
Affective Lens: An Emotion Based Movie Recommendation Engine

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Abstract

Movie Recommendation Engine has been wildly used in the industry. However, there is not much recommendation engine is based on users' emotion state. In this paper, I am going to present an emotion based movie recommendation engine called Affective Lens. I'll also explain how this recommendation system work and how well it performs based on 3 user study.

Author Keywords

Emotions; Emotional signature; Movie reviews.

ACM Classification Keywords

I.2.1 [I]: Artificial Intelligence]: Applications and Expert Systems

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Introduction

The importance of emotions in films have been long recognized, as well as the demonstrated ability of movies to elicit emotions such as amusement, anger, and more. Effect elicitation, triggered by emotions, was found to be a powerful reason for box office success, and filmmakers use a variety of methods to elicit emotions in their audiences, such as narration, screen-architecture, images, colors, lighting, music, camera angles and characters [1]. Smith's [2] further describes an interplay of emotions between a film and its audience, in the following manner: A film is an invitation to feel in a way; however, while the audience can recognize how a film is cueing them to feel, they may either accept it, or reject the invitation by not feeling those emotions. A recent study found that movie goers experience a dynamic set of emotions that is spontaneously evoked when they recall the movie.

Given this specific role of emotions in the film industry, and their eliciting effect on film viewers, it is interesting to build a recommendation engine that responds to user emotions.

Related Work

Exploring Emotions in Online Movie Reviews for Online Browsing

Nadeem explained in that paper the relationship between movie reviews and emotion signature of the movie. The result is very interesting, they find a clear relationship between movie reviews and emotion signature based on reviews. Given Nadeem's work I assume that the movie review can be an indicator of user's emotion state.

Data and Methodology

Data Set Information

The dataset contains 34,686,770 reviews of different movies reviews in amazon.com. There are 6,643,699 movies in the data set and the time span is from Jun 1995 to Jun 2013.

Movie Emotion Extraction

In this project, I chose to use synesketch text to emotion API to extract User emotion from the data set review text.

*"It was good but not as emotionally moving
as the the Christmas Carol by Dickens I like
Christmas movies that make me sigh"*

Happiness weight: 1.0
Sadness weight: 0.09999999999999999
Anger weight: 0.049999999999999996
Fear weight: 0.049999999999999996
Disgust weight: 0.049999999999999996
Surprise weight: 0.090000000000000001

Figure 1: This figure illustrates the analysis result of the sample text above from synesketch text to emotion API.

User Emotion Evaluation

Affective Lens is a rule based recommendation engine. The recommendation Algorithm is based users' emotion state. The user can select their current state and their target state using a web browser, affective lens is going to calculate the vector of the user's emotion change.

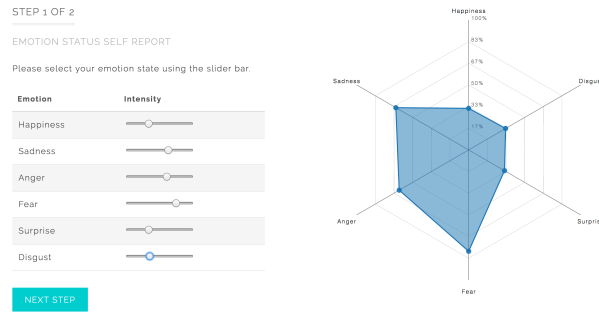


Figure 2: This figure illustrates the user interface for selecting current emotion state.

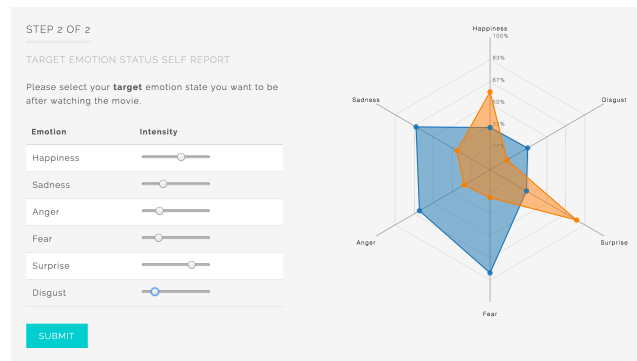


Figure 3: This figure illustrates the user interface for selecting target emotion state.

Recommendation Algorithm

Affective Lens recommends movie based on cosine similarity between the movie's emotion vector that measured from previous section and the user's emotion vector difference from current state to target state.

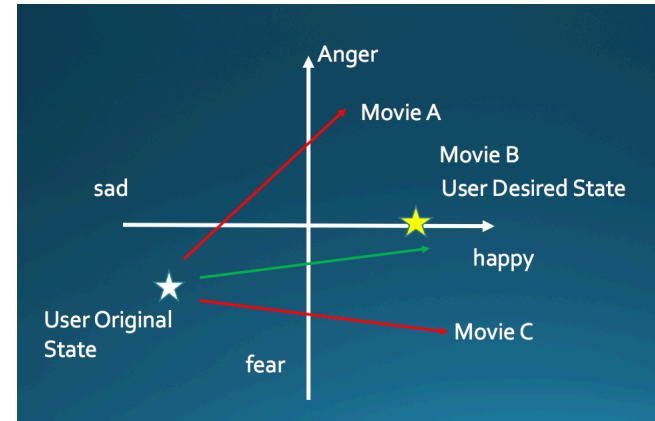


Figure 4: This figure illustrates 3 different movie vector. The user wants to change their state from original state to target state. Movie A and C does not work but movie B makes user get closer to the target emotion state.

$$\text{similarity} = \cos(\theta) = \frac{A \cdot B}{\|A\| \|B\|} = \frac{\sum_{i=1}^n A_i \times B_i}{\sqrt{\sum_{i=1}^n (A_i)^2} \times \sqrt{\sum_{i=1}^n (B_i)^2}}$$

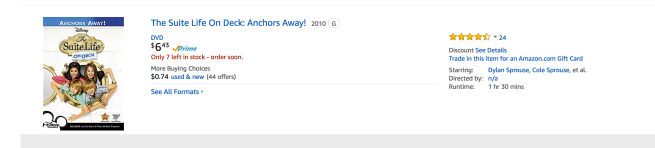


Figure 5: This figure illustrates the result of the recommendation. Once the best match was found the website is going to navigate the user to the amazon page.

Result

The user study is very interesting. There are three participants of my user study. One participant reported that Affective Lens changed its emotion state dramatically towards his target state. Another participant one reports that it somewhat changed his target state but not necessarily towards his target state. The last participant reports that the Affective Lens does not changed her emotion state.

References

1. Nadeem Bader. 2017. Exploring Emotions in Online Movie Reviews for Online Browsing. ACM Library.
2. Greg M Smith. 2003. Film structure and the emotion system. Cambridge University Press.