The Relationship Between YouTube Thumbnail Characteristics and View Counts

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Abstract

This paper examines the impact of YouTube thumbnail characteristics, including brightness, saturation, facial expressions, and word count, on video view counts. Utilizing statistical hypothesis testing, we investigate whether these variables significantly influence video performance. Results indicate no statistically significant relationships, though trends observed for facial expressions suggest areas for further investigation.

1. Introduction

YouTube thumbnails serve as the visual gateway to video content, influencing viewers' decisions to click on a video. With millions of videos uploaded daily, optimizing thumbnails has become a key focus for content creators. Commonly discussed factors include brightness, saturation, facial expressions, and text content, all of which are thought to attract viewers. This study aims to determine whether these thumbnail attributes significantly correlate with video view counts.

2. Related Works

Previous studies have explored the influence of visual elements on digital media engagement. For instance, Li's research on Travel Pictures on Consumer Appeal suggests that color and saturation play a role in attracting attention. While Poudel et al. looked at how thumbnail content impacted user engagement with videos, the specific impact of YouTube thumbnail characteristics on video view counts remains underexplored. This study contributes to this gap by analyzing a dataset of videos and their thumbnail features.

3. Experimental Design

3.1. Hypotheses

Our research is based on the following null and alternative hypotheses:

- **Hypothesis 1 - Brightness:** Null: There is no relationship between the brightness level of a YouTube thumbnail and video view counts. Alternative: There is a relationship between the brightness level of a YouTube thumbnail and video view counts.

- **Hypothesis 2 - Saturation:** Null: There is no relationship between the saturation level of a YouTube thumbnail and video view counts. Alternative: There is a relationship between the saturation level of a YouTube thumbnail and video view counts.

- **Hypothesis 3 - Facial Expressions:** Null: The distribution of view counts does not differ across different facial expressions in YouTube thumbnails. Alternative: The distribution of view counts differs across different facial expressions in YouTube thumbnails.

- **Hypothesis 4 - Word Count:** Null: There is no relationship between the number of words in a YouTube thumbnail and video view counts. Alternative: There is a relationship between the number of words in a YouTube thumbnail and video view counts.

3.2. Methods

Data for this study were collected from a sample of YouTube videos, extracting information on thumbnail brightness, saturation, facial expressions, and word count. Video view counts served as the dependent variable. Statistical significance was evaluated

at a p-value threshold of 0.05. Hypotheses 1, 2, and 4 were tested using Spearman correlation tests, while hypothesis 3 was tested using Kruskal-Wallis. We used the spearmanr package from scipy.stats in Python to find our Spearman correlations for hypotheses 1,2 and 4. For hypothesis 3, we used the kruskal Python package from scipy.stats.

4. Data

4.1. Data Gathering

For this research, we gathered data from YouTube videos spanning various genres and channels. Examples of the channels analyzed include Gordon Ramsey, Dude Perfect, and CaseOh. We examined several factors potentially influencing viewer engagement, such as facial expressions, saturation, brightness, and word count in thumbnails. Data was collected from videos uploaded within the past one to three years to ensure a fair and representative sample of YouTube users. In order to determine brightness level and saturation we used the Opencv Python package, and to determine facial expressions of thumbnails, we used the Deepface python library.

4.2. Data Usage

To test our hypotheses, we collected data on ten videos per channel and two channels per genre. To minimize larger channels from having a skewed impact on the results of our tests, we used a ranking system for all categories except for facial expression and word count. We ranked the videos within each channel from 1-10 on their view count, saturation, and brightness. This way every channel and genre can be represented in an equitable way regardless of their following.

5. Results

Variable	Test Used	p-value
Brightness	S. Correlation	0.504
Saturation	S. Correlation	0.240
Facial Expressions	Kruskal-Wallis	0.07
Word Count	S. Correlation	0.225

Table 1: Table of p-values for each of the factors measured by tests in relation to views
S. Correlation: Spearman Correlation

5.1. Brightness

The Spearman correlation for brightness level yielded a p-value of 0.504, indicating no statistically significant relationship between brightness

and view counts. Thus, we fail to reject the null hypothesis.

5.2. Saturation

For saturation levels, the Spearman correlation produced a p-value of 0.240. This result suggests no statistically significant relationship, and the null hypothesis was not rejected.

5.3. Facial Expressions

The Kruskal-Wallis test for the relationship between facial expressions and view counts resulted in a p-value of 0.070. While this result approaches significance, it does not meet the p = 0.05 threshold. Therefore, the null hypothesis was not rejected.

5.4. Word Count

The Spearman correlation analysis of the word count yielded a p-value of 0.225, indicating that there is no statistically significant relationship. The null hypothesis was not rejected.

6. Discussion & Future Work

Our results indicate that none of the tested thumbnail characteristics are significantly correlated with video view counts. However, the near-significant result for facial expressions suggests that this variable may merit further exploration. Future studies could expand the sample size and explore additional factors, such as color schemes or contextual elements in thumbnails.

7. Conclusion

This study found no strong evidence supporting the relationship between thumbnail brightness, saturation, facial expressions, or word count and YouTube video view counts. While our findings suggest that these attributes may not independently drive video engagement, further research could clarify their roles within a broader set of design factors.

References

- Poudel, Diwash, Mert Can Cakmak, and Nitin Agarwal. "Beyond the click: How YouTube thumbnails shape user interaction and algorithmic recommendations." *The 16th International Conference on Advances in Social Networks Analysis and Mining (ASONAM)*, accepted for presentation, 2024.

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