Emotion Detection in Text: Unraveling the Emotional Journey of Movie Characters

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Abstract. The ability to detect emotions in text has garnered significant attention in the field of sentiment analysis. This project, titled "How do you feel, my dear," delves into the realm of emotion detection in fictional scripts for movies and TV series. The primary objective of this research is threefold: firstly, to develop a model capable of predicting emotions in text, utilizing datasets such as EmoBank, WASSA-2017, or Emotion Detection from Text for training; secondly, to represent emotions either categorically or in a continuous space like Valence-Arousal-Dominance; and finally, to leverage the developed model to study the emotional profiles of the main characters in a selected movie from the Cornell Movie-Dialogs Corpus. The study also aims to investigate how these emotional profiles evolve over time throughout the movie's storyline and how they are influenced by the various relationships among different characters. Cross-validation using the training set serves as the evaluation strategy for the model's performance.

Keywords: emotion detection, sentiment analysis, fictional scripts, text analysis, EmoBank, WASSA-2017, Valence-Arousal-Dominance, Cornell Movie-Dialogs Corpus, character emotional profile, movie storytelling, relationship influence, cross-validation.

1. Introduction

Emotions are an integral part of human communication and understanding, influencing the way we express ourselves and interpret others' sentiments. Emotion detection in text is a fascinating area of research that aims to enable computers to discern and categorize emotions conveyed in written or spoken language. In this project, we embark on a journey to explore emotion detection in text, with a specific focus on deciphering the emotional profiles of characters in movies. By applying advanced deep learning techniques, such as Recurrent Neural Networks (RNNs), we seek to uncover the emotional nuances of movie dialogues and analyze how emotions evolve over time, contributing to a deeper understanding of narrative arcs and character dynamics.

1.1. Definition of Emotion Detection in Text

Emotion detection in text refers to the computational process of recognizing, classifying, and interpreting emotional expressions within textual data. It involves training machine learning models, particularly deep learning architectures like RNNs, to identify patterns and linguistic cues associated with different emotions. By learning from annotated data, the models can accurately predict the emotional states conveyed in a given text, ranging from positive emotions like happiness and excitement to negative emotions like sadness and anger.

2. Datasets

To accomplish the task of emotion detection in text, we utilize a diverse set of datasets, each contributing valuable annotated samples for training and evaluation. The primary datasets employed in this project include:

2.1. EmoBank

EmoBank is a rich dataset containing sentences annotated with arousal, valence, and dominance ratings. These ratings represent the intensity of emotional experiences and provide a nuanced perspective on emotional expressions in text.

2.2. WASSA-2017

The WASSA-2017 dataset consists of tweets annotated with categorical emotion labels, including joy, sadness, anger, and fear. This dataset introduces real-world and informal language expressions, making our model more robust and adaptable to various contexts.

2.3. Emotion Detection from Text

This dataset comprises text samples from diverse sources, each annotated with categorical emotion labels. By incorporating additional data, we enhance the generalization capability of our emotion detection model.

2.4. Cornell Movie-Dialogs Corpus

The Cornell Movie-Dialogs Corpus offers a collection of movie dialogues, complete with detailed metadata. This corpus enables us to delve into the emotional journeys of movie characters, studying how emotions are expressed and evolve in a cinematic context.

3. Project Structure

The project follows a structured approach to build and evaluate an emotion detection model for text data. The main goal of the project is to develop a model that can accurately predict the emotions expressed in textual conversations. The project is divided into several sections, each serving a specific purpose in the overall process.

3.1. Data Preparation

In the initial phase of the project, we gather and preprocess the datasets to make them suitable for training our emotion detection model. This step involves loading the data into dataframes, handling missing values, and merging datasets to create a comprehensive dataset.

3.2. Data Preprocessing

To ensure the quality and consistency of the data, we undertake thorough data cleaning and preprocessing. The process includes converting text to lowercase, removing URLs and special characters, tokenizing text into words, removing stopwords, and lemmatizing words for standardization.

3.2.1. Train Dataset

The training dataset consists of a combination of EmoBank, WASSA-2017, and the Cornell Movie-Dialogs Corpus. EmoBank provides sentences annotated with emotion intensities, WASSA-2017 offers fine-grained emotion labels from social media, and the Cornell Movie-Dialogs Corpus contributes dialogues capturing emotions in conversational contexts.

index	Text	Emotion
5483	Unilever group names new chairman	Neutral
4035	“Come on, Amy,” I said, “he’ll be along soon.”	Positive
4712	'Ronnie' and Eto'o hug and make up	Positive
2016	I estimate the value to be in six figures, and we are a small winery.	Neutral
518	---- the development of community-wide supports for the positive growth of all Marion County young people.	Neutral

Table 1. A snippet of Train dataframe

3.2.2. Test Dataset

The test dataset is designed for evaluating the model's generalization capabilities. It includes diverse samples from EmoBank, WASSA-2017, and the Cornell Movie-Dialogs Corpus, ensuring the model's effectiveness in recognizing emotions in unseen data.

index	Text	Emotion
6132	Hence the Ag Fair, and the ongoing experimentation with varieties and soils at First Light.	Neutral

4241	I heard an automatic window roll down.	Neutral
6316	In addition, most top-line hotels have upscale malls full of designer boutiques.	Positive
1712	Wilson, 182.	Neutral
7758	"But an artist who would stay first among his fellows can tell when he begins to fail."	Neutral

Table 2. A snippet of Test dataframe

3.3. Building the Emotion Detection Model

The crux of the project lies in constructing a powerful emotion detection model using Recurrent Neural Networks (RNNs). RNNs are ideal for sequential data, making them suitable for analyzing text data with temporal dependencies. The model comprises an Embedding layer to map words to dense vectors, an LSTM layer to capture sequential patterns, and a Dense layer with softmax activation to generate output probabilities for different emotion classes.

3.4. Making Predictions

With the trained emotion detection model, we proceed to make predictions on the dialogues of movie characters using the Cornell Movie-Dialogs Corpus. We apply the model to detect emotions in the text and label each dialogue with the corresponding emotion.

3.5. Data Visualization and Analysis

In this section, we delve into the emotional profiles of main characters in the selected movie. We create visualizations such as bar plots and pie charts to represent the distribution of different emotions for each character. Additionally, we explore how emotional profiles change over time during the movie, using line plots and area charts to observe fluctuations in emotions.

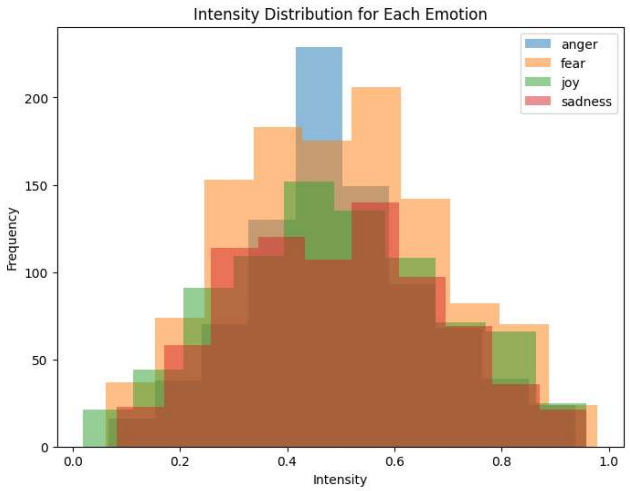

Figure 1. Intensity Distribution for each Emotion

3.6. Emotional Profile and Relations

To understand the impact of character relationships on emotions, we analyze the emotional responses of characters based on their interactions with others. We construct network diagrams to visualize character relationships and calculate sentiment scores between connected speakers to assess emotional similarities.

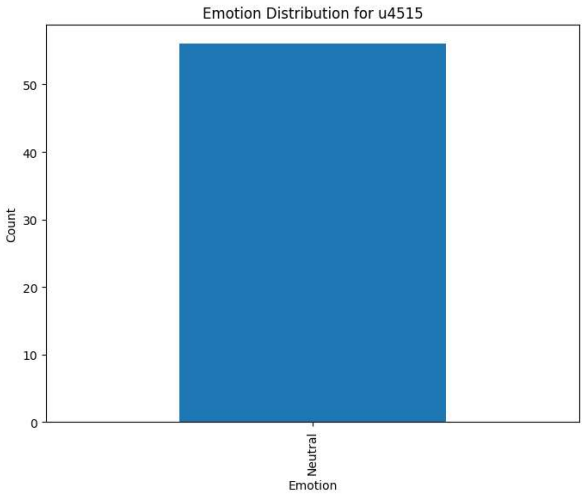

Figure 2. Emotion Distribution for the the selected character

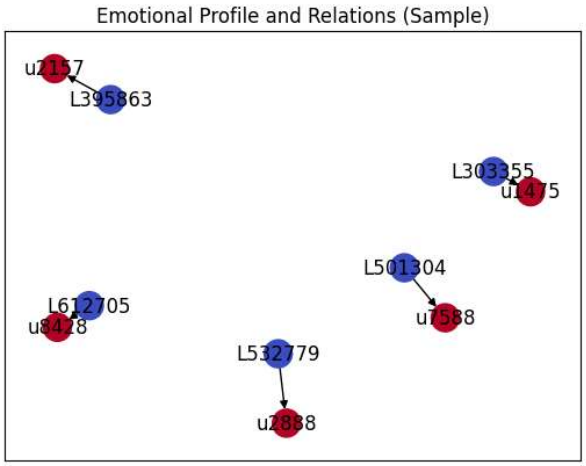

Figure 3. Emotional Profile and Relations for 5 samples

4. Conclusion

In conclusion, this project explores the captivating world of emotion detection in text, with a focus on character dialogues in movies. By employing powerful deep learning techniques, we unveil the emotional journeys of movie characters and uncover the intricate emotional dimensions of cinematic experiences. Through data visualization and analysis, we gain valuable insights into character dynamics, narrative arcs, and the influence of relationships on emotions. This project not only advances our understanding of emotion detection but also showcases the potential for emotion analysis in diverse forms of media and real-world interactions.

5. References

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