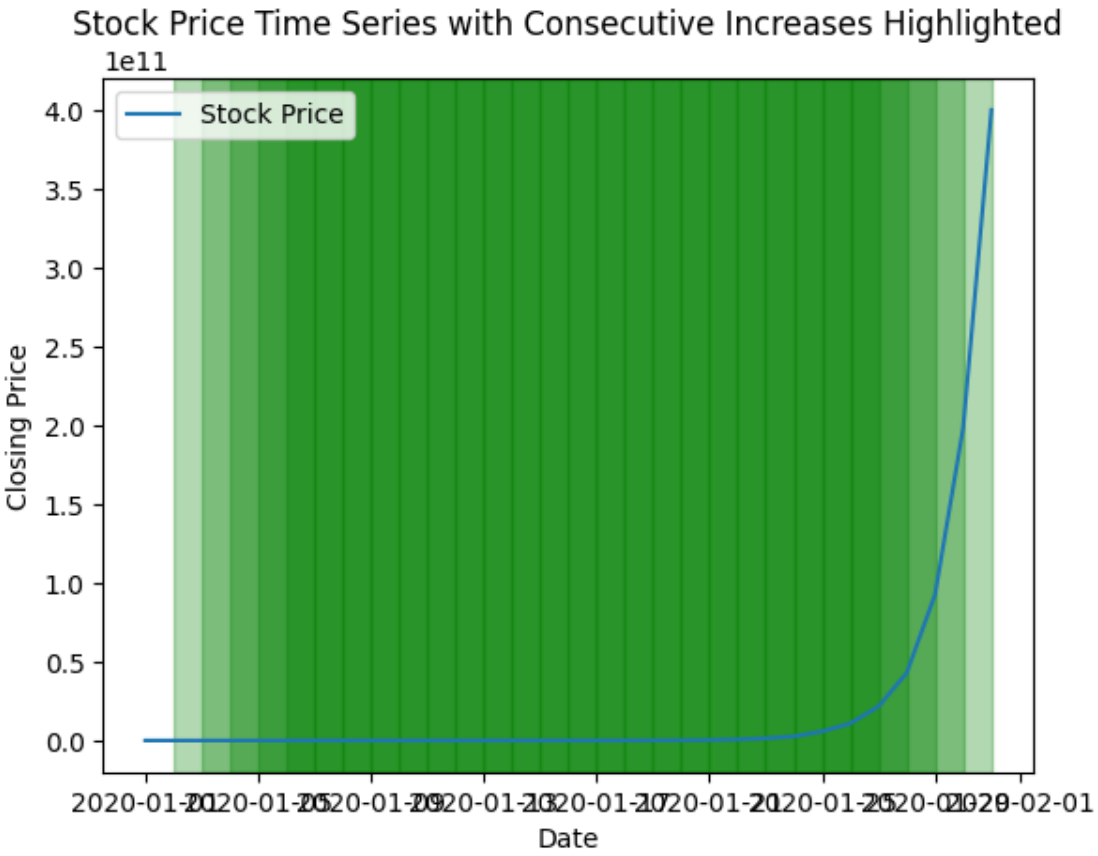

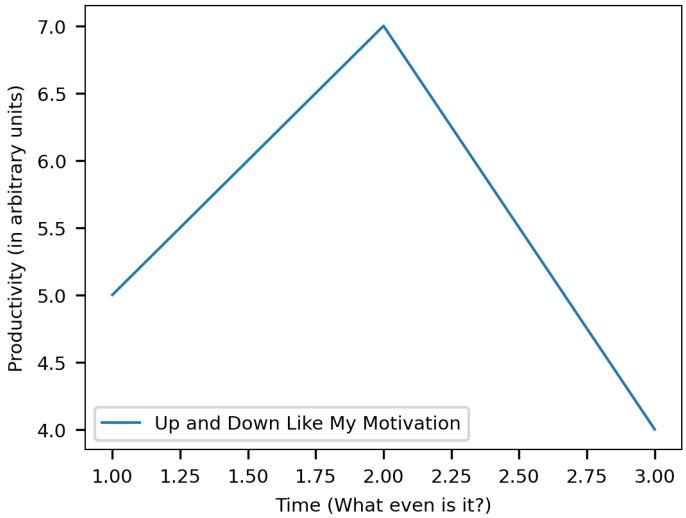


```
/home/lectures/.config/matplotlib
```

```
Requirement already satisfied: scienceplots in
/opt/anaconda3/lib/python3.8/site-packages (1.0.2)
Requirement already satisfied: matplotlib in
/home/lectures/.local/lib/python3.8/site-packages (from scienceplots) (3.7.3)
Requirement already satisfied: contourpy>=1.0.1 in
/home/lectures/.local/lib/python3.8/site-packages (from
matplotlib->scienceplots) (1.1.1)
Requirement already satisfied: cycler>=0.10 in
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matplotlib->scienceplots) (0.12.1)
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Requirement already satisfied: packaging>=20.0 in
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(23.2)
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/opt/anaconda3/lib/python3.8/site-packages (from matplotlib->scienceplots)
(5.12.0)
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packages (from importlib-resources>=3.2.0->matplotlib->scienceplots) (3.17.0)
Requirement already satisfied: six>=1.5 in /opt/anaconda3/lib/python3.8/site-
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Note: you may need to restart the kernel to use updated packages.
```