Game of Thrones Character Personality Analysis via Linguistic Features and the Big Five Model

Jonathan Neimann
Boston University
jneimann@bu.edu

Abstract

For this project, I wanted to take a classic computational approach of analyzing the personalities of main characters in the *Game of Thrones* television series, expand on the analysis, and map the findings to emotional data. Most character profiles take plot points and actions to summarize the character, however I wanted to see if I could take that a step further by adding an emotional mapping to their dialogue to try and understand why they took the actions they did. By applying natural language processing techniques to dialogue data, I extracted linguistic features and mapped them to the Big Five personality traits of psychology. This method provides a structured, evidence-based alternative to traditional literary character analysis to try and reveal more nuanced personality insights between characters.

1 Introduction

Understanding character personality is central to understanding the narrative. In this project, my objective is to systematically analyze the personalities of the main characters of the *Game of Thrones* series by examining their spoken dialogue. We use natural language processing (NLP) tools to extract linguistic features from character lines and infer personality profiles based on the Big Five personality model; these are:

- **Openness**: This trait reflects a person's curiosity, creativity, and willingness to try new things. High-openness individuals are imaginative and enjoy intellectual pursuits, while low-openness individuals tend to be more practical and conventional.
- **Conscientiousness**: This trait relates to how organized, responsible, and thorough a person is. High-conscientiousness individuals are disciplined and goal-oriented, while low-conscientiousness individuals are more spontaneous and laid back. This seemed to be prevalent in a lot of characters from the show
- **Extraversion**: This trait measures how outgoing, energetic and sociable a person is. High extraversion individuals are assertive and enjoy being around others, while low extraversion individuals are more reserved and prefer solitude.
- **Agreeableness**: This trait reflects how kind, cooperative, and compassionate a person is. High agreeableness individuals are trusting and empathetic, while low agreeableness individuals are more competitive and skeptical.
- **Neuroticism**: This trait measures emotional instability, anxiety, and moodiness. It's often discussed in its opposite form, Emotional Stability. High neuroticism individuals are prone to stress and worry, while low neuroticism individuals are calm and resilient.

For example, given a dataset of dialogue from Tyrion Lannister, the system computed a high score for Extraversion, based on sentence structure and emotional language. This automated personality profiling can provide useful insights into character development and personality expression in storytelling. This method proved useful in some regards and needs improvement/refinement in others

I believe the approach holds promise in multiple applications, including AI character generation and scriptwriting analysis, as well as application in other mediums as well such as song lyrics. I also chose to do this out of personal interest as character development has always been an intriguing concept for me in many tv shows. I really wanted to see if we could determine a characters emotion profile *solely* based on their dialogue.

The last objective was to create a chat-bot that allowed users to talk and interact with different *Game*

of Thrones characters where they would respond based off of their dialogue and emotional profiles. This did not obtain great results for reasons I will go into.

2 Methodology

Our system integrates linguistic analysis with psychological modeling in four primary stages: data preparation, feature extraction, trait mapping, and personality profiling.

2.1 Data Preparation

I began with the cleaned dialogue dataset from Kaggle ‘‘Game of Thrones Script All Seasons’’, which contains every line of dialogue from all 8 seasons of game of thrones, the speaking character, and episode metadata. Since there are a massive number of characters throughout the show, I decided to focus on 39 ”main” ones that I personally decided and extracted the dialogue just from those characters to create our main dataset. After filtering the characters, I proceeded with text cleaning and sentence tokenization.

2.2 Linguistic Feature Extraction and Base Model

From each character's dialogue, I extraced basic linguistic features based on prior research connecting language use to personality traits. These are:

- **Lexical Diversity (0 to 1 scale):** Measures vocabulary variety.
- **Average Sentence Length (words per sentence):** Longer sentences suggest complex speech patterns.
- **Ego-centric Speech Ratio (“I” vs. “we”):** Indicates self-focused speech.
- **Sentiment Analysis (-1 to +1 scale):** Positive scores imply optimistic speech; negative values suggest hostility or sadness.

Using these traits I was able to build a base model that gave each of our 39 main characters a ”score” for each trait. This was done using a **simple NLP-based profiling system** that extracted linguistic patterns using Statistical Feature Extraction, basic sentiment analysis and speech style comparisons.

2.3 Enhanced Character Profile Model

I wanted to expand upon the basic model in preparation for Big 5 trait mapping by adding some more complex features, hoping that an increase in linguistic and psychological traits would create a richer character profile.

The first process was to create a dictionary of ”seed” emotional words that the model would use to analyze each character's emotional traits. I wanted to make sure to use actual words from the script to create these seed words and implemented a word embedding model that uses the gensim library to train Word2Vec word embeddings on the cleaned dialogue data. I was then able to train the model on the preprocessed dialogue I created for each emotion (anger, fear, joy, sadness, trust, disgust, surprise and anticipation), and use the trained model to update the ”seed” library with words that semantically similar from the dialogue.

While the original model already analyzed basic metrics such as word count, sentence length, lexical diversity, pronoun usage, and sentiment using TextBlob or fallback word lists, the updated version adds a more detailed layer of analysis. It calculates sentence punctuation patterns (question and exclamation ratios), lexical richness through word length and long word ratios, and formality indicators like function word frequency and contraction usage. It also deepens the perspective analysis by distinguishing between first, second, and third person pronoun ratios and introduces a new metric for authority through command word frequency.

Other major additions include emotional profiling, which quantifies the use of emotion-laden words across the predefined emotions from the seed words: Analyzing character relationships, which examines sentiment in how characters speak about one another: And analyzing character arcs, which tracks how characters evolve over time in sentiment and linguistic behavior.

These enhancements give the model more interpretive power for character comparisons, allowing for a more comprehensive understanding of speech styles, social positioning, and emotional tendencies.

2.4 Big 5 Mapping

The last round of analysis involved using this enhanced model to attempt and map each main character using the Big 5 personality traits (Openness, Conscientiousness, Extraversion, Agreeableness,

and Neuroticism) Each extracted feature is associated with one or more personality traits. For example, higher lexical diversity increases Openness scores, while higher contraction frequency may indicate lower Conscientiousness.

To do this I applied a trait-mapping function that assigns weighted scores to each Big Five dimension based on relevant linguistic features, such as emotional word usage, pronoun ratios, and sentence complexity. These scores are normalized for comparability using MinMaxScaler. After calculating the personality trait scores, the script generates concise natural language summaries for each character, which aim to provide an intuitive understanding of each character's psychological profile.

The Big Five model tries to builds on the analysis models by incorporating a more nuanced and research-backed feature set, offering a deeper interpretation of character behavior. However, it should be noted that the accuracy of the results depends on the quality of the underlying linguistic features and the assumptions I made in the feature-to-trait mappings. While the summaries provide some insights, they still remain approximations of the characters' full complexity.

Here is a comparison of the models:

Feature	Baseline Model	Enhanced Analysis	Big Five Personality Model
Linguistic Features	Basic (word count, sentence length, lexical diversity)	Extensive (word length, formality, pronouns, command words)	Uses enhanced features as input
Emotion Analysis	Basic sentiment (TextBlob or word lists)	Proportions of different emotions	Uses emotion proportions to predict Neuroticism and Extraversion
Complexity Analysis	None	Optional (with spaCy)	Uses complexity features to predict Openness
Relationship Analysis	None	Included	Not directly used
Character Arcs	None	Optional	Not directly used
Personality Inference	None	None	Maps linguistic features to Big Five traits
Summarization	None	None	Generates natural language summaries of personality

Figure 1: Model Comparison

2.5 Chatbot

Finally, I attempted to create a chat-bot designed for a user to interact and talk to these characters from *Game of Thrones* based on their dialogue and emotional characteristics. This involved much trial and error and is yet to be fully completed.

I originally used the base gpt2 model and combined it with my emotional analysis scores to try and generate responses. This turned into creating a character specific model which consisted of fine-tuning a base GPT-2 model using only Jon Snow's dialogue lines. The model was trained on around 1,133 lines over three epochs, focusing solely on predicting the next word in a sequence without any conversational context or knowledge of who Jon was speaking to. As a result, the model learned to associate Jon with relevant GoT vocabulary—such as names, places, and concepts—and may have absorbed some of his stylistic speech patterns. However, several key limitations remain: it lacks factual knowledge about the GoT storyline, struggles with coherence, fails to engage in meaningful conversation, and does not exhibit a deep understanding of Jon Snow's true personality. Instead, it imitates his voice through surface-level word associations.

3 Results

3.1 Baseline Model

The baseline model successfully extracted linguistic traits for multiple characters, yielding the following observations:

Key Insights:

- **Tyrion Lannister:** High lexical diversity and positive sentiment, reflecting intelligence and wit.
- **Jon Snow:** Simple sentences with neutral sentiment, indicating straightforwardness.
- **Arya Stark:** High ego-centric score, consistent with her independent nature.

Observed Issues:

- Sentiment scores require refinement. For instance, Ramsey Bolton, a villain, has a higher sentiment score than Jon Snow, which contradicts expectations.
- Lexical diversity outlier: Daario Naharis exhibits an unusually high score (0.9444). This is due to characters with few lines having higher lexical diversity scores as it is measured by unique words/total words.

3.2 Enhanced Model

The enhanced model didn't necessarily improve the issues from lexical diversity and sentiment, as it was using the same script. What it did do however was provide a more complete character profile and also the ability to view character trends throughout the seasons.

We are now able to see each character's emotional score using the emotions predetermines in my dictionary. Here are the emotional scores of some of the main characters (Figure 1)

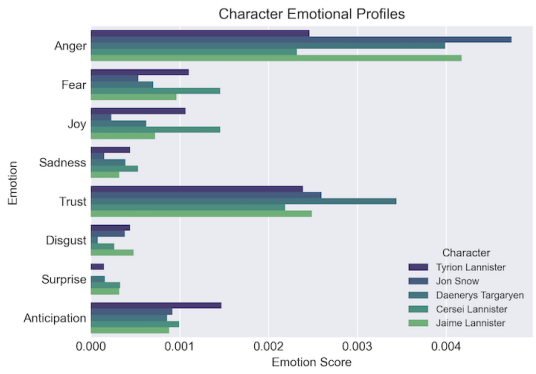

Figure 2: Emotion Profile for main characters

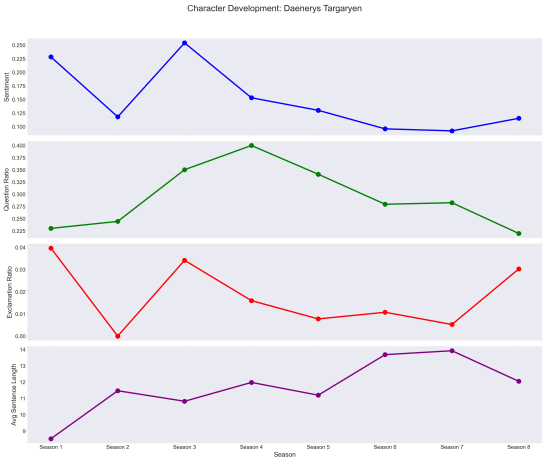

Figure 4: Dialogue changes for Dany

According to this visualization, anger seems to be the dominant emotion throughout the show (unsurprisingly) with very big scores across the board. The results also show surprisingly low scores for sadness based on viewer perception. This could be an improvement in the model worth noting or the based on the fact that characters in Game of Thrones often show sad emotions when they are alone and not speaking with another character, as they need to be perceived as hardened warriors who aren't easily shaken. Further visualization grouping characters by house or faction show similar trends.

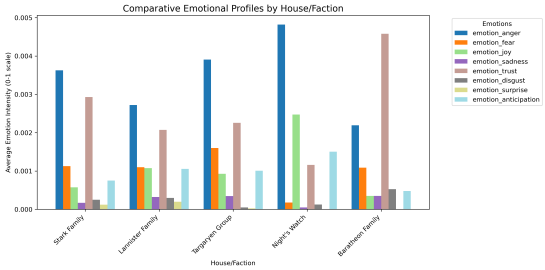

Figure 3: Emotional Profiles by House/Faction

Lastly, this model allowed us to view character personality traits throughout the seasons, providing insights on how their dialogue changed. Here is a figure representing the changes with Dany. I found it interesting how her average sentence length grew as she became a more prominent character but her sentiment decreased greatly as she hardened into her more "evil" end self (spoiler warning!).

3.3 Big 5 Model

Mapping these new emotional traits to each category of a big 5 personality trait provided more analysis and profiling for the characters. We now had "scores" for each character for each of the traits that allowed us to do some interesting analysis and comparisons for each characters emotional state. For example we were able to build radar charts for each character, here is the one for Jaime Lannister for example, a more extroverted character:

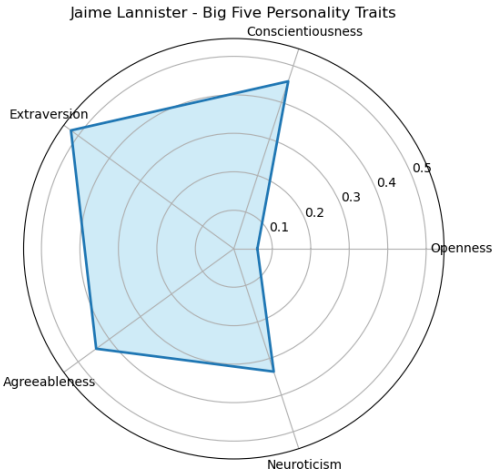

Figure 5: Jaime Lannister Radar Chart

These weren't always perfect and showed some discrepancies that I formed when simply viewing the show. For example the radar chart for Sandor Clegane (The Hound), has him as very neurotic (true) but also very extraverted (maybe not so much.

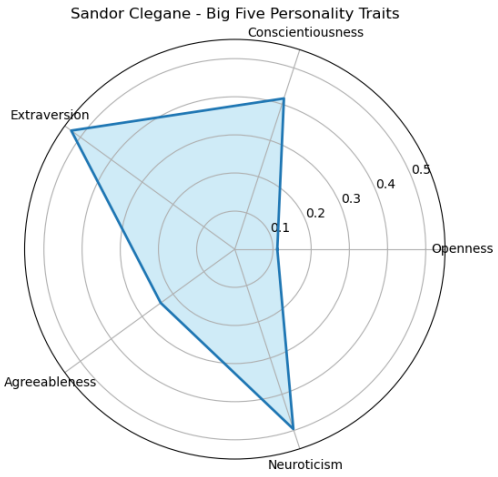

Figure 6: The Hound Radar Chart

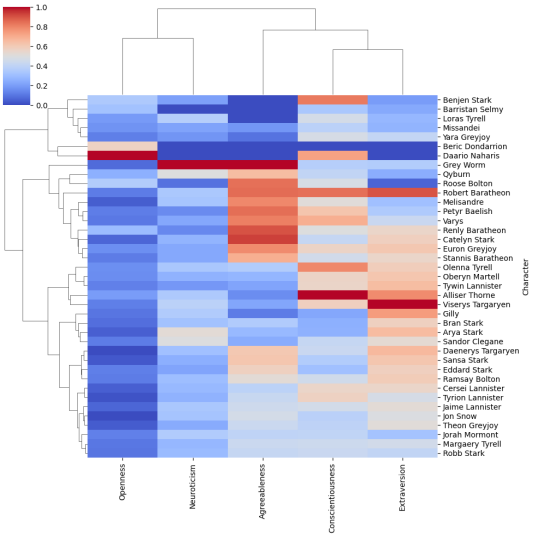

Figure 8: Big 5 Heat Map

This shows some limitations in my implementation of the big 5 model. Where there are more factors to consider such as how the number of lines spoken will effect these scores (since some traits will have much higher proportions) and also how adjusting the weights can contribute to a more precise and accurate model (based on our previous assumptions of these characters).

The Big 5 analysis also gave us a chance to compare characters based on these personality traits. For example, our model has Allister Thorne, the cold, mean and highly disciplined trainer of the Knights Watch as the most conscientious character, something most show viewers could agree upon.

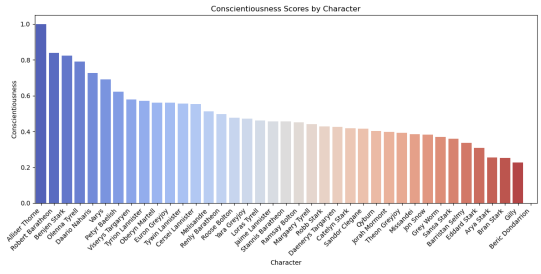

Figure 7: Characters ranked by Conscientiousness

I also derived a heat map for comparison of all traits as well. The lack of openness doesn't come as a surprise to anyone who's seen the show, but there are certainly a few surprises (Viserys Targaryen being the most extroverted is certainly one), this again could be the limitations of *only* using the script and not relying on the actions of the characters for this analysis.

3.4 Chatbot

Attempting to build a chatbot using these character profiles proved to be a cumbersome and computationally expensive process with varied results. Originally almost all of the character deferred to their default response that I assigned in the model. This made me realize that a generated response for each character was not going to be possible without each character having their own model. I created a specific model for Jon Snow to see if that would affect anything. The model was trained on around 1,133 lines over three epochs, focusing solely on predicting the next word in a sequence without any conversational context or knowledge of who Jon was speaking to. As a result, the model learned to associate Jon with relevant *Game of Thrones* vocabulary such as names, places, and concepts, and may have absorbed some of his stylistic speech patterns. However, the quality of the raw text generated by the fine-tuned Jon Snow model is low. The responses are often factually incorrect, incoherent, ignore the user's specific questions, and ramble using associated GoT keywords rather than forming meaningful conversation. As some of the results here show:

Figure 9: Jon Snow response to "hi Jon"

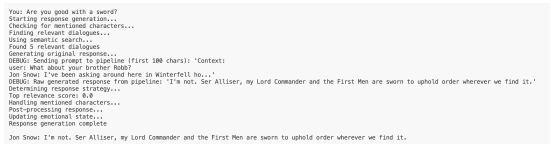

Figure 10: chat bot confusing ”sword” and ”sworn”

While this does seem to mimic Jon Snow's voice and dialogue, it does not exhibit a deep understanding of his true personality.

4 Conclusion

Emotional character analysis remains a complicated subject and using just dialogue certainly has it's limitations. However, we were able to discover some connections through these models and analysis. For instance, characters with high lexical diversity often reflect greater levels of Openness, while those who frequently use command-oriented language may score lower in Agreeableness, this makes sense in both context and assumption, and shows that these models can be valuable in using speech to determine personality traits.

This experiment also underscored that the selection and mapping of linguistic features to personality traits can critically shape the outcome, and i believe that further research and fine tuning of my model and these weights is needed to refine these mappings and explore the impact of different feature sets.

Lastly, I want to touch upon what i believe is the true base model of this experiment, the viewers themselves. As people watch different shows and movies, being able to *see* their actions, hear their inflections, and watch their reactions all contribute to how we perceive their personality and emotion. The beauty of a great TV show is that we the viewers can get together and all have different opinions on certain characters motives and actions. Using statistical analysis on the script does not capture these nuances because a contextual understanding of the source material remains essential. Automated analysis alone does not fully grasp the narrative and psychological nature of complex fictional characters. And while i believe the approach I took offers valuable insights and many things to build upon, it also has clear limitations in capturing the depth and richness of human personality.

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