Bollywood Cinema Sentiment Lab – Final Report

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GitHub Repository

Objective

This project establishes a reproducible pipeline for analyzing cultural and political themes in contemporary Bollywood films (post-2010). Using a randomly sampled dataset of 100 movies, the study integrates subtitle files, plot descriptions, and poster images to explore themes such as Hindu–Muslim relations, gender dynamics, nationalism, and an additional theme: urban struggles. The pipeline incorporates LLM-based approaches for both data enrichment and thematic analysis.

Data Collection & Pipeline Overview

The pipeline comprises six distinct stages, primarily implemented in R, with Python auxiliary calls for data acquisition where beneficial.

1. **Sampling & Setup (`01_data_sampling_and_setup.R`)**:

- Downloaded the Kaggle dataset and generated a random sample of 100 movies released after 2010.
- Cleaned and merged sampled movies to ensure dataset quality.

2. **Asset Collection (`02_fetch_movie_assets.R`)**:

- **Subtitles**: Acquired via SubDL API, including structured handling of ZIP files.
- **Descriptions**: Sourced from Wikipedia using an API-driven, section-specific scraping approach for plot extraction.
- **Posters**: Retrieved using the TMDb API, with IMDb ID to TMDb ID mapping.
- **Robustness**: Incorporated comprehensive error handling and `Sys.sleep` for respectful API/scraping practices.

3. **Metadata Collection (`03_fetch_movie_metadata.R`, `03_analyse_movie_metadata.R`)**:

- **Director Names & Box Office**: Scraped from Box Office Mojo using tailored R functions with mimicked browser headers.

- **Director Gender Inference**: Employed the Gemini LLM for name-based gender prediction, a key demographic indicator.
- **Analysis**: Generated initial descriptive plots for director gender distribution and box office trends.

4. **Thematic Data Building (`04_build_movie_themes.R`)**:

- Combined movie plots and systematically cleaned subtitle texts into a unified dataset for thematic processing.
- Robust subtitle parsing and cleaning (`clean_subtitles` function) to remove timestamps, line numbers, and watermarks.

5. **Sentiment and Theme Analysis (`04_thematic_analysis.R`)**:

- **Theme Presence**: Prepared the pipeline to Utilize Gemini LLM to identify the presence of "Hindu–Muslim relations", "Gender relations", and "Nationalism" within movie plots.
- **Sentiment Classification (Strategy)**: Due to LLM API credit limitations, a detailed strategy for chunk-wise subtitle analysis, anchoring to plot descriptions, and maximum sentiment aggregation is proposed and documented. This ensures scalability for future full-scale implementation.

6. **Visualization (See below)**: Plots generated using `ggplot2` in R.

Thematic Coding Strategy (Contd.)

The thematic coding strategy emphasizes a multi-stage LLM application: **Theme Presence**: LLM-based detection of specified themes using movie plot summaries. This leverages the LLM's understanding of narrative context. Plot understanding can be further enriched by incorporating narrative summaries from sources like `Letterboxd`.

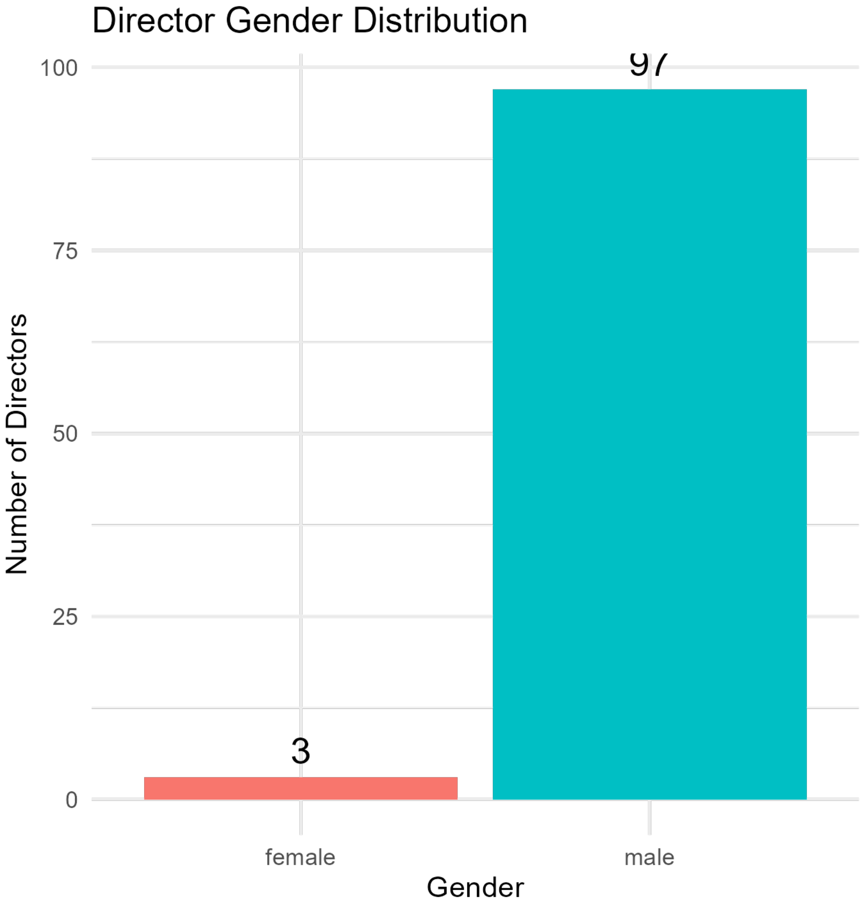
- **Sentiment Analysis Strategy**: As detailed in `scripts/sentiment_analysis.md`, my proposed method addresses context window limitations by chunking long texts (like subtitles), anchoring analysis to overarching plot themes, and aggregating sentiment for a robust measure. This systematic approach ensures accurate, context-aware sentiment classification for: *Exclusionary–Inclusive*, *Progressive–Conservative*, and *Positive–Negative*.

Additional Theme: Urban Struggles

Justification: Urban life in contemporary Indian cinema often portrays unique socio-economic and emotional conflicts distinct from traditional rural narratives or broader nationalistic themes. Films like *Gully Boy*, *Wake Up Sid*, and *Lipstick Under My Burkha* exemplify these struggles, highlighting themes of anonymity, high-density living, and inequality. This dimension offers valuable insights into evolving societal challenges and complements existing thematic binaries, adding depth to the cultural analysis.

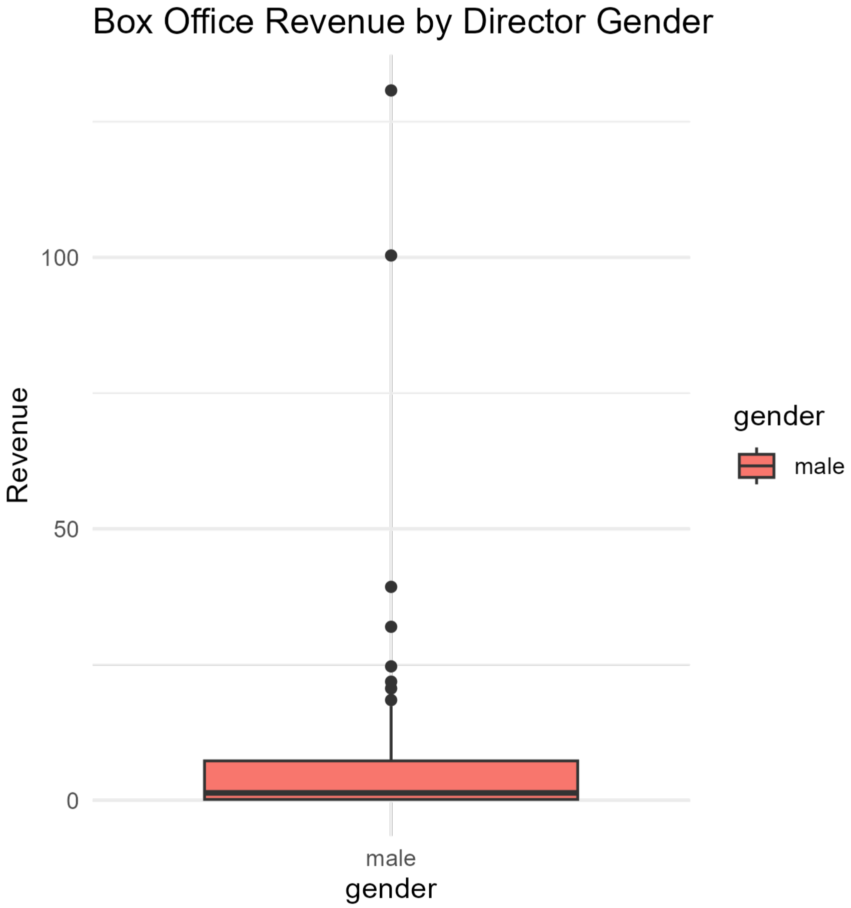
Visualizations

1. Director Gender Distribution



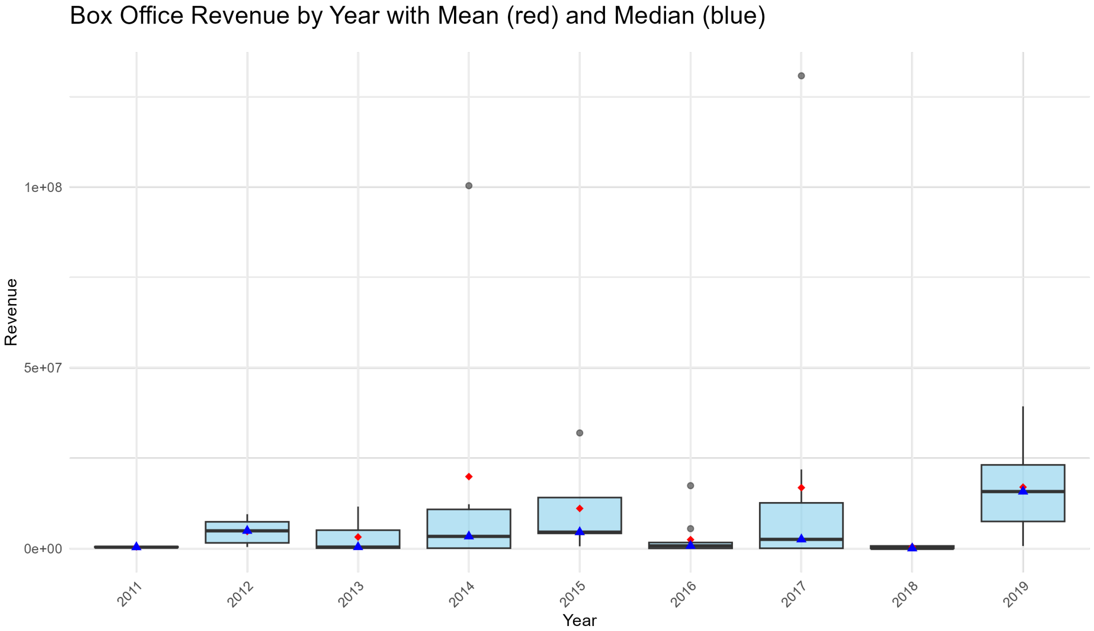
This plot displays the inferred gender distribution of directors in the sampled movie dataset, utilizing LLM-based name-to-gender inference.

2. Box Office Collection by Director Gender



Illustrates the distribution of box office revenues, categorized by the inferred gender of the directors, highlighting potential disparities. Current analysis does not show female due to lack of data.

3. Box Office Collection Over Time (2010–Present)



Shows the trend of box office collections for sampled movies from 2010 onwards, with red indicating the mean and blue the median revenue per year.

Directory Structure Snapshot

```
data/
- clean/          # Final structured datasets
- raw/            # Raw scraped data (subtitles, plots, metadata, posters)
- build/          # Combined thematic and sentiment processing files
scripts/            # All R scripts (helpers, data acquisition, analysis, plotting)
output/             # Final plots and figures
README.md           # Project description
supplementary_ideas.md  # Suggestions for data enrichment
```