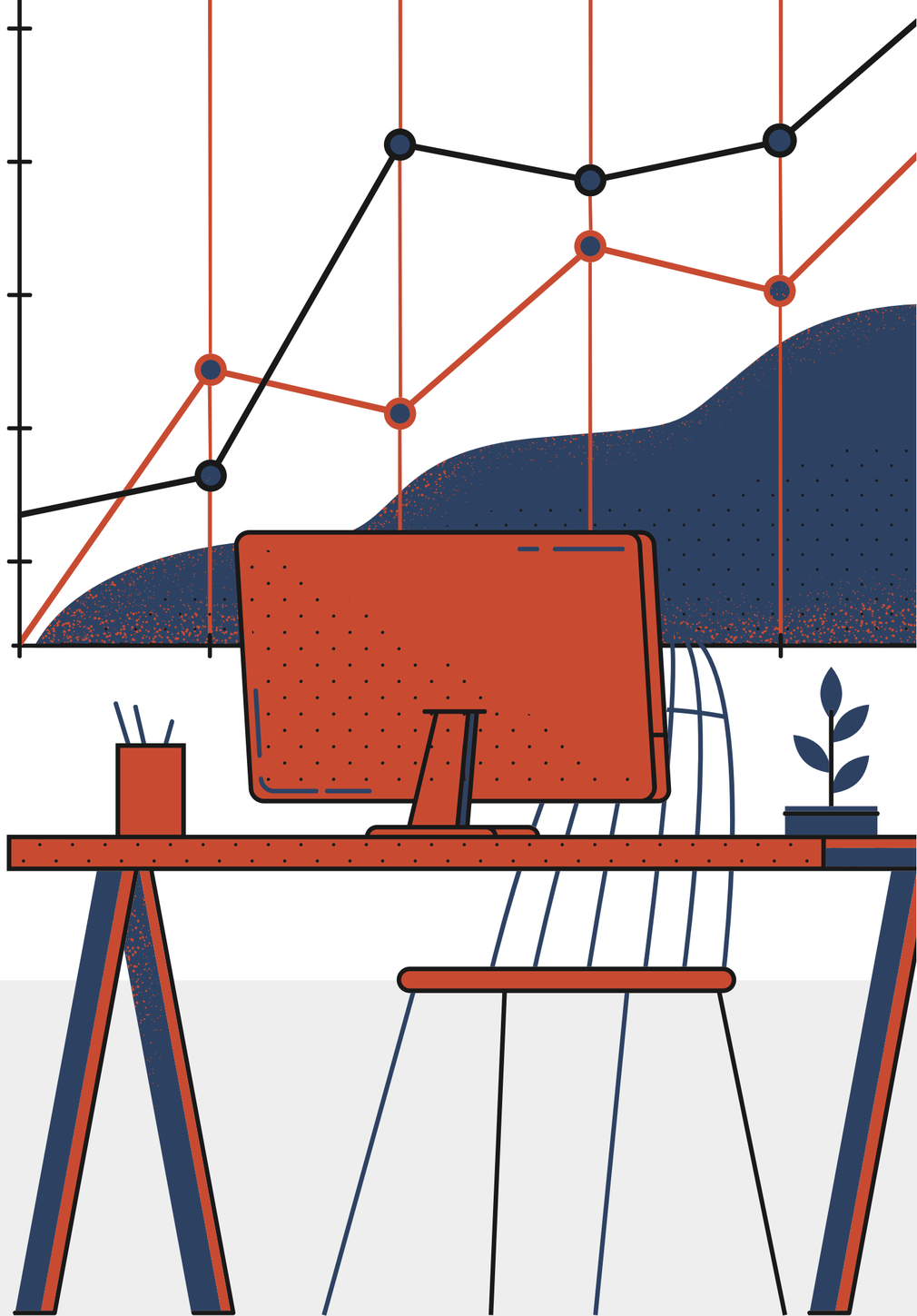
Tuesday, 5

Rochester Institute of Technology

Computational Analysis of Gender Perception in the UK Before and After Women's Suffrage



PRESENTED BY

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FACULTY ADVISOR

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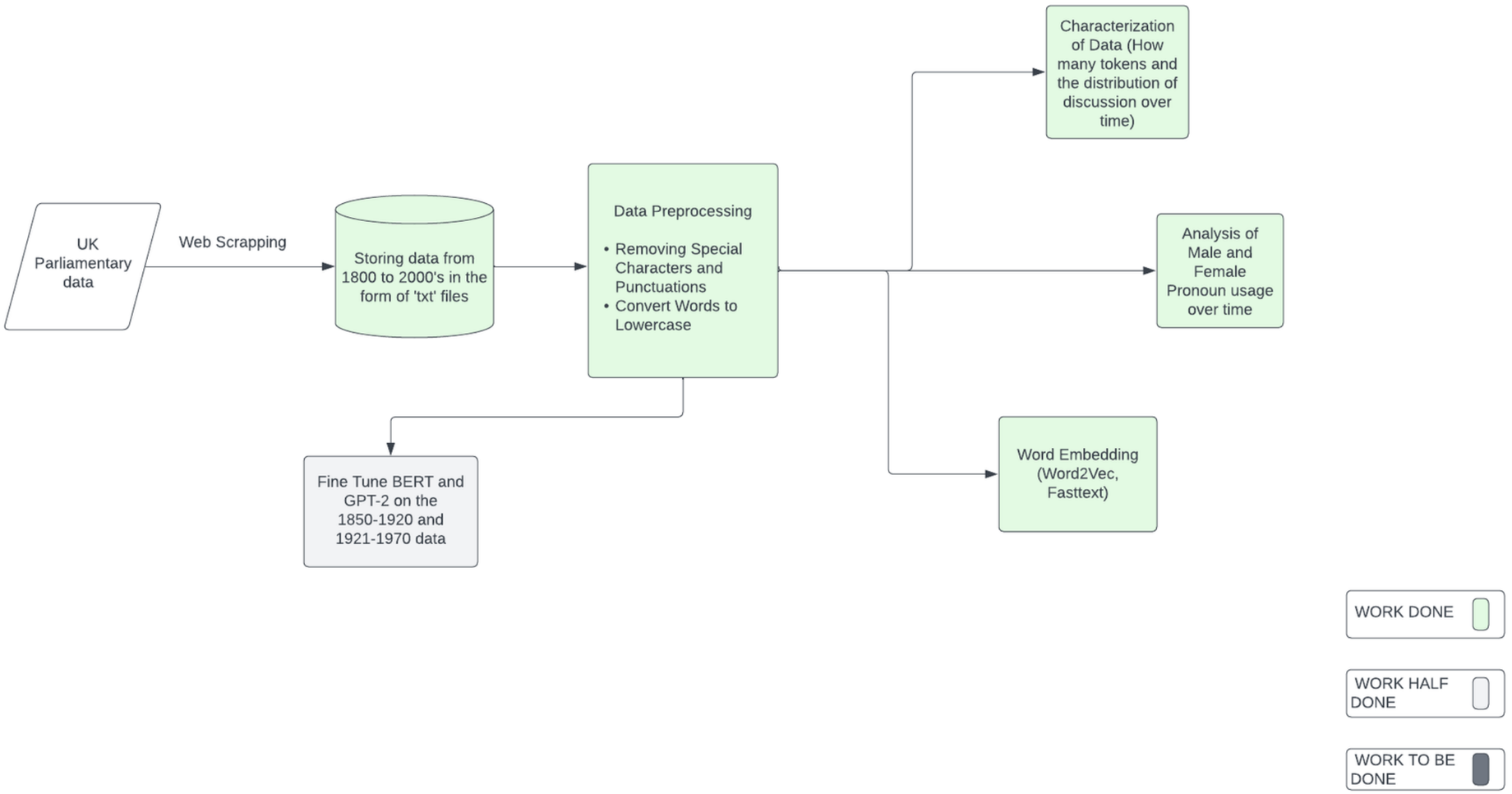
Objective

In the UK, It was not until the Equal Franchise Act of 1928 that women over 21 were able to vote and women finally achieved the same voting rights as men

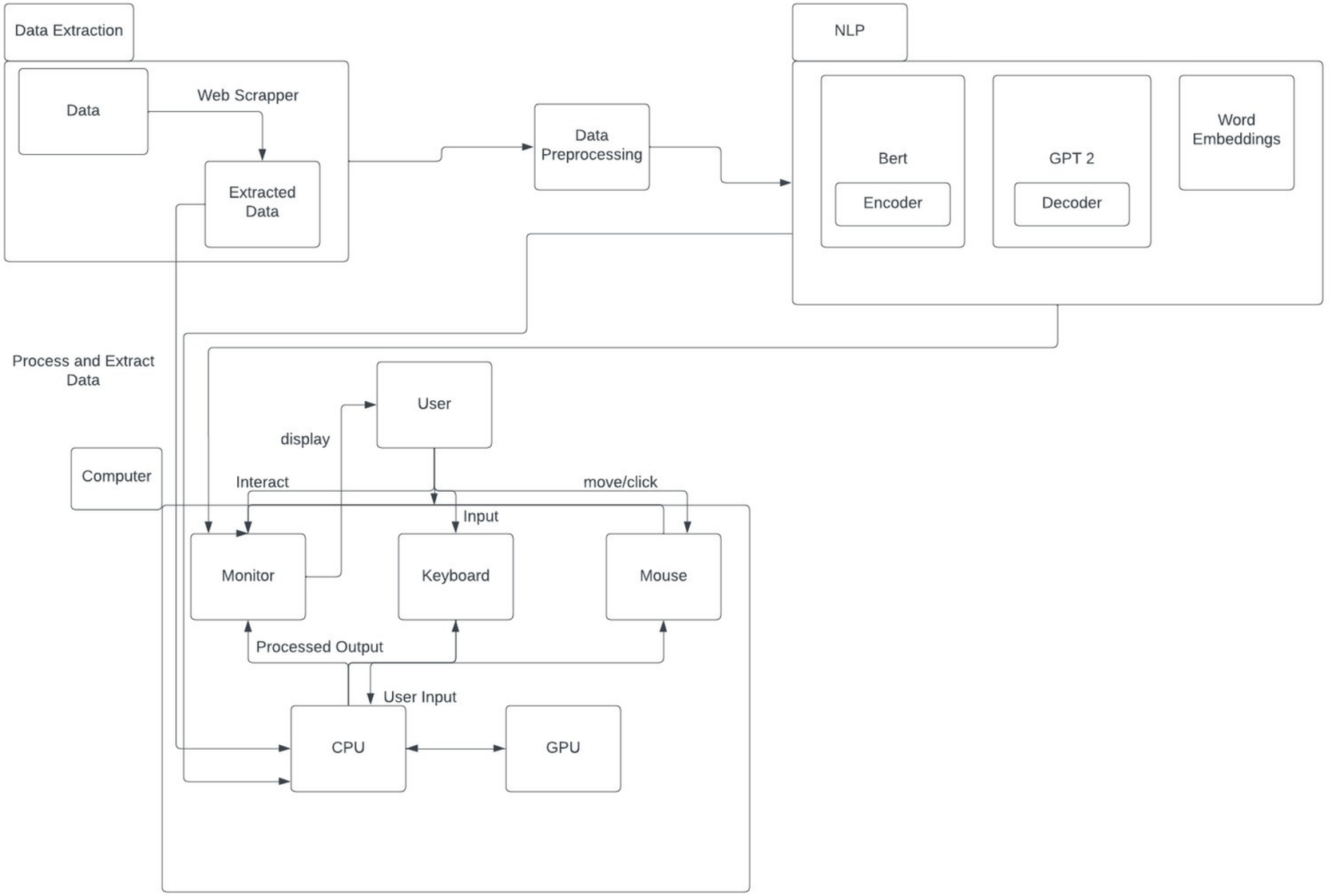
Goal

Gain an understanding of how women’s representation has evolved over time

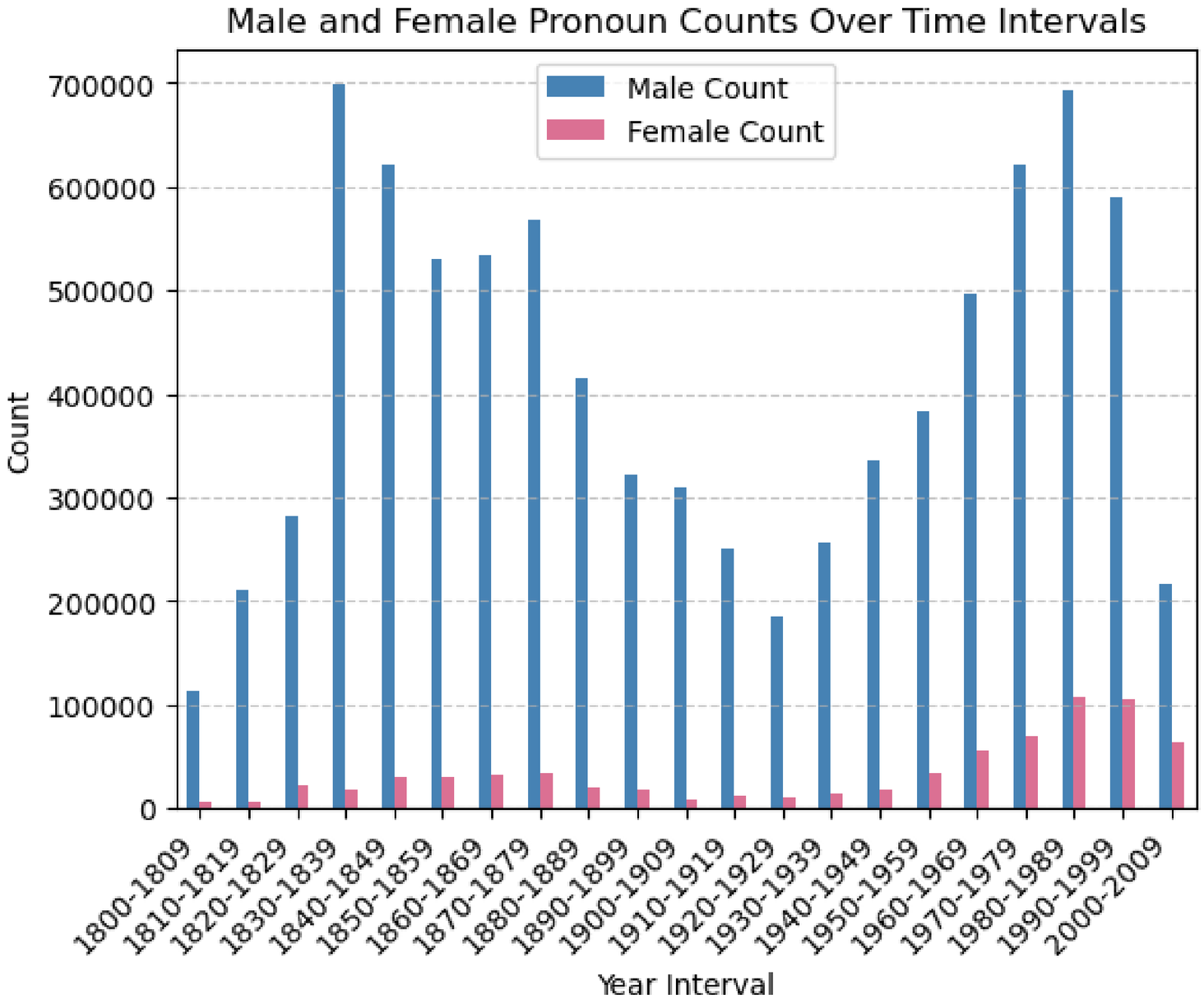
II Updated Architecture Diagram



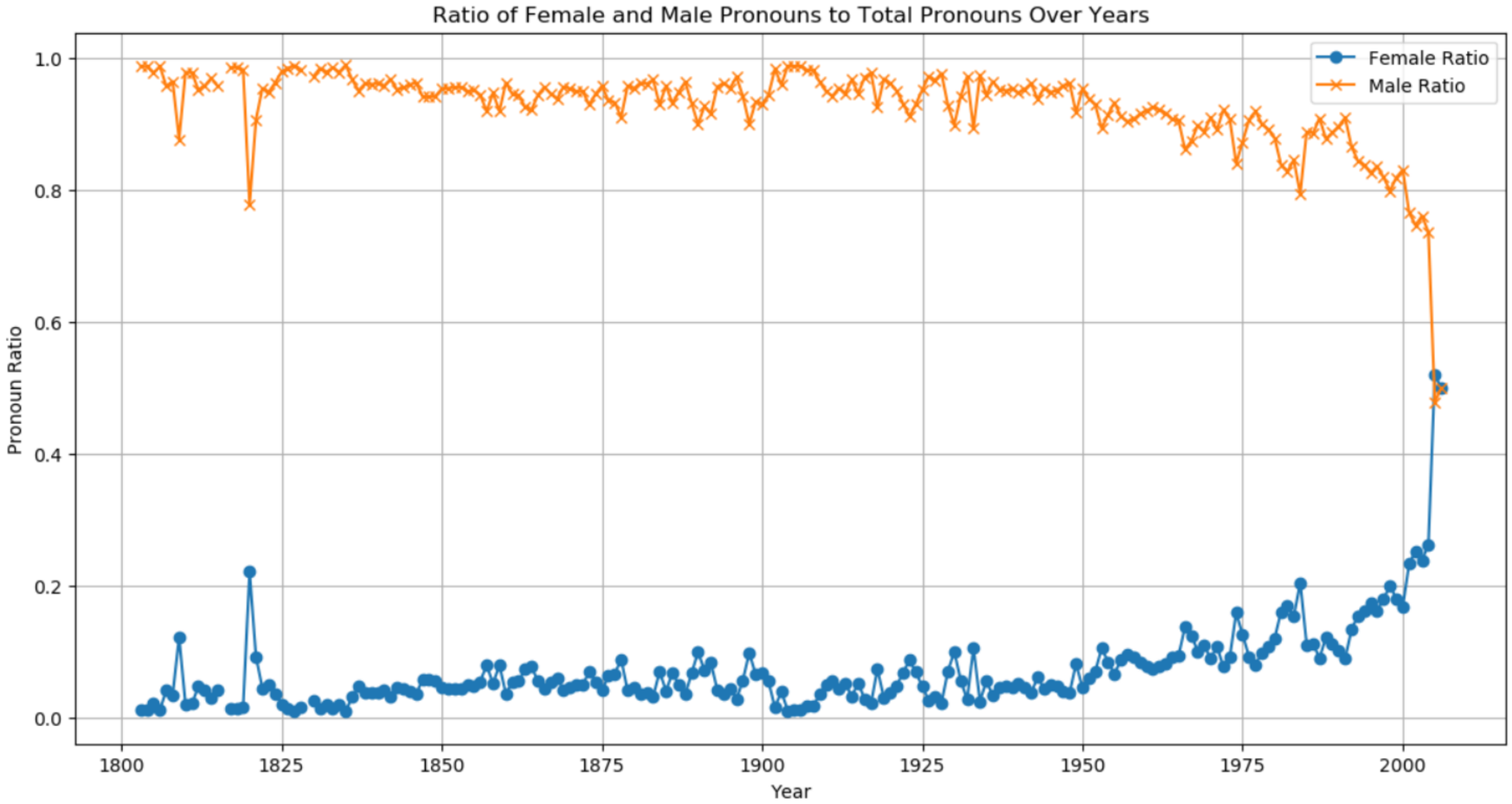
III DOMAIN DIAGRAM



Results as of now - Gender Pronoun Count



V Results as of now - Gender Pronoun Count



Results as of now - Word2Vec

```
# Find words similar to the word woman
similar_words = model.wv.most_similar('woman', topn=5)
print(f"Similar words to 'woman': {similar_words}")
```

```
Similar words to 'woman': [('wife', 0.6032223105430603), ('female', 0.5838871002197266), ('girl', 0.563331842422485
4), ('husband', 0.552932858467102), ('seducer', 0.5423462986946106)]
```

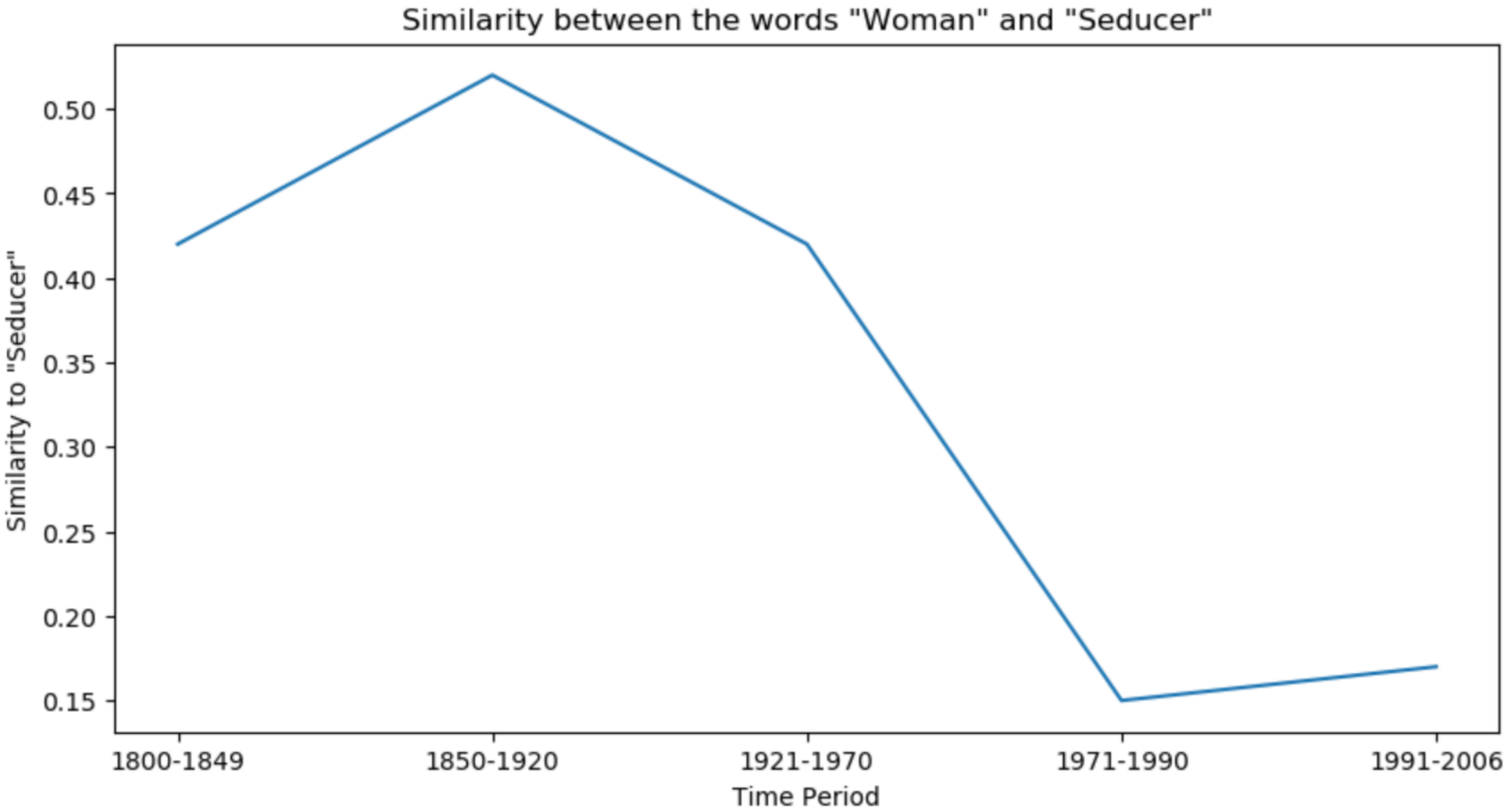
Word Analogies

```
analogy_result = model_1849.wv.most_similar(positive=['seducer', 'man'], negative=['woman'], topn=1)
print(f"Word analogy result for the year 1800-1849: {analogy_result}")
analogy_result = model_1920.wv.most_similar(positive=['seducer', 'man'], negative=['woman'], topn=1)
print(f"Word analogy result for the year 1850-1920: {analogy_result}")
analogy_result = model_1970.wv.most_similar(positive=['seducer', 'man'], negative=['woman'], topn=1)
print(f"Word analogy result for the year 1921-1970: {analogy_result}")
analogy_result = model_1990.wv.most_similar(positive=['seducer', 'man'], negative=['woman'], topn=1)
print(f"Word analogy result for the year 1971-1990: {analogy_result}")
```

```
Word analogy result for the year 1800-1849: [('creature', 0.29993459582328796)]
Word analogy result for the year 1850-1920: [('mortal', 0.3551318943500519)]
Word analogy result for the year 1921-1970: [('chap', 0.3808192014694214)]
```

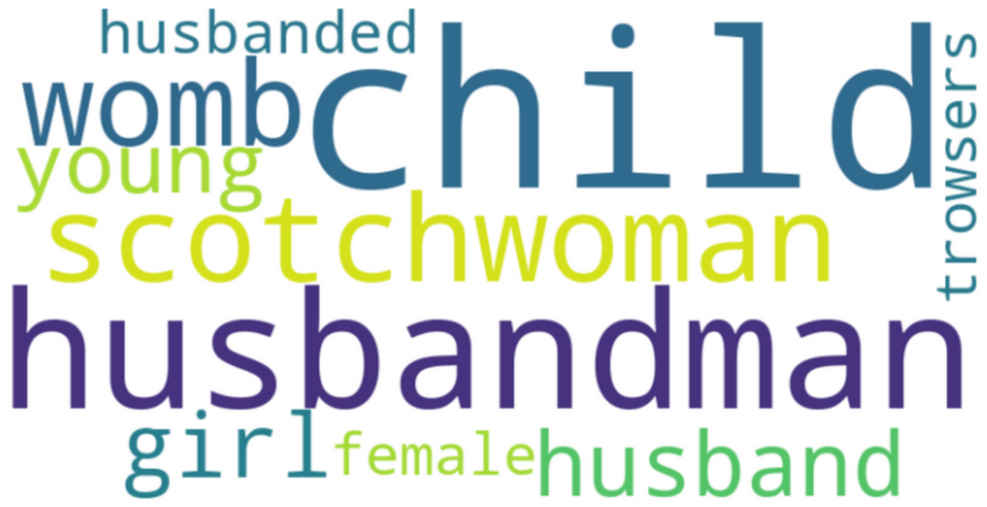
```
KeyError: "Key 'seducer' not present in vocabulary"
```

Results as of now - Fasttext



Results as of now - Fasttext

1803-1850



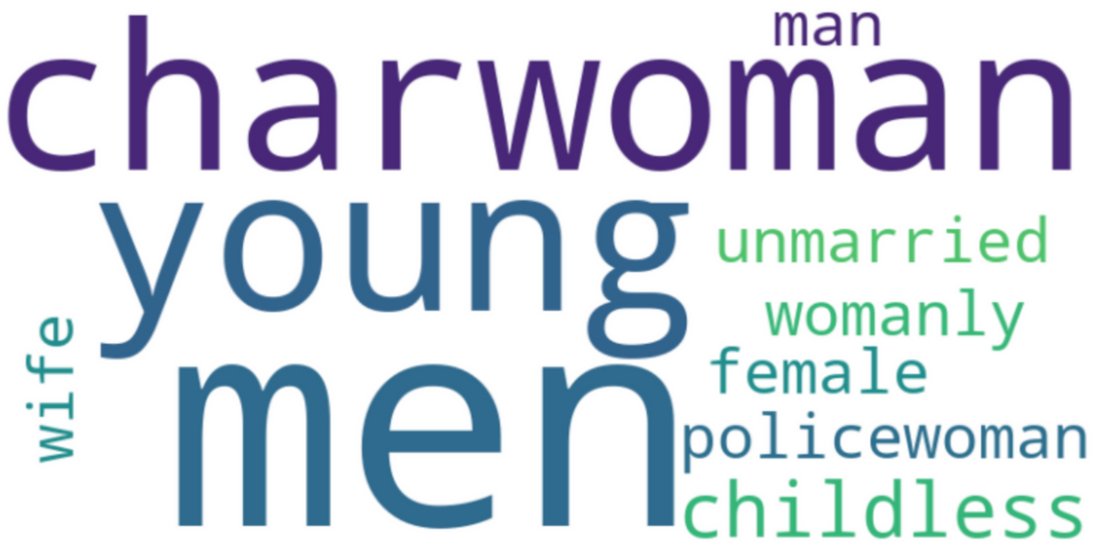
1990-2006

Results as of now - Fasttext

1850-1920

Suffragette means a woman seeking the right to vote through organized protest

1921-1970



Charwoman means a woman employed to clean houses or offices

Results as of now - Bert Model

```
df['label'] = df['year'].apply(label_year)
print(df)
```

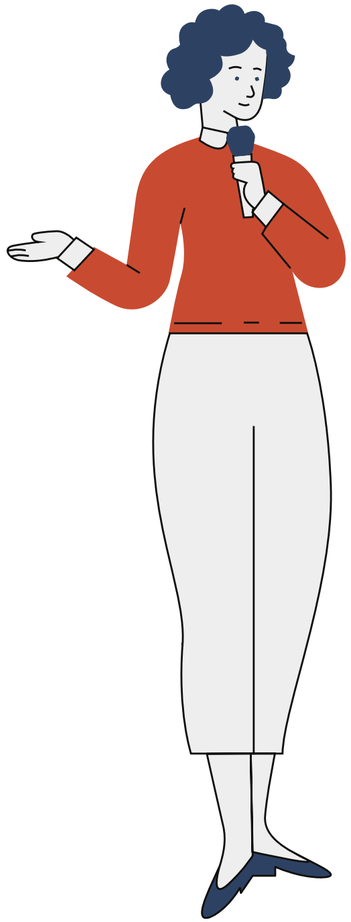
```
                                                      text  \
0        acquainted the House that their Address of Wed...
1        (Answered by Mr. A. J. Balfour.) I understand ...
2        (Answered by Mr. A. J. Balfour.) I am afraid I...
3        (Answered by Mr. Walter Long.) No opportunity ...
4        (Answered by Mr. Bonar Law.) The value of the ...
...                                                    ...
2282429  is the appropriate heading to which they shoul...
2282430  from interest allowable and interest disallowa...
2282431  premium bonds, for which there is a fixed limi...
2282432  respect of the financial year 1966–67, the num...
2282433  the Order, was to stop an unnecessary strain o...

                                                 input_ids  \
0        [101, 19056, 1996, 2160, 2008, 2037, 4769, 199...
1        [101, 1006, 4660, 2011, 2720, 1012, 1037, 1012...
2        [101, 1006, 4660, 2011, 2720, 1012, 1037, 1012...
3        [101, 1006, 4660, 2011, 2720, 1012, 4787, 2146...
4        [101, 1006, 4660, 2011, 2720, 1012, 14753, 290...
...                                                    ...
2282429  [101, 2003, 1996, 6413, 5825, 2000, 2029, 2027...
2282430  [101, 2013, 3037, 3499, 3085, 1998, 3037, 4487...
2282431  [101, 12882, 9547, 1010, 2005, 2029, 2045, 200...
2282432  [101, 4847, 1997, 1996, 3361, 2095, 3547, 1516...
2282433  [101, 1996, 2344, 1010, 2001, 2000, 2644, 2019...

                                            attention_mask  year  label
0        [1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, ...  1905      0
1        [1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, ...  1905      0
2        [1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, ...  1905      0
3        [1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, ...  1905      0
4        [1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, ...  1905      0
...                                                    ...   ...    ...
2282429  [1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, ...  1969      1
2282430  [1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, ...  1969      1
2282431  [1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, ...  1969      1
2282432  [1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, ...  1969      1
2282433  [1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, ...  1969      1

[2282434 rows x 5 columns]
```

```
df.groupby('label').describe()
```

	year							
	count	mean	std	min	25%	50%	75%	max
label								
0	942621.0	1883.132608	20.579734	1850.0	1866.0	1880.0	1901.0	1920.0
1	1339813.0	1952.192676	13.280689	1921.0	1944.0	1955.0	1963.0	1970.0

Accuracy for 20k sampled sentences

```
Epoch 1 Training: 100%|██████████| 2000/2000 [5:06:24<00:00,  9.19s/it]
Epoch 1 - Validation Loss: 0.4342, Accuracy: 0.8015
Epoch 2 Training: 100%|██████████| 2000/2000 [4:36:05<00:00,  8.28s/it]
Epoch 2 - Validation Loss: 0.3468, Accuracy: 0.8515
Epoch 3 Training: 100%|██████████| 2000/2000 [4:31:37<00:00,  8.15s/it]
Epoch 3 - Validation Loss: 0.4823, Accuracy: 0.8105
```



Conclusion

- The 1928 milestone of voting rights for women above 21 in the UK might be reflected in the shift towards words like "suffragette" and "worker" in the 1850-1920 period and beyond. This indicates increased visibility and acknowledgment of women's roles in society and politics.

Future Work

- Hyper parameter Tune the current Bert model and complete the training on GPT2

The End

Thank you

References -

Khadilkar, K., KhudaBukhsh, A. R., & Mitchell, T. M. (Year). Gender bias, social bias, and representation in Bollywood and Hollywood.