

Network Analysis of Entities and Relationships in Breaking Bad TV Series



*Analysis of Entities and Relationships Using Network Analysis and Text
Classification model*

Jeppe Hedegaard Adamsen & Markus Henriksson

Problem Statement and Objectives

Problem Statement:

- The "Breaking Bad" series presents complex interactions among characters, locations, and events. Extracting and analyzing these connections through subtitles allows for insights into the storylines' social dynamics and narrative structure.

Objectives:

- To build a network of **characters**, **locations**, **events**, and **relationships** using subtitle data and Wikipedia information.
- Explore Key Network indicators
- Visualize the character dynamics and relations.
- Develop a **SetFit model Text Classifier** to classify entities and predict relationships (e.g., "works with," "teaches") among characters and events.

Approach

Process

- Data Extraction:
 - Extracted data from "Breaking Bad" subtitles and Wikipedia using a large language model (LLM).
 - Organized the data into a structured JSON format, capturing entities (like characters and locations) and their relationships.
- Data Processing:
 - Prepared labeled examples with clear labels (e.g., "Character: Walter White") to identify entity types.
 - Augmented the dataset to ensure a balanced representation of entities and relationships.
- Network Analysis:
 - Created network visualization to show the connections and frequency of entities and relationships.
 - Visualized the network to understand how different entities interacted.
- Model Development:
 - Built a SetFit model to classify relationships and entities based on the prepared data.
 - Trained the model using the labeled examples.
- Classification:
 - Used the trained SetFit model to classify relationships between entities
 - Gradio interface to display model

Findings

Findings:

- **Character network visualization:**
 - Structure of the characters' dynamics and significances in the network
 - Degrees of centralities
- **Classification Setfit Model:**
 - **Relationship Prediction:** Relationship types (e.g., "teaches," "works with") were identified, allowing for a deeper understanding of character dynamics (e.g., "Walter White works with Jesse Pinkman").

Insights:

- These findings gave insights on **key character interactions** and **positions**, for instance showcasing relationships like alliances and conflicts and character centralities .

Results - Visualizations and Text Classifier

Relationship Comparison

Select first character (char1)

Jesse Pinkman

Select second character (char2)

Walter White

Clear



Submit

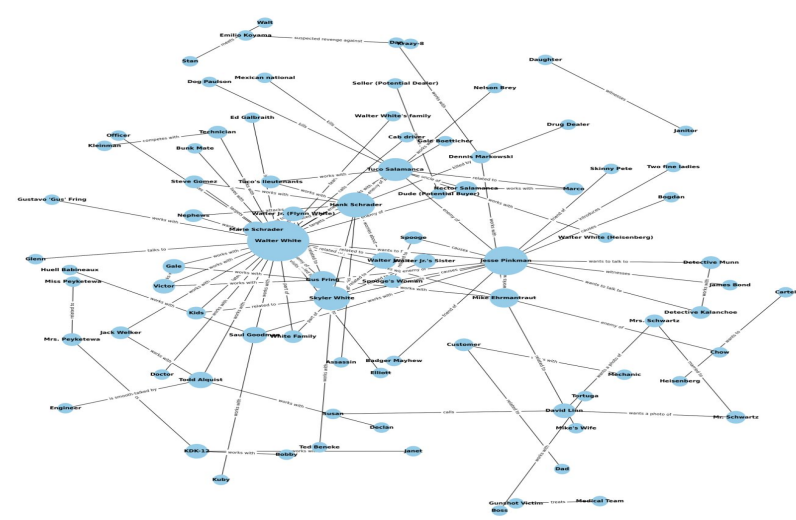
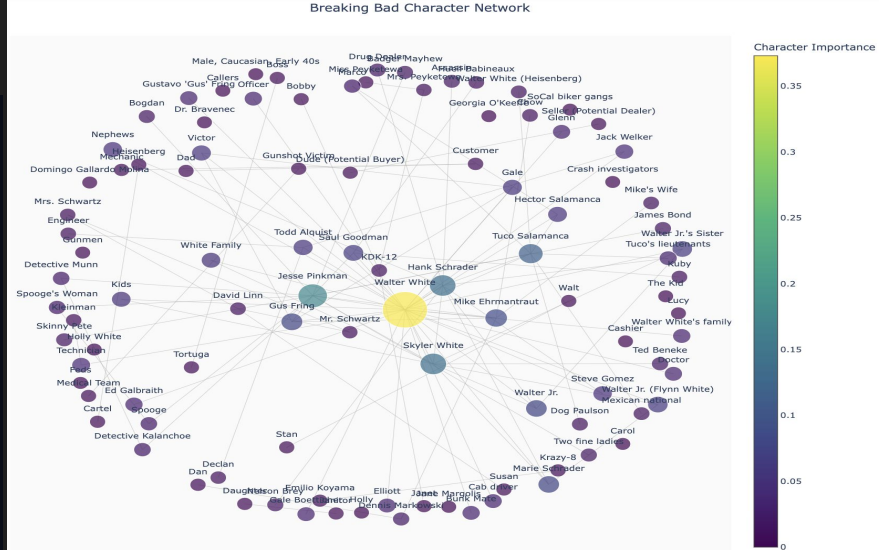
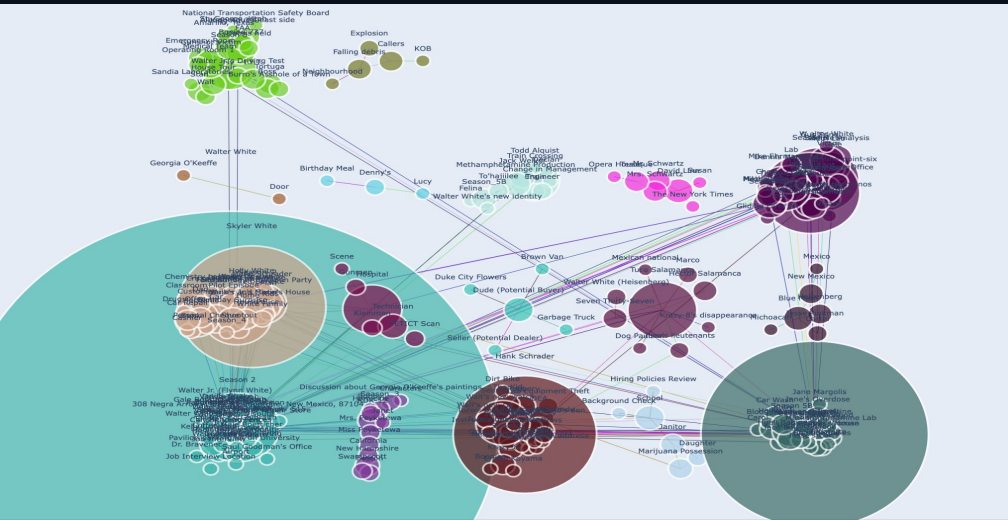
Results

Comparing relationship between Jesse Pinkman and Walter White:

Jesse Pinkman <=> Walter White:
Jesse Pinkman -> Walter White: works with
Walter White -> Jesse Pinkman: works with

Flag

Use via API  · Built with Gradio 



Summary

Central findings

- Visualizing the network of relationships helped reveal the complex structure of the series, from alliances to plot-critical locations and events.
 - From here it can be derived that the most central character is Walter White, and other characters with high centralities were Jesse Pinkman, Hank Schrader and others.
- The project used SetFit few-shot learning to classify entities and relationships, providing an automated and efficient way to analyze social networks and interactions within Breaking Bad.
 - For instance Walter White works with Jesse Pinkman.

Future Improvements?

- Incorporating communities, as it can be argued that the TV-series has different communities.
- More thorough prompting, as some of the data-extraction simply has mistakes, for instance some characters with different pseudonyms are made as two different characters.
- Improvements in TextClassifier, more specific character relationships could be incorporated.