

MPs-elected.xlsx
spreadsheet

I am a Master's student pursuing Data Science and Communication, For my Dissertation, I am researching a question "A Comparative Analysis of Data Visualisations generated by LLMs over Manual visualisations in representation Election Data and by evaluating based on accuracy, Applications and Ethical considerations"

So I will be testing you on a use case provided below

" The objective of this use case is to check how LLMs can work on 2 requests at a time asking it to stack a graph based on gender in the UK elections in 2024 where you will be asked to Generate a Comparison of parties with A stacked bar chart comparing the gender balance of MPs for each political party. Include a secondary axis showing the percentage of female candidates fielded by each party"

What is your understanding of plotting 2 plots what types of Data Visualisation do you choose and on what basis are best practices in the field of representing election data



1 Sept, 13:57:02

Thank you for providing context about your research. I understand that you're studying the comparative analysis of data visualizations generated by LLMs versus manual visualizations, specifically in the context of election data. Your use case focuses on creating a visualization that combines two aspects of the UK elections in 2024: gender balance and party representation.

For this specific use case, I would recommend using a single plot that combines two types of data visualization:

1. Stacked Bar Chart: This will be the primary visualization.
 - Purpose: To show the gender balance of MPs for each political party.
 - X-axis: Political parties
 - Y-axis (primary): Number of MPs
 - Stacks: Divided by gender (typically two categories: male and female)
2. Line Graph: This will be overlaid on the same plot, using a secondary Y-axis.
 - Purpose: To show the percentage of female candidates fielded by each party.
 - X-axis: Shared with the stacked bar chart (political parties)
 - Y-axis (secondary): Percentage of female candidates

Reasons for choosing this combined visualization:

1. Data Integration: This approach allows us to present two related but distinct pieces of information in a single, coherent visualization. This makes it easier for viewers to see relationships between the gender balance of elected MPs and the proportion of female candidates fielded by each party.
2. Efficiency of Space: By combining two plots, we make efficient use of space and reduce the cognitive load on the viewer who would otherwise need to switch between two separate visualizations.
3. Comparative Analysis: The stacked bar chart allows for easy comparison of absolute numbers across parties, while the line graph provides a relative measure (percentage) for additional context.
4. Best Practices in Election Data Representation:

- Color Coding: Use distinct, colorblind-friendly colors to differentiate between genders and parties.
- Clear Labeling: Ensure all axes, legends, and data points are clearly labeled.
- Order: Arrange parties in a meaningful order (e.g., by total number of MPs or alphabetically).
- Data Labels: Include actual values on the bars and percentage labels on the line graph for precise reading.
- Legend: Provide a clear legend explaining all elements of the visualization.

5. Ethical Considerations:

- Ensure the visualization doesn't reinforce gender binaries if the data includes non-binary gender identities.
- Use neutral color schemes that don't reinforce gender stereotypes.
- Provide context in the form of a brief explanation or caption to avoid misinterpretation.

6. Accessibility:

- Ensure the chart is readable in both color and grayscale.
- Use patterns in addition to colors for the stacked bars to improve accessibility for colorblind individuals.

To create this visualization, we'll need to analyze the data from the Excel file you've provided. Let's start by examining the contents of the file and then proceed with creating the visualization based on the available data.

 Analyzed MPs by Party and Gender ▾



Python



Rerun



Edit



This code reads an Excel file containing data on elected MPs, counts the number of MPs by party and gender, calculates the percentage of...

[Show More](#)

```
1 import pandas as pd
2 import matplotlib.pyplot as plt
3 import seaborn as sns
4
5 # Read the Excel file
6 file_path = 'MPs-elected.xlsx'
7 df = pd.read_excel(file_path, sheet_name='Sheet1')
8
9 # Display the first few rows and data info
10 print(df.head())
11 print("\n
12 Dataframe Info:")
13 print(df.info())
14
15 # Count MPs by party and gender
16 party_gender_counts = df.groupby(['party_name', 'gender']).size().unstack(fill_value=0)
17
18 # Calculate percentage of female candidates for each party
19 total_candidates = party_gender_counts.sum(axis=1)
20 female_percentage = (party_gender_counts['Female'] / total_candidates) * 100
21
22 # Sort parties by total number of MPs (descending)
23 party_gender_counts = party_gender_counts.sort_values(by='Male', ascending=False)
24
25 print("\n
26 Party Gender Counts:")
27 print(party_gender_counts)
28
29 print("\n
30 Percentage of Female Candidates:")
31 print(female_percentage)
```

>
{ ... } 1 Items

Based on the data we've loaded and analyzed, we now have a clear understanding of the gender distribution among MPs for different political parties in the UK elections. Here's a summary of what we've found:

Optional: Click on columns or rows to focus on specific data



Export



	Female	Male
Labour	168	200
Conservative	29	92
Liberal Democrat	32	40
Labour and Co-operative	22	21
Scottish National Party	1	8
Independent	0	6
Reform UK	0	5
Sinn Fein	2	5
Democratic Unionist Party	1	4
Green	3	1
Plaid Cymru	3	1
Social Democratic and Labour Party	1	1
Speaker	0	1
Traditional Unionist Voice	0	1
Ulster Unionist Party	0	1
Alliance	1	0

	0
party_name	
Alliance	100.0
Conservative	23.96694214876033
Democratic Unionist Party	20.0
Green	75.0
Independent	0.0
Labour	45.65217391304348
Labour and Co-operative	51.162790697674424
Liberal Democrat	44.44444444444444
Plaid Cymru	75.0
Reform UK	0.0
Scottish National Party	11.111111111111111
Sinn Fein	28.57142857142857
Social Democratic and Labour Party	50.0
Speaker	0.0
Traditional Unionist Voice	0.0
Ulster Unionist Party	0.0

These results provide us with the necessary data to create the requested visualizations:

- 1. A stacked bar chart comparing the gender balance of MPs for each political party.
- 2. A secondary axis showing the percentage of female candidates fielded by each party.

To create these visualizations, we'll use matplotlib for its flexibility in creating complex, multi-axis charts. This choice allows us to effectively represent both the absolute numbers and percentages in a single, informative graph.

Shall I proceed with creating the visualizations as described?



K

Why do you think that these visualisations are more appropriate for the request?



The stacked bar chart with a secondary axis showing percentages is appropriate for this request because:

1. It efficiently displays both absolute numbers and percentages in one graph.
2. The stacked bars clearly show the gender balance within each party.
3. The secondary axis with percentages allows for easy comparison of female representation across parties.
4. It adheres to best practices in election data visualization by providing a clear, comparative view.

Shall I proceed with creating this visualization using matplotlib?



K

According to your understanding of plotting 2 plots what types of Data Visualisation do you choose and on what basis are best practices in the field of representing election data

Using the attached file generate a Party Comparison with A stacked bar chart comparing the gender balance of MPs for each political party. Include a secondary axis showing each party's percentage of female candidates.



`</>` Created a stacked bar chart for gender balan... ▼

Python

Rerun Edit

This code snippet generates a stacked bar chart displaying the number of male and female MPs by political party, along with a secondary axis... [Show More](#)

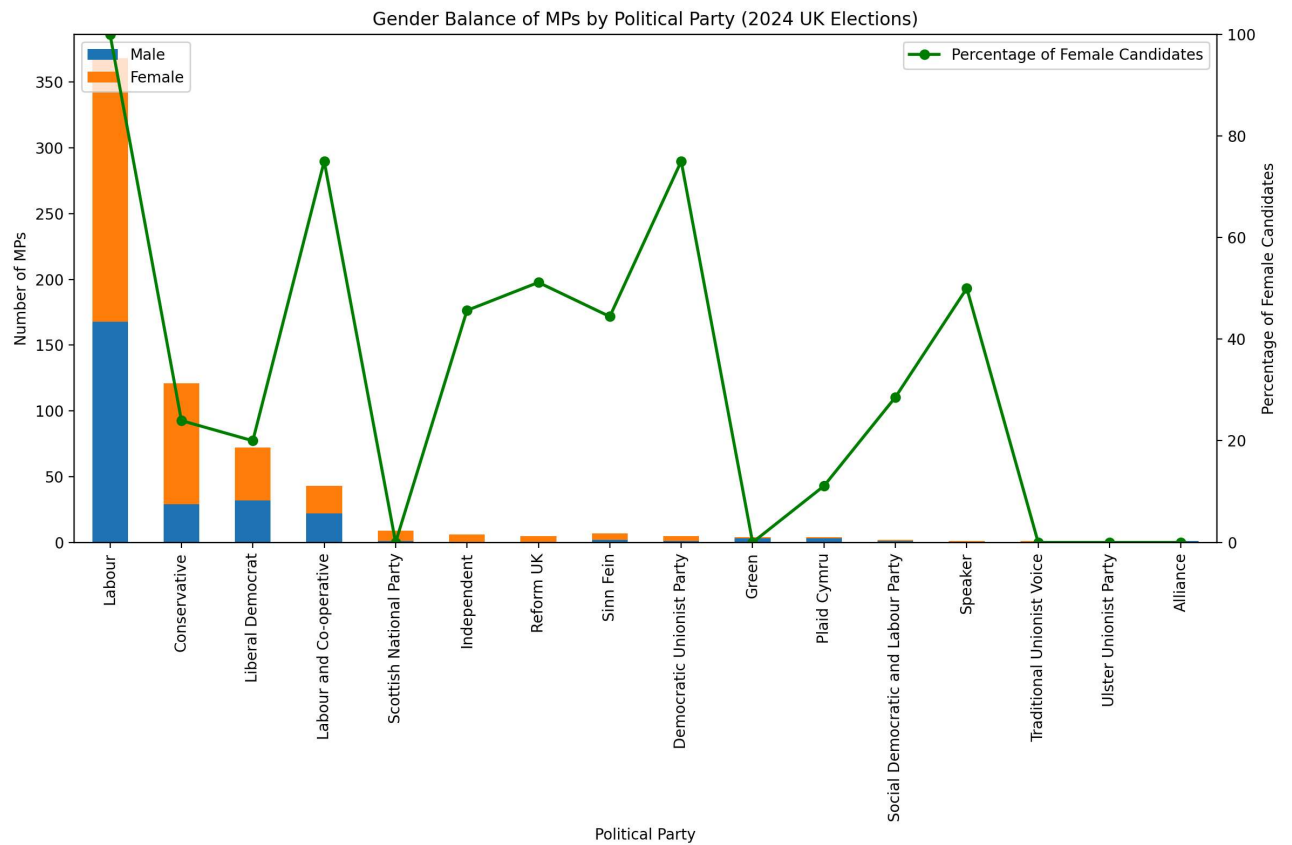
```
1 # Create a stacked bar chart with a secondary axis for percentage of female candidates
2 fig, ax1 = plt.subplots(figsize=(12, 8))
3
4 # Plot the stacked bar chart
5 party_gender_counts.plot(kind='bar', stacked=True, ax=ax1, color=['#1f77b4', '#ff7f0e'])
6
7 # Set labels and title
8 ax1.set_xlabel('Political Party')
9 ax1.set_ylabel('Number of MPs')
10 ax1.set_title('Gender Balance of MPs by Political Party (2024 UK Elections)')
11
12 # Create a secondary axis for the percentage of female candidates
13 ax2 = ax1.twinx()
14 ax2.plot(female_percentage.index, female_percentage.values, color='green', marker='o', line
15 ax2.set_ylabel('Percentage of Female Candidates')
16 ax2.set_ylim(0, 100)
17
18 # Add legends
19 ax1.legend(['Male', 'Female'], loc='upper left')
20 ax2.legend(loc='upper right')
21
22 # Rotate x-axis labels for better readability
23 plt.xticks(rotation=45)
24
25 # Show the plot
26 plt.tight_layout()
27 plt.show()
```

`{ ... }` 1 Items

Here's the visualization that combines the stacked bar chart for gender balance and the line graph for the percentage of female candidates:

Unable to create interactive chart for this

Static



This chart effectively represents the gender balance of MPs for each political party and shows the percentage of female candidates fielded by each party on the secondary axis.

What would you like to analyze or visualize next regarding the UK election data?