

# Analysis of Seven Editing Bias in Movie Trailer Based on Editing Features

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## ABSTRACT

Recently, movie trailers are created for a certain target audience. There are few diversity of movie trailers because the types of effects in a trailer are limited. Therefore, it is difficult to edit a trailer that caters to the different preferences of various users. To solve this problem, we define seven *editing biases* by images, audios, and captions for the trailers based on definitions in related work and editing features of a movie, and we propose the method analyzing degrees of seven editing biases in a movie trailer. We then propose user interface representing the result of analysis of the trailer based on its editing features.

## CCS CONCEPTS

• **Human-centered computing** → **Information visualization.**

## KEYWORDS

Movie trailer; editing features; video analysis

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## 1 INTRODUCTION

Currently, movie trailers are edited using various elements, such as sound effects, lines, and captions. However, four trailers at most are produced for each movie. Moreover, the length of each trailer is at most only a few minutes. Because a trailer is edited for a certain target audience, the scenes and effects that can be included in the trailer are limited. Therefore, it is difficult to edit a trailer that caters to the various users in the target audience. However, the viewer could be lost if the trailer is not attractive enough to them.

To solve this problem, in Section 4, we define seven editing biases (scene reordering, length of scenes, background music, emphasis of characters, number of lines, number of topic words, and change of sentiment polarity) that occur when movies are summarized and edited into trailers based on definitions in related work and editing features of a movie. In addition, we propose the method

of analyzing degrees of seven editing biases in a movie trailer. We then propose user interface representing the result of analysis of the trailer based on its editing features in Section 5. The degrees of seven editing biases of the uploaded video file and the typical balance of the degrees of seven editing biases for each movie genre are presented on the interface.

## 2 RELATED WORK

### 2.1 Editing Features

Giannetti and Leach [4] analyzed the basic techniques and effects of camera work and shots in their study. According to their analysis, shots such as long and close shots emphasize specific topics such as the characters and background in the scenes. However, these methods are not effective in current movie trailers because scenes in the movie are shortened by the editor when they are summarized for a trailer. This means each scene of the movie can lose its continuity when edited down. Video lighting is a similar case. Wheeler [15] and Kanematsu et al. [9] described lighting as one of the important factors of video work because the lighting techniques can be used to control the mood and atmosphere of a scene. However, lighting may not be effective enough in the extremely short sequences of a movie trailer. Therefore, in this paper, we do not define features of shots and lighting as editing biases for movie trailers. Ikenobe [6] defined a movie trailer as a series of scenes that a movie editor uses to attract a target audience. Moreover, the order of each scene is rearranged, not to follow the storyline, but to emphasize impressive scenes. The method of reordering scenes can produce a trailer that has a completely different story from that of the movie. Therefore, the reordering of scenes is defined as an important editing feature in this paper.

Tomino [13] noted that sound elements such as background music and sound effects can give movies continuity. Ikenobe [6] also asserted that music is an essential factor for attracting viewer interest in a movie trailer. However, Vineyard [14] noted that the sound design of a movie is not a visible feature of editing. He defined a sound design as a factor that can determine the atmosphere of the movie. Therefore, in this paper, the background music is defined as an essential editing feature that generates sentiment polarity.

### 2.2 Genre Classification

Buckland [1] noted that the border between the genres of a movie is not clear because one movie can have several features from

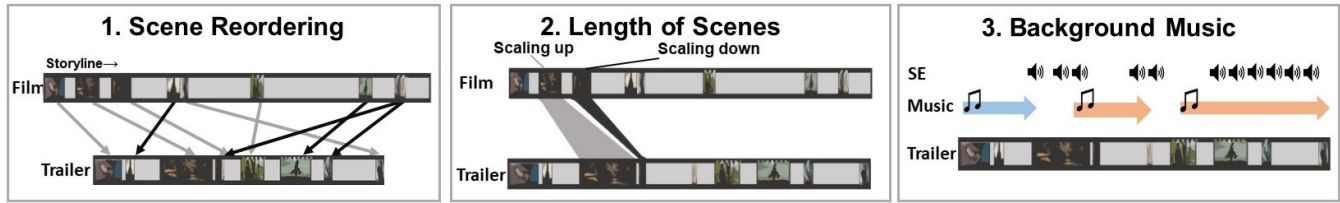


Figure 1: Audio-visual biases.

other movie genres. Hesham et al. [5] proposed a system that uses machine learning to classify movie genre based on the textual features of a movie’s subtitle. In their study, movies are also defined as content that contains a mixture of genres. In contrast, the genre classification system proposed by Ekenel et al. [2] classifies genres of TV programs and web videos with high precision by analyzing audio and video features.

### 2.3 Video Summarization

Li et al. [10] proposed a method to generate a video summary of a story with important scenes extracted from the movie based on the plot summary from Wikipedia [16]. Another approach proposed by Xie et al. [17] is a video summarization system based on the importance evaluation model. Although there are many video summarization methods based on the story and important scenes of a movie, fewer methods have been proposed that generate a movie trailer based on the extraction of its elements. In this study, we extract characteristic words and the names of the main characters from the plot summary in Wikipedia.

In the system proposed by Ercolessi et al. [3], TV drama scenes are detected and summarized based on automatic speaker diarization and speech recognition. In our proposed method, text data in the script and plot are used to analyze characteristic words and used to define an important editing bias for movie trailers.

Money et al. [12] surveyed video summarization systems, which include systems for movies. Although there are many systems that focus on the audio-visual cues of video content, there are few systems analyzing the elements intentionally added to a movie trailer.

## 3 MOVIE TRAILER BIASES

Two types of data are available from the creators of movies: the script and official trailers. A trailer is a summary of a movie created using various editing methods. Because editors use these techniques to attract the attention of the target audience and leave an impression on them. In this study, these editing techniques are defined as seven editing biases. In addition, the scripts of movies are provided on several websites. e.g., [8]. The script contains not only the settings and background of the scenes, but also almost all the lines, behavior, and facial expressions of the characters. The script is a reproduction of a movie in the form of text. Therefore, our proposed method analyzes the following five editing biases using text data: scene reordering, the emphasis of characters, number of lines, number of topic words, and change in sentiment polarity. In our method,

editing biases are analyzed by Microsoft Video Indexer.<sup>1</sup>The plot and summary of a movie are provided on online databases such as Wikipedia and the Internet Movie Database (IMDb) [7]. In addition, our proposed method analyzes the following two editing biases using audio-visual data: length of scene and background music.

In this paper, we define editing features as two groups of editing biases: audio-visual biases and contents biases. Audio-visual biases include 1. Scene Reordering, 2. Length of Scenes, and 3. Background Music (see Figure 1). Contents biases include a. Emphasis of Characters, b. Number of Lines, c. Number of Topics, and d. Change in Sentiment Polarity. Editing biases (see Figure 2).

## 4 DEGREES OF VIDEO EDITING BIASES

### 4.1 Degrees of Audio-Visual Biases

To analyze the degree of editing biases, we create the script of a movie trailer by editing the script of the movie in advance. In this section, *Slow West*<sup>2</sup> is analyzed as an example.

**4.1.1 Scene Reordering.** As Ikenobe [6] notes, scenes used in a trailer are mixed up by the editors in an order that is unrelated to the storyline so that they emphasize impressive scenes. In this paper, we define the reordering of scenes as an editing bias that has the largest influence on a viewer’s understanding of the story and atmosphere. In Figure 1, the black arrows indicate reordered scenes and the gray arrows indicate scenes that remain in the order of the storyline. To extract the degree of exchange as an editing bias, the proposed system calculates the rate of scene reordering, that is, the proportion of scenes that appear before and after the location of their sequence of the storyline.

**4.1.2 Length of Scenes.** As Giannetti and Leach [4] noted, differences of length of scenes and shots have a different impression on viewers. A scene made up of shortcuts makes viewers excited. In contrast, a scene made with long cuts contains detailed information about the story. In this paper, we define the length of the scenes in a trailer as an editing bias that determines a viewer’s impression and understanding of the story. The black regions of Figure 1 shows the scaling down of certain scenes and the gray regions indicate the scaling up of certain scenes. To extract the degree of the editing bias, we compare the component ratio of each scene of the trailer and the movie.

<sup>1</sup>Video Indexer, Azure Media Services, <https://azure.microsoft.com/ja-jp/services/media-services/video-indexer/>

<sup>2</sup>Slow West Official Trailer #1 (2015), <https://www.youtube.com/watch?v=pFFsTsdJfF8>



Figure 2: Content Biases

4.1.3 *Background Music*. Tomino [13] noted that sound elements such as background music and sound effects can give movies continuity. Vineyard [14] noted that the sound design of a movie is not a visible feature of editing. He defined a sound design as a factor that can determine the atmosphere of the movie. Because a movie trailer is a mixture of audio and visual content, background music has a strong influence on a viewer’s impression regarding sentiment. Furthermore, it is evident that background music is an effective way to emphasize the mood of a certain situation in a trailer. Some editors use music that does not exist in the movie to emphasize a particular mood. In this paper, the background music is defined as one element of the sentiment polarity of a movie trailer.

## 4.2 Degrees of Content Biases

4.2.1 *Emphasis of Characters*. The emphasis of characters in the trailer is a way for the editor not only to describe the main cast of the movie but also to create a certain atmosphere. Certain characters that create a negative sentiment, such as the villain, maybe more emphasized in the trailer. As a result, a viewer’s impression and the sentiment polarity regarding the trailer may be different from those of the movie. In our proposed method, the differences in the appearance rates of the characters in the trailer and movie are defined as the emphasis of particular characters. These rates are determined by an analysis of the script. In the proposed method, the main characters are determined based on the order of the cast in Wikipedia and the number of their occurrences in the script (see Figure 2(a)).

4.2.2 *Number of Lines*. The number of lines affects the understanding of a story as an editing bias because lines rather than visual information help viewers to understand the content of the movie. In addition, the lines of the trailer and the contents of the movie can be defined as an editing bias when there is a gap. The proposed method extracts two types of text data: the lines themselves and the script of the trailer without any lines. This is because the lines are not always synchronized with the scenes of the trailer. The number of lines is calculated based on the number of words in the trailer (see Figure 2(b)).

4.2.3 *Number of Topics*. Similar to the number of lines, the number of topics in the scene determines the amount of information conveyed to viewers. In the proposed system, nouns and verbs are extracted from the text data of the script as the characteristic words of the scene (see Figure 2(c)).

4.2.4 *Change in Sentiment Polarity*. In addition to the background music, the emphasis of the characters, topics in the lines, and script also change the sentiment polarity of the trailer (see Figure 2(d)). In



Figure 3: User Interface

this paper, we hypothesize that the background music has a larger influence on the sentiment polarity of a viewer’s impression than the other three biases.

## 5 USER INTERFACE

The user interface of the analysis result is shown in Figure 3. Firstly, a user uploads a movie trailer file or pastes an URL of the movie trailer on the video window to view as illustrated in the orange box. Secondly, the degrees of seven editing biases are presented as seek bars on the right side of the video window.

The window under the video window presents several movie genres closest to the balance of the degrees of the uploaded movie trailer file. In addition, the typical balance of the degrees of seven editing biases for each genre is shown in the same window. For example, when a balance of the seven editing biases of a trailer uploaded by a user is similar to the typical balance of movie genre "Action", "Sci-fi" and "Adventure", these genres are presented as buttons. The user can click these buttons and compare the differences between the balance of the trailer and the typical one. Therefore, the user may discover the uniqueness of an uploaded trailer or adjust the editing technique of a trailer based on the result of the analysis.

## 6 CONCLUSION

In this paper, we defined seven editing biases in a movie trailer based on definitions in related work and editing features of a movie. We then proposed a method that can extract seven editing biases: scene reordering, scene length, background music, emphasis of characters, number of lines, number of topic words, and change in sentiment polarity. In addition, we proposed a user interface that

presents degrees of seven editing biases based on movie trailer analysis.

As future work, we plan to generate movie trailers from any movies using degrees of seven editing biases by the machine learning method. In addition, it is necessary to analyze the content of the trailer to analyze what kinds of content tend to be focused on and how they affect a viewer's impressions. In addition, a method of avoiding spoilers of the story is required not to decrease user interests in the film. To reject spoilers, Maeda et al. [11] proposed a system detecting spoilers in the user review based on its location in the story documents such as text data of the literature. We plan to propose the method using the script of the movie instead of the text of literature.

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