BBB presents

Inclusive Scripts: Predicting Media Diversity and Bechdel Test Scores

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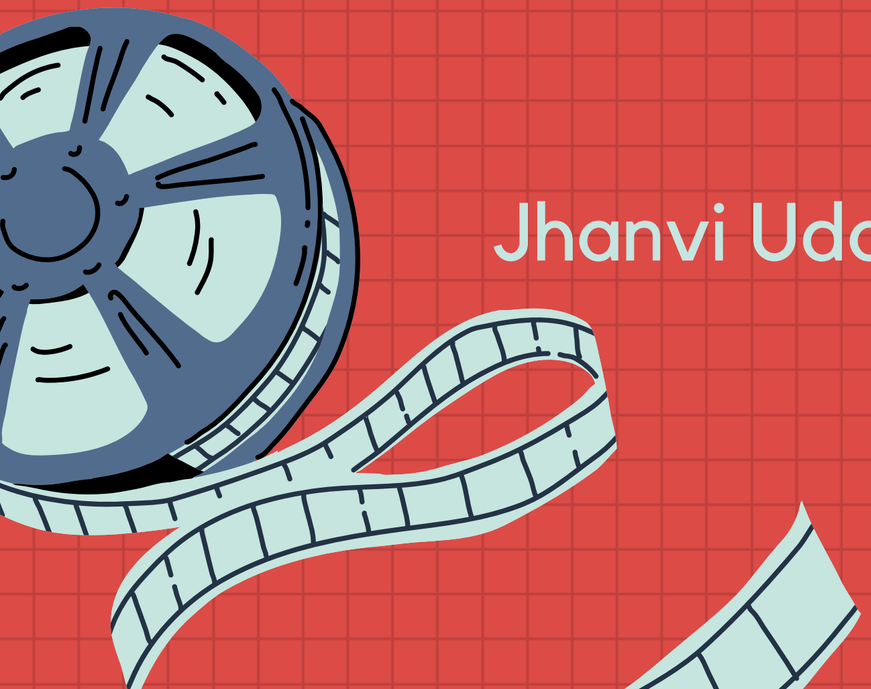
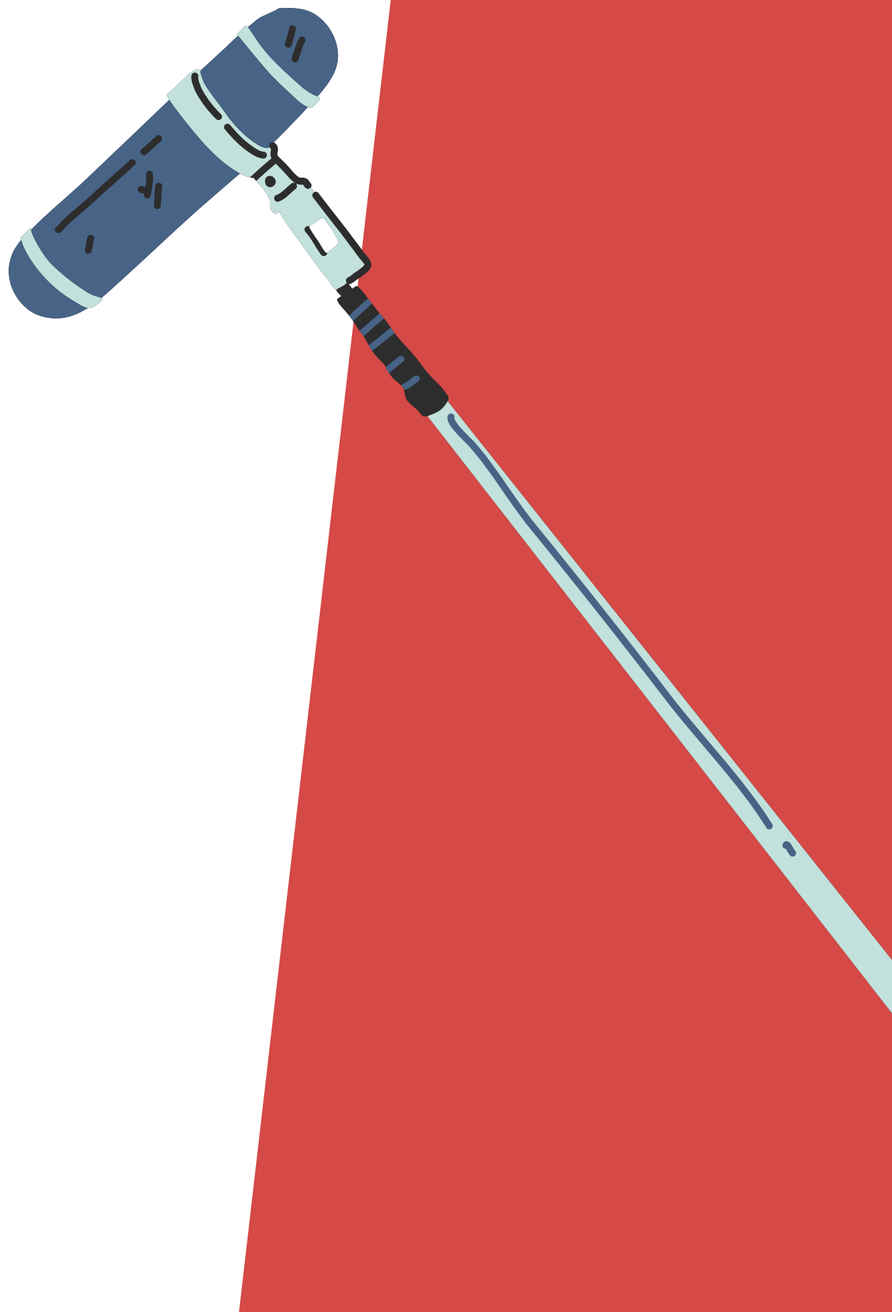
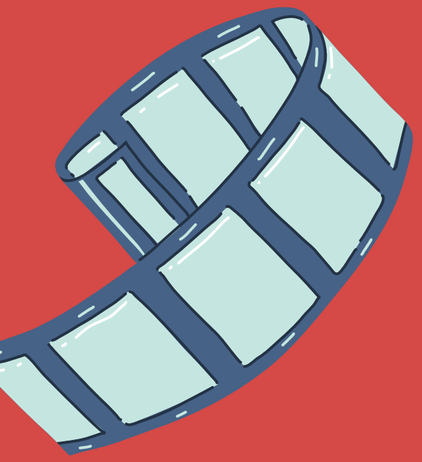


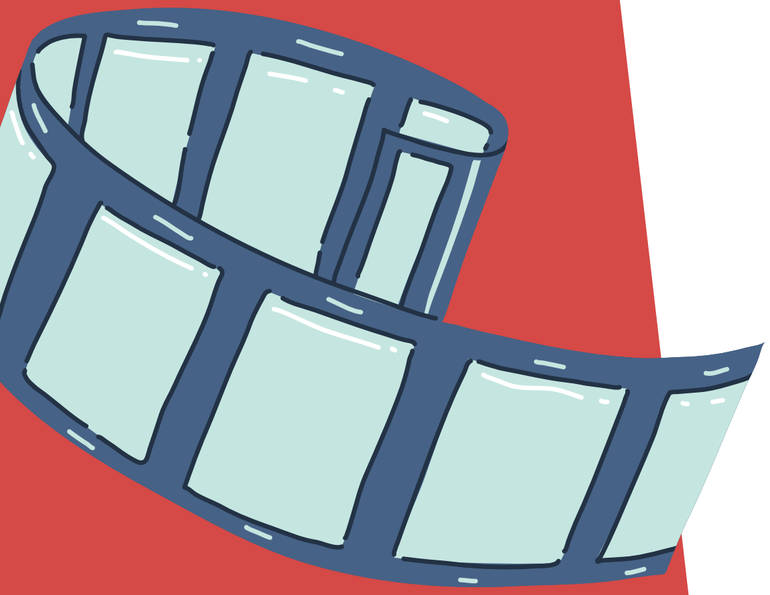
What is the Bechdel Test?



The Bechdel Test is a measure of women's representation in movies. To pass the test, a film (or TV episode) has to satisfy three points. It must:

1. Include at least two named women characters
2. These women should have at least one conversation
3. The conversation should be about something other than a man



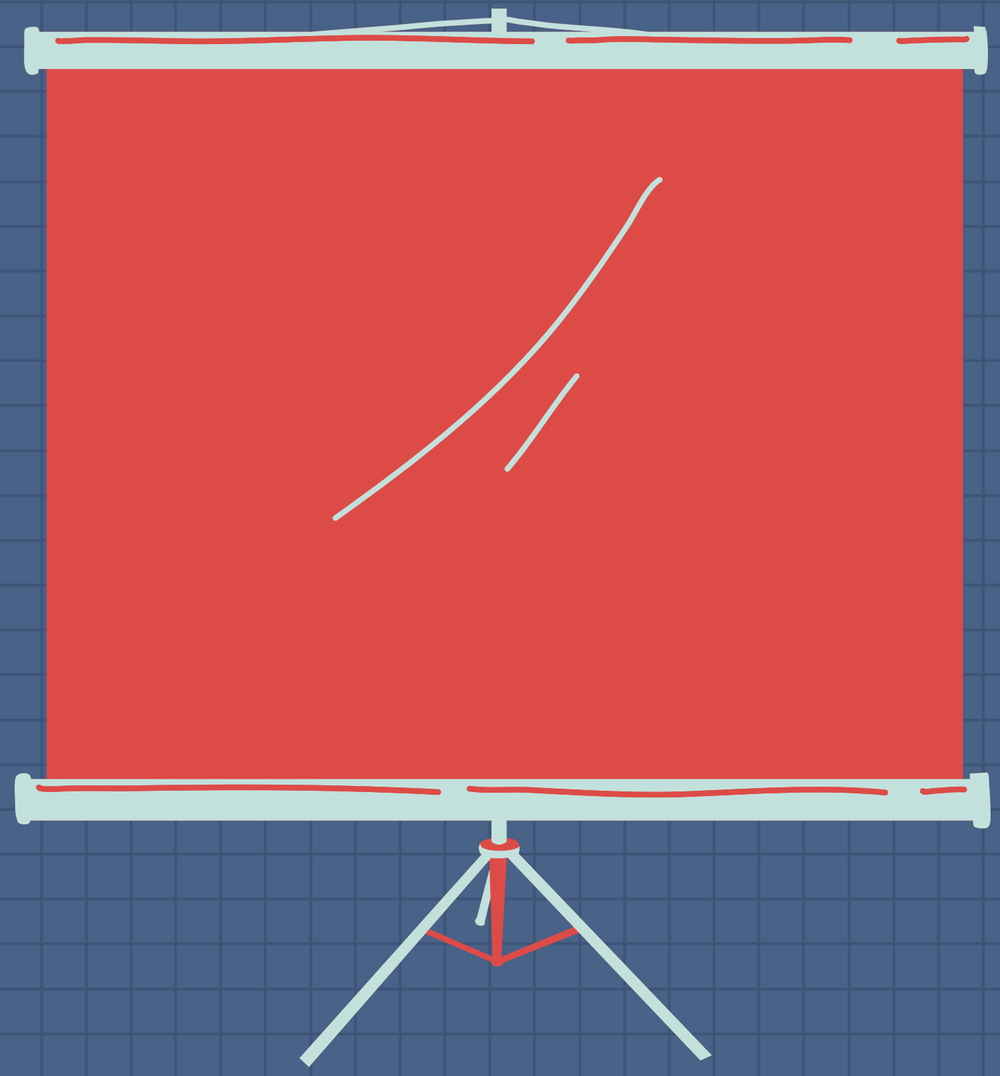


About Media Diversity

It evaluates the inclusivity of TV shows and films based on various diversity criteria like

- Gender
- Race
- LGBTQ
- Disability
- Technical Merit

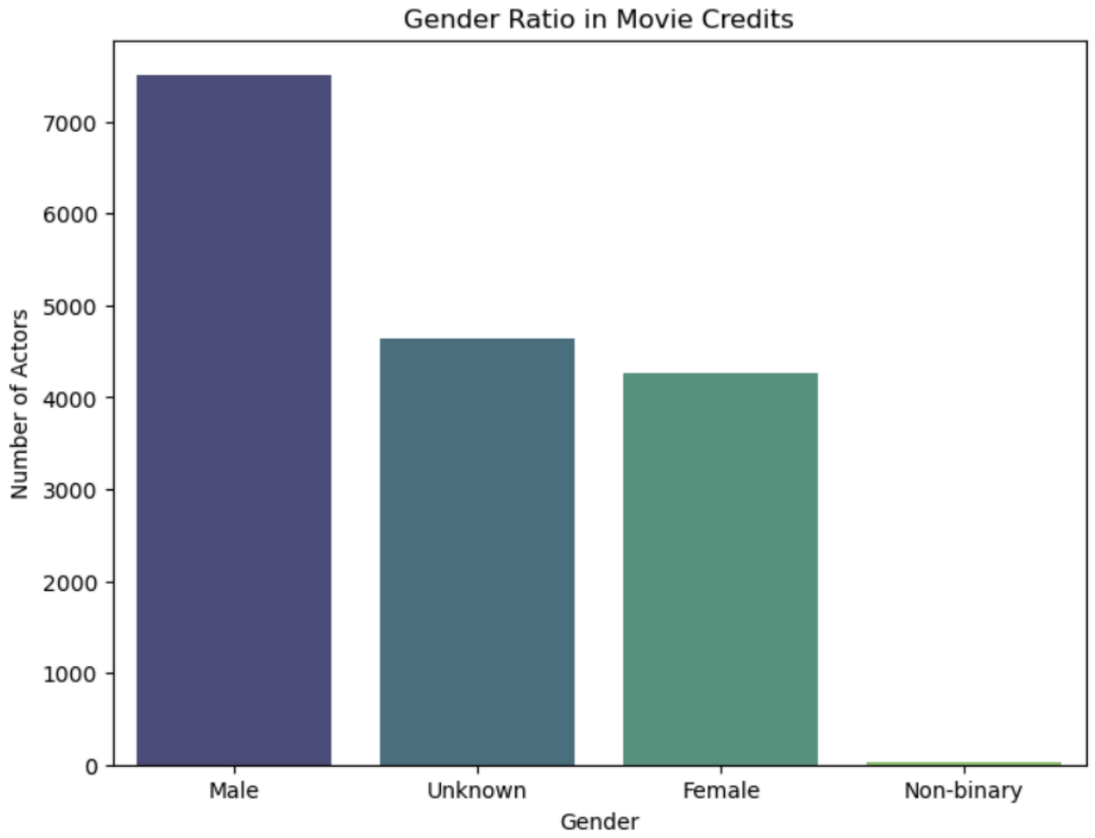
For each category, the test provides a score ranging from 1 to 5, with higher scores indicating better representation and inclusivity. These individual category scores are then used to calculate an overall grade for the TV show or film, ranging from A+ to F.



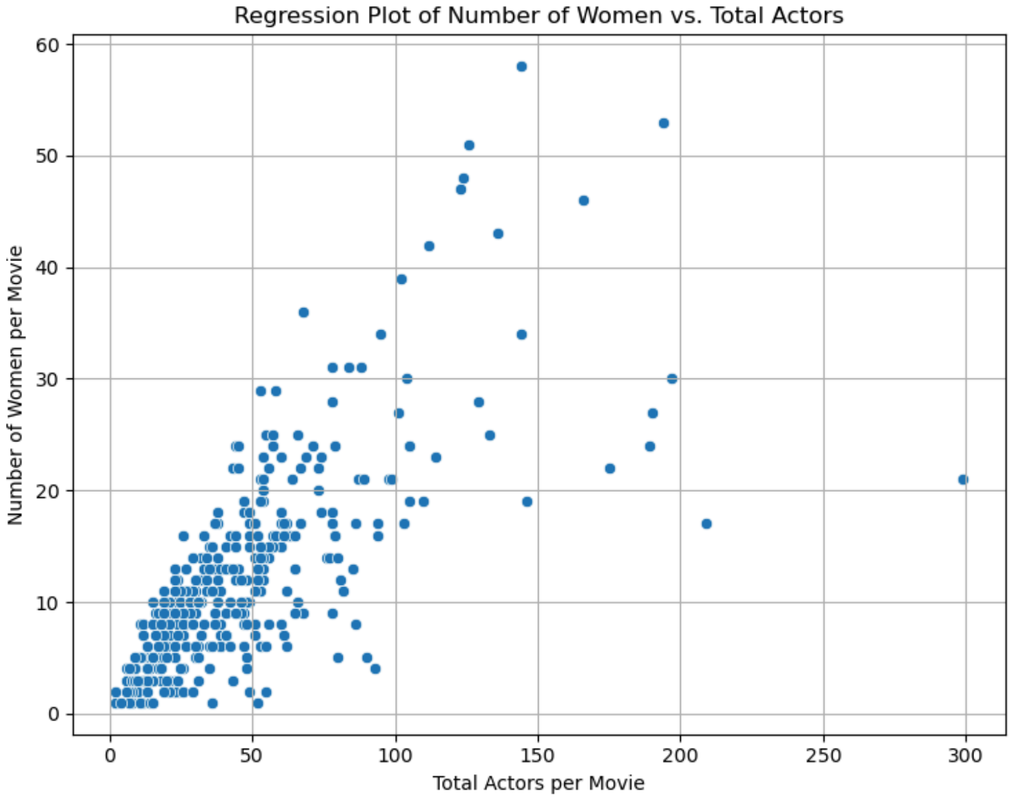
Our Data

Gender Ratios

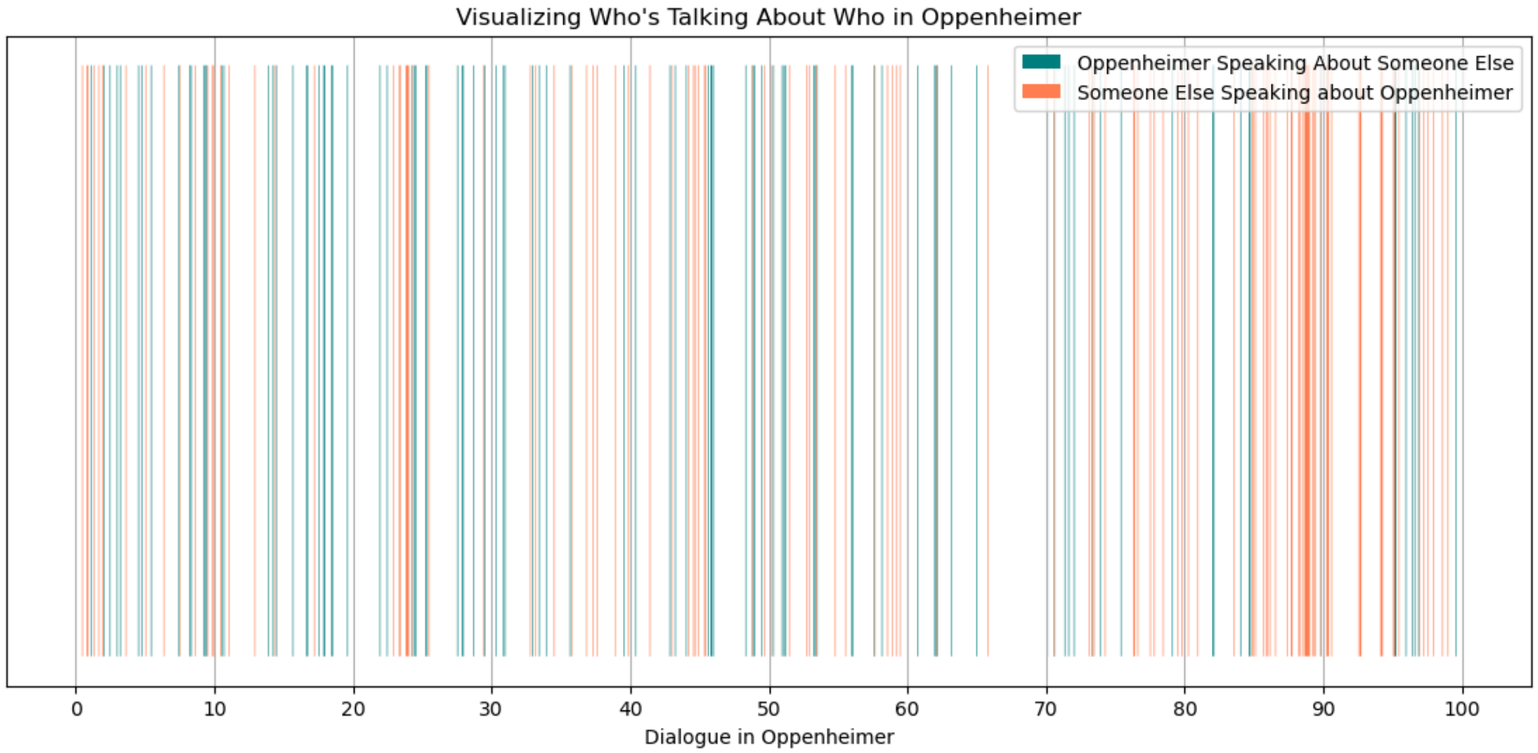
- In most of the movie data we have there are more male characters than female characters
- There are also a significant number of unknowns which are for the small, unnamed characters who appear in passing and don't affect our analysis



Gendered Characters vs Total



Data Cleaning and Visualization



Purpose of the Project

To provide insights for scriptwriters to create more representative content

To create awareness about diversity and inclusion among the audience

To help film studios increase representation of diverse characters in films

Our Questions

1

How can we determine the proportion of movies passing the Bechdel Test, understand script patterns and compare the efficiency of decision trees vs if-else statements?

2

How do the number of characters from different races and the distribution of dialogue lines across genders and races contribute to the overall diversity score provided by the Mediaversity Index?

3

How can we use unsupervised learning techniques to better understand scripts - and better understand the difference between scenes that might pass the Bechdel test, and those that do not seem to pass it?

Methodology/ Models Used

Classification

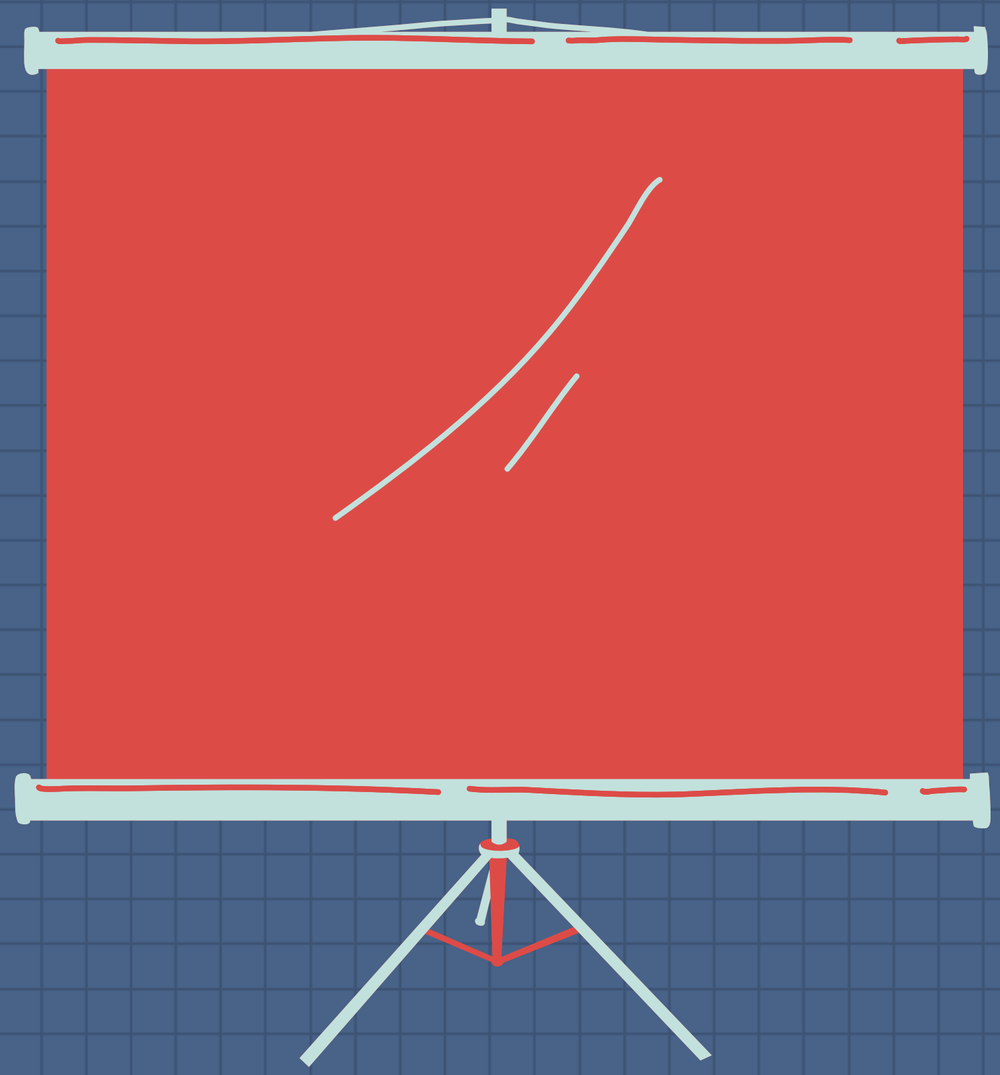
- Random Forest Classifier
- K Nearest Neighbours
- Gaussian Naive Bayes
- Support Vector Machine

Regression

- Linear Regression
- Lasso Regression
- Random Forest Regressor
- Gradient Boosting
- Ridge Regression
- Stochastic Gradient Descent

Unsupervised

- Latent Dirichlet Allocation
- K Means Clustering
- Market Basket Analysis
- Sentiment Analysis



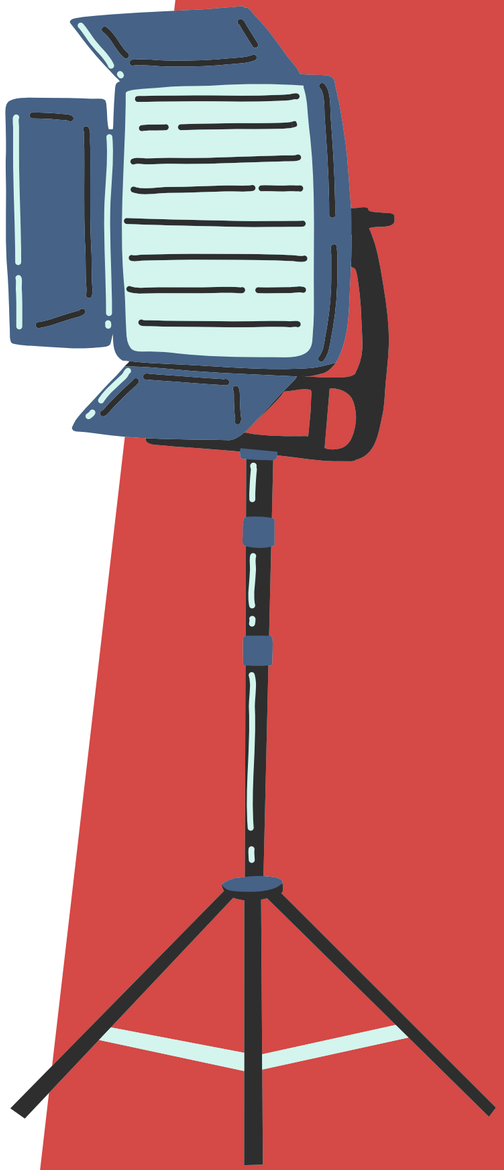
Bechdel Test Analysing using Classification Models

Understanding the Results

If-Else Statements:

- High Precision for True and High Recall for False
  - It is correct in identifying movies that pass and fail the test
- Low Recall for True
  - There are false negatives and we are missing movies that pass the test

	precision	recall	f1-score	support
False	0.61	0.86	0.71	322
True	0.82	0.54	0.65	380
accuracy			0.69	702
macro avg	0.71	0.70	0.68	702
weighted avg	0.72	0.69	0.68	702



Understanding the Results

Using Classification Models, we observed overfitting in predicting the rating of these movies that pass the Test.

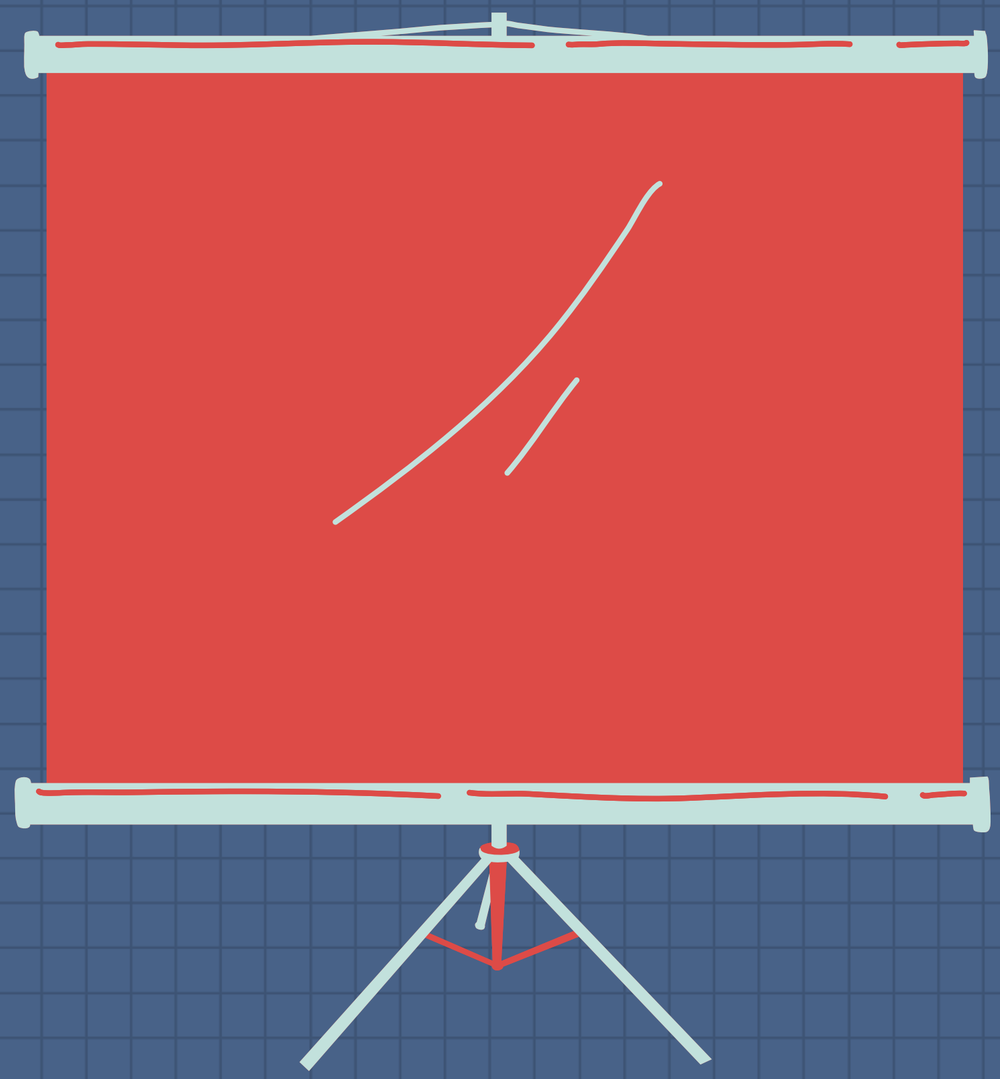
The models use various features like the number of characters, number of women, men, and non-binary characters, scenes without male characters, scenes with two non-male characters, number of Bechdel scenes per movie, and gender of the director and producer.

After Hyperparameter tuning, we observed similar results between all models in identifying movies that pass the Bechdel test or not.

Understanding the Results

Random Forest and SVM had balanced performances across both classes. While KNN had lower precision compared to recall and vice versa for GNB.

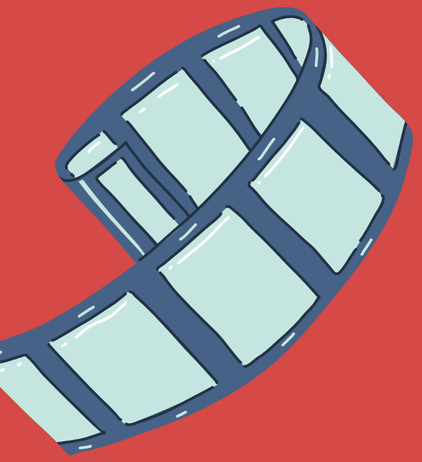
This helped us conclude that If-Else statements were almost as good (if not better) than applying the classification models.

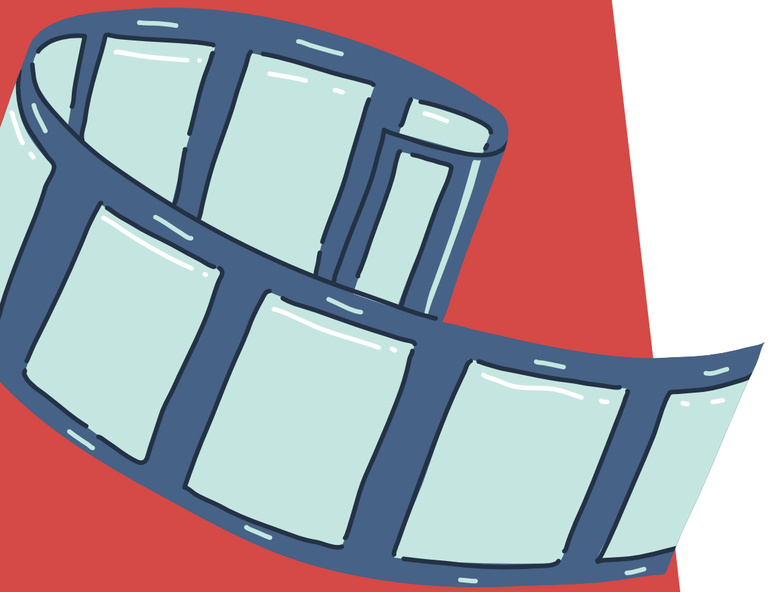


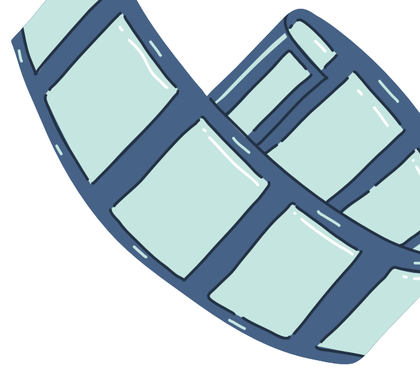
Diversity Analysis with Mediadiversity Index

Analysis

- Predict Media Diversity Score using various features related to the number of characters from different races and the distribution of dialogue lines across genders and races
- Used various models with and without parameter tuning and polynomial features
- Found that the selected features do not seem to contribute significantly to the overall diversity score, at least not in a way that these models can effectively capture

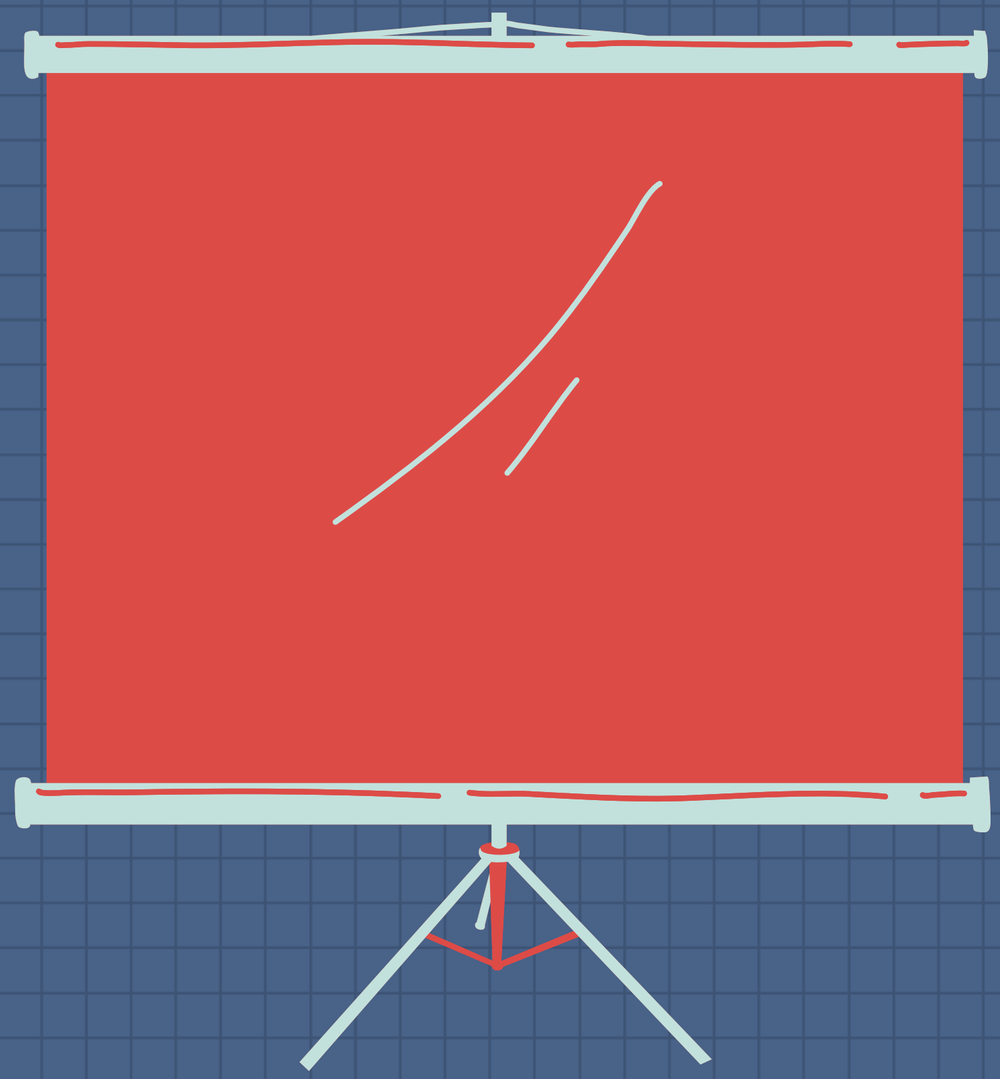






Additional Scope

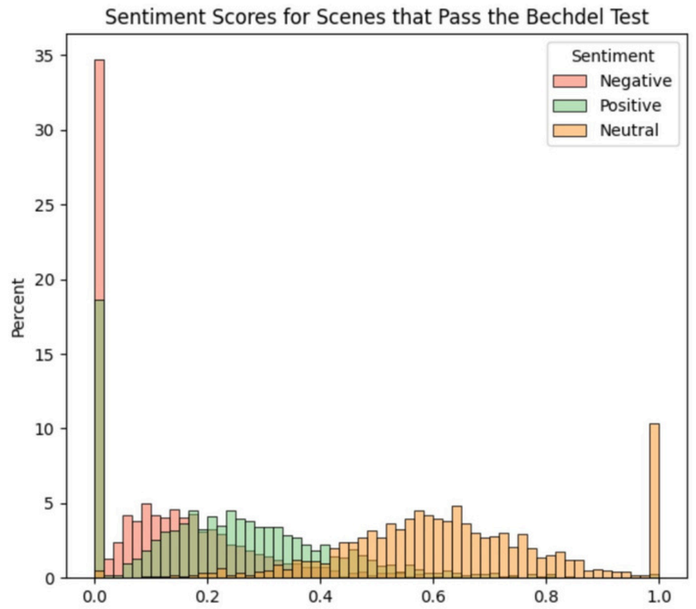
- Poor performance of the models with low MSE and R Square
- Performance worsened with Polynomial features of degree 3
- Encouraged us to use feature engineering to find other factors that might be influencing the score
- Also prompted us towards unsupervised learning

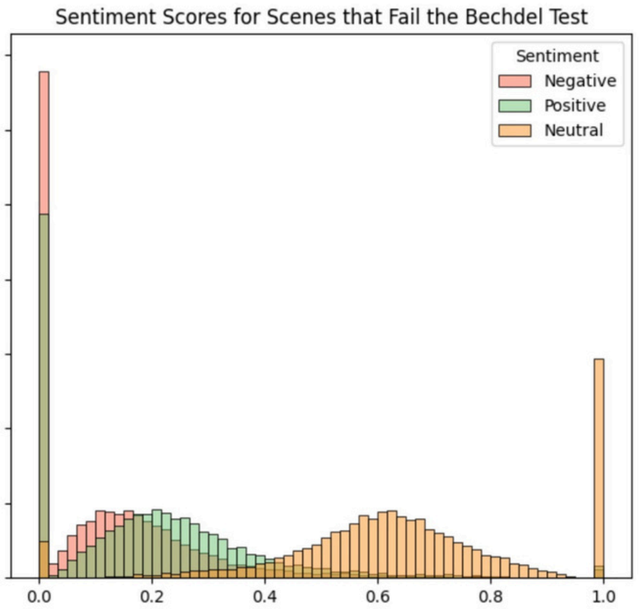


Unsupervised Learning for Script Understanding

Sentiment Analysis

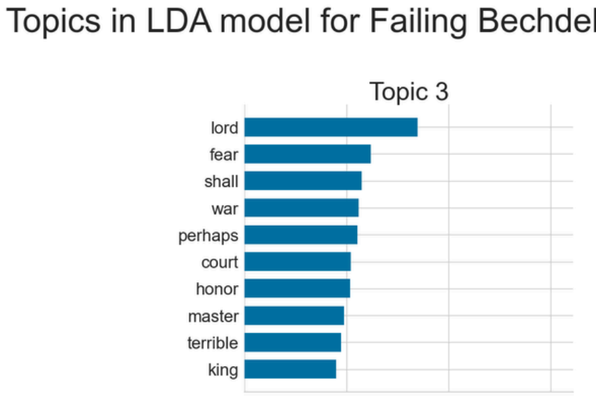
- Scenes that passed the Bechdel Test (unfortunately) had a slightly higher negative sentiment
- Scenes that were not rated as Bechdel Scenes had similar sentiments

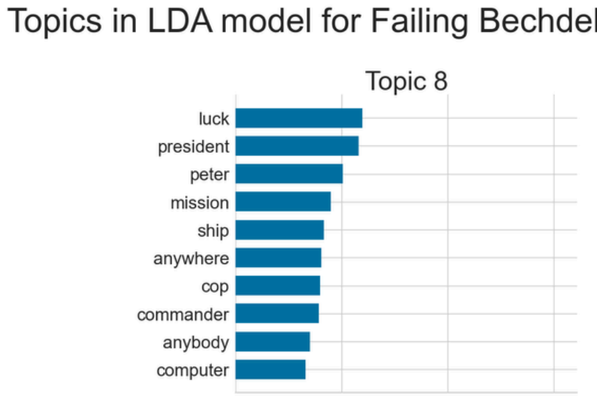




Latent Dirichlet Allocation

- Extracted topics to understand the differences between Bechdel and Non Bechdel Scenes
- While we couldn't discern any clear topics the Bechdel Scenes, Non Bechdel Scenes show more clear genres like presidential based or medieval era movies like topics 3 and 8 here.
- Potential work- further filtering out names





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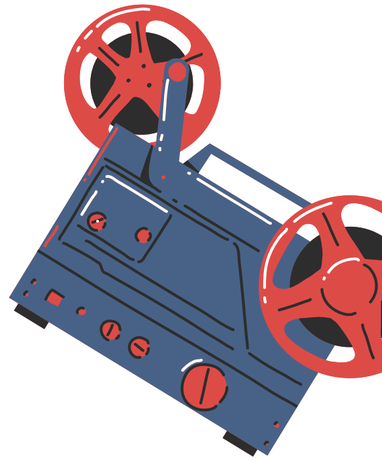
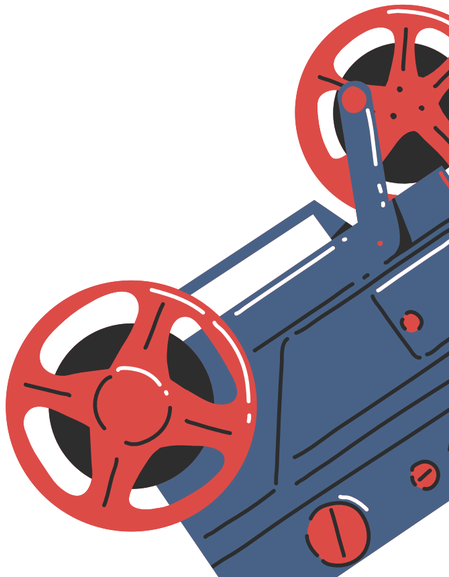


- We calculated important words for each scene and script to compare the similarity in words between the two and analyze a scene's contribution to the movie
- Fewer characters was associated with lower scene importance
- Scenes with more women still had higher mention of men
- Higher scene importance is mainly associated with more characters than gender of the characters

Cluster	Number Women	Number Men	Importance	Avg Talk Men
0	Very Little	A Little	Not Very	29.06%
1	Very Little	A Lot	Somewhat - Very	64.35%
2	A Little	Very Little	Not Very	86.1%
3	A Lot	Very Little - Some	Somewhat - Very	70.6%



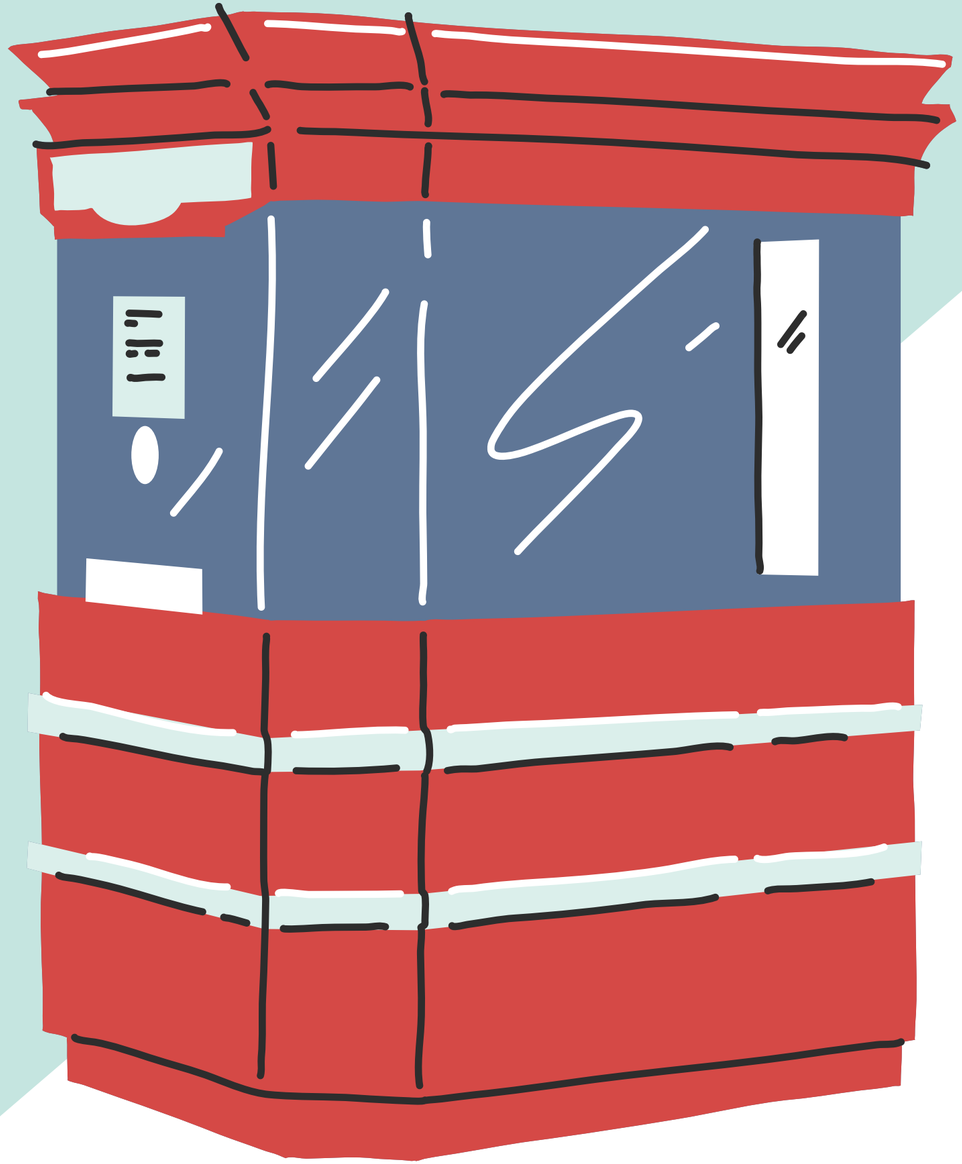
Conclusion

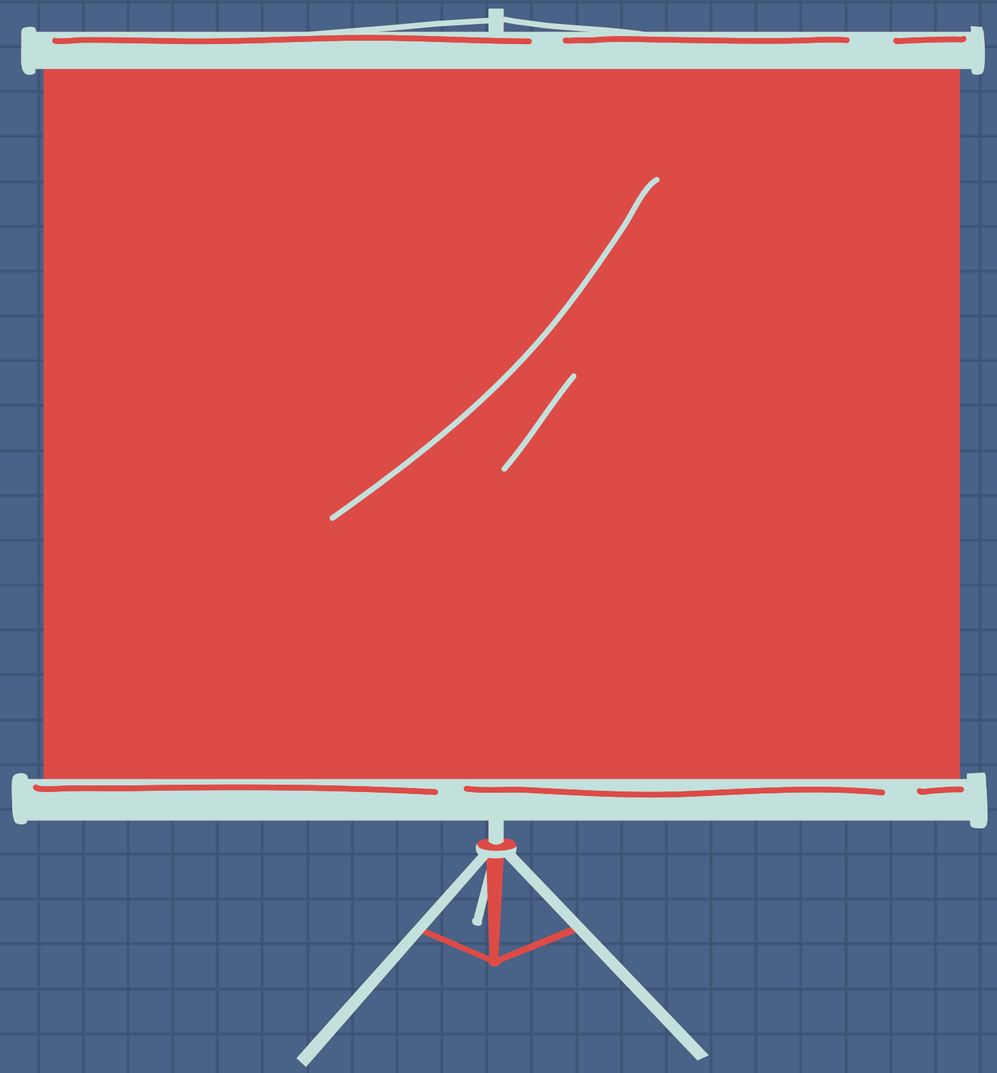
Gender Diversity and Media Diversity our multifaceted concepts that are difficult to capture and solve with a single project. For such diverse topics, unsupervised learning methods might prove to be better performing.

Our models can be used to accurately predict the Bechdel Test result of movies. This can be used by Scriptwriters to write more diverse and inclusive scripts. It can also be used to understand the diversity of their scripts and make necessary changes to improve representation.

Future Work

1. Getting more movie data and script data
2. Further exploration of feature engineering
3. Trying new models, specially for regression
4. Deep dive into the scripts to gain more insights





Thank you

Any Questions?

- Bechdel's Beautiful 🅱eople
(Raj, Jhanvi and Shambhavi)