

## Research Article

# A Study of Human Emotion on the Virtual Crocodile with an Artificial Life span of 100days

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## ABSTRACT

This study is aimed at capturing the impact of flaming generated through social media on content by Emotion analysis and Key Graph Analysis. The analysis and discussion clarify those three points. First, humans want to mourn the death of comic strip character, as an Artificial Life. Second, Reply tends to be relatively positive throughout the entire flaming period, thus they do not fully reflect the feelings of the recipients. Third, content that has been under flaming will not stop being criticized for a long period of time, and that being flaming experience itself will be consumed as content.

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## Introduction

This paper studies a comic strip of a crocodile that lived for 100 days, as an Artificial Life. The subject matter addressed in the paper is a comic strip posted on Twitter entitled "A Crocodile Who Will Die in 100 Days. It was updated daily on Twitter<sup>i</sup> by comic artist Yuki Kikuchi on Twitter for 100 days, from December 12, 2019, to March 20, 2020.

"A Crocodile Who Will Die in 100 Days" was promoted for commercial deployment shortly after it recorded the highest number of "likes" on Twitter in Japan's history. Therefore, both the content and the product were widely recognized, and it can be said to have succeeded in attracting the attention of the AISAS model<sup>ii</sup> of Internet consumption behavior. However, the trending that briefly attracted favorable attention from an unspecified number of people turned overnight and got under the flame, in which attacks and criticisms flooded in from an

unspecified number of people in a short period because of the promoted. In this respect, it is worth noting that it is rare for content that was both trending and flamed not to lead to successful sales.

An important part of this paper is the connection between Artificial Life and the outpouring of strong emotions that yield flaming. This paper deals with the death of a crocodile, as an Artificial Life that lasts 100 days in the ordinary life, and the human reaction to the event. In other words, through the events of this content, this paper is to consider not only the impact of the flaming on the content, but also how humans deal with the death of the crocodile, which is just a comic strip character as an Artificial Life, and how they wish to be treated.

## Previous Research

This thesis focuses on trending and flaming on social networking services (SNS). This chapter describes the

attitudes and behavior in order to develop marketing strategies appropriate for each stage.

<sup>i</sup> A social networking service launched by Obvious (Twitter, Inc.) in July 2006 and used by 217 million users per day as of April 2021 [1].

<sup>ii</sup> Proposed by Dentsu in 2004. The acronym stands for Attention, Interest, Search, Action, Share, and is used to understand consumers'

positioning of this thesis regarding previous research on flaming on the Internet in an SNS.

Concerning flaming, defined flaming as "a requirement that a large amount of criticism is written on CGMs such as social media in a short period of time and that the criticism spread to multiple online services rather than only to a single online service" [2], "A Crocodile Who Will Die in 100 Days" which meets the above definition because the criticism spread across various media, including Twitter, in a short period after the promotion for commercial deployment.

The previous research also addressed actual flame cases [2], this paper, similarly, addresses a real flame case. Approaches to flames have been attempted by categorizing Tweets and aggregating them in time series. This paper differs from the previous study in that it focuses on a single case of "A Crocodile Who Will Die in 100 Days" and uses Emotion analysis and Key Graph Analysis to study the flames. The research on the presence of others on SNS has indicated the desire to examine the factors that cause flaming by content and to elucidate the processes that lead to flaming [3]. Since this paper quantitatively analyzes and examines the flaming of content, this paper is academically and socially significant research that also contributes to the clarification of the process.

### Purpose

The purpose of this paper is to clarify the impact of flaming on content. This paper shows how flaming have affected peoples' emotions.

### Methods

This chapter describes the data, Emotion, and Key Graph Analysis used in this thesis.

This paper collected a total of 169,307 Tweets and 18,180 Replies. Tweets are including either or both the official name of the subject, "100 日後に死ぬワニ," the abbreviation of the subject, "100 ワニ," and the author of the subject, "きくちゆうき." Replies are collection by sent to the author, Yuki Kikuchi (@yuukikikuchi), 100 days to die crocodile official (@100waniOfficial). Tweet data and Reply data were both collected from two periods, based on the events and Google trends. before the film's release (April 1, 2020) to (June 30, 2021) and From around the start date of the film release (July 1, 2021) to around the end date of the film release (August 8, 2021).

Emotion analysis and Key Graph Analysis are conducted on the Tweets and Replies.

### Emotion analysis

Emotion analysis analyzes the Tweet data and Reply data for each time series, and quantitatively quantifies the emotional fluctuations seen in the user's transmissions.

Emotion analysis using ML-Ask is an Emotion analysis method that focuses on a wider range of emotions. Emotions are classified into 10 categories using the Emotional Expression Dictionary: "sadness", "shame", "anger", "dislike", "fear", "surprise", "like", "excitement", "peace", and "joy" [4].

### Key Graph analysis

Key Graph Analysis analyzes the same Tweet data and Reply data for the same period as the Emotion analysis, to objectively visualize the information and impressions that users were transmitting.

For the analysis, the Dice coefficients based on equation (1).

$$DSC(A, B) = \frac{2|A \cap B|}{|A| + |B|} \quad (1)$$

## Results

This chapter shows Increase/ decrease of collected data, Emotion analysis results, Key Graph analysis results.

### Increase/ decrease of collected data

The Key Graph analysis and Emotion analysis in this paper focuses on the months of before the film's release (April 1, 2020) to around the end date of the film release (August 8, 2021).

However, to get an overall picture of this content at the beginning, here are the monthly changes in Tweet and Reply data from July 1, 2019, to July 25, 2022, five months before this content was serialized.

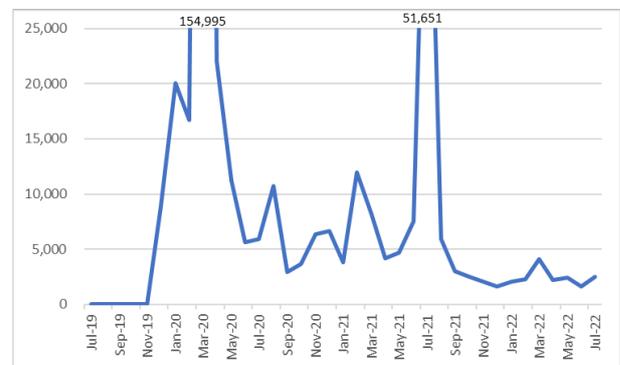


Fig. 1: Increase/ decrease of Tweet data (July 1, 2019 - July 25, 2022)

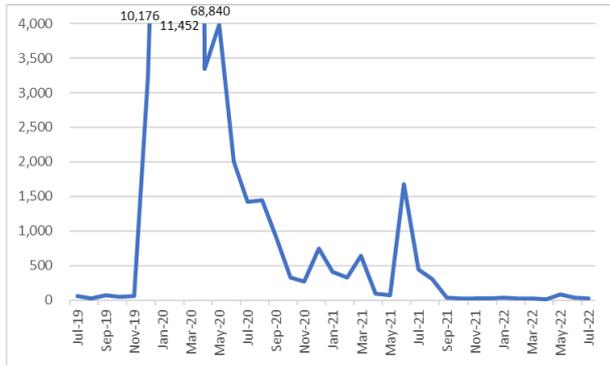


Fig. 2: Increase/ decrease of Reply data (July 1, 2019 - July 25, 2022)

*Emotion analysis results*

Using the collected data, Emotion analysis was conducted for each period, and the percentage of each Emotion was calculated for each period. This was done to make it easier to compare the transition, since the number of Tweets and Replies are differed from period to period. Fig.3, Fig.4 are below show a graphical summary of the percentage transition of each estimated emotion.

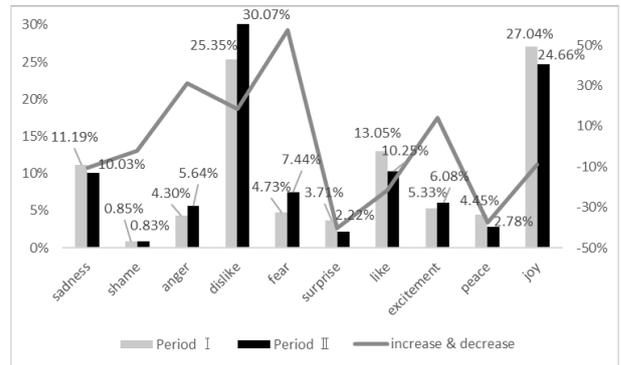


Fig. 3: Tweet Emotion analysis (April 1, 2020 - June 30, 2021, and July 1, 2021 - August 8, 2021)

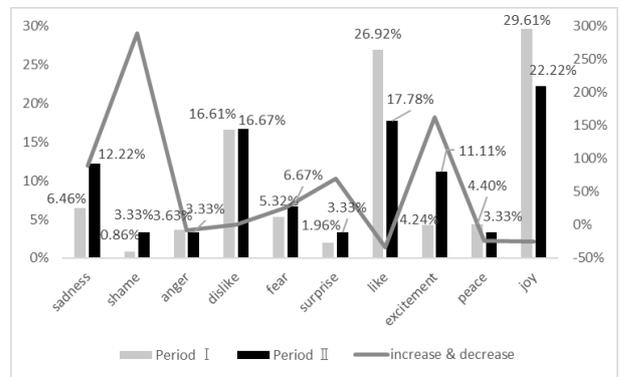


Fig. 4: Reply Emotion analysis (April 1, 2020 - June 30, 2021, and July 1, 2021 - August 8, 2021)

*Key Graph analysis results*

In this chapter, the clusters that can be read from the Key Graph Analysis results are indicated by numbers in each figure to clarify what kind of context was present in the Tweets and Replies.

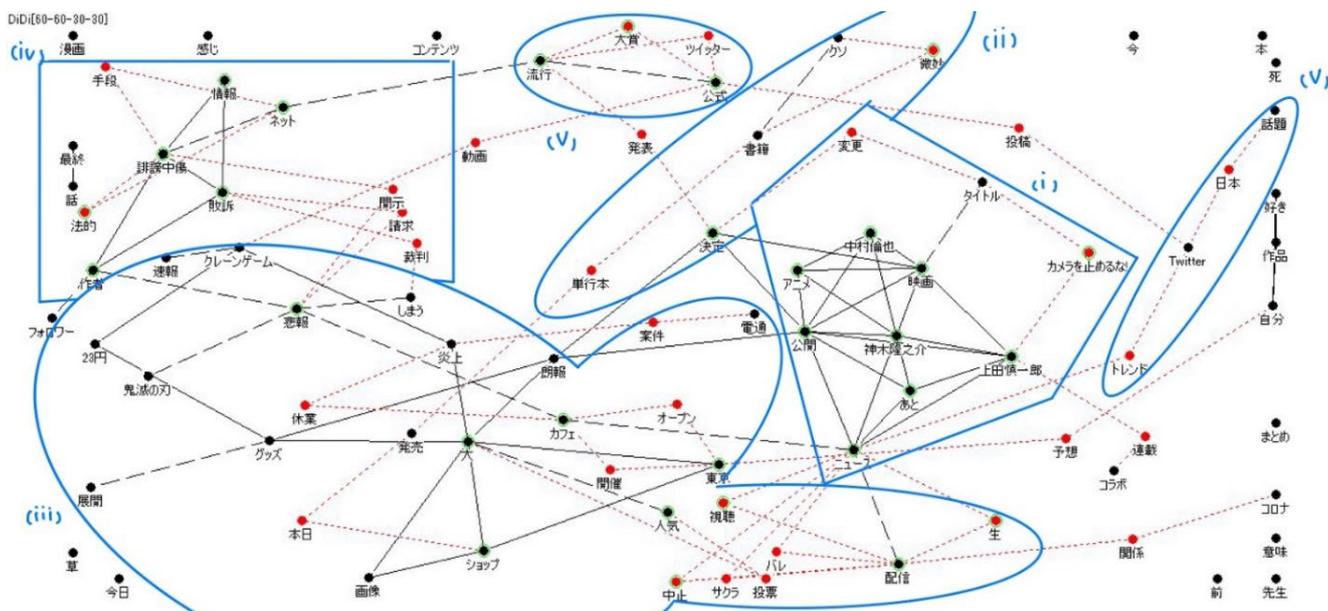


Fig. 5: Tweet data Period I (April 1, 2020 - June 30, 2021)

- (i) Information and reaction about the film of this content.
- (ii) Negative Tweets about this content book.
- (iii) Ridicule this content. E.g., compared film of this content with other popular work box-office (“Demon Slayer” (Koyoharu Gotouge)). The café of this content that closed within three days of its opening. The crane game of goods was priced at ¥23 per game. The problem of shill in live distribution, etc.
- (iv) Reactions and ridicule a lawsuit filed by the author of this content in response to a defamation statement.
- (v) Information and reaction to this content being hot topic about.

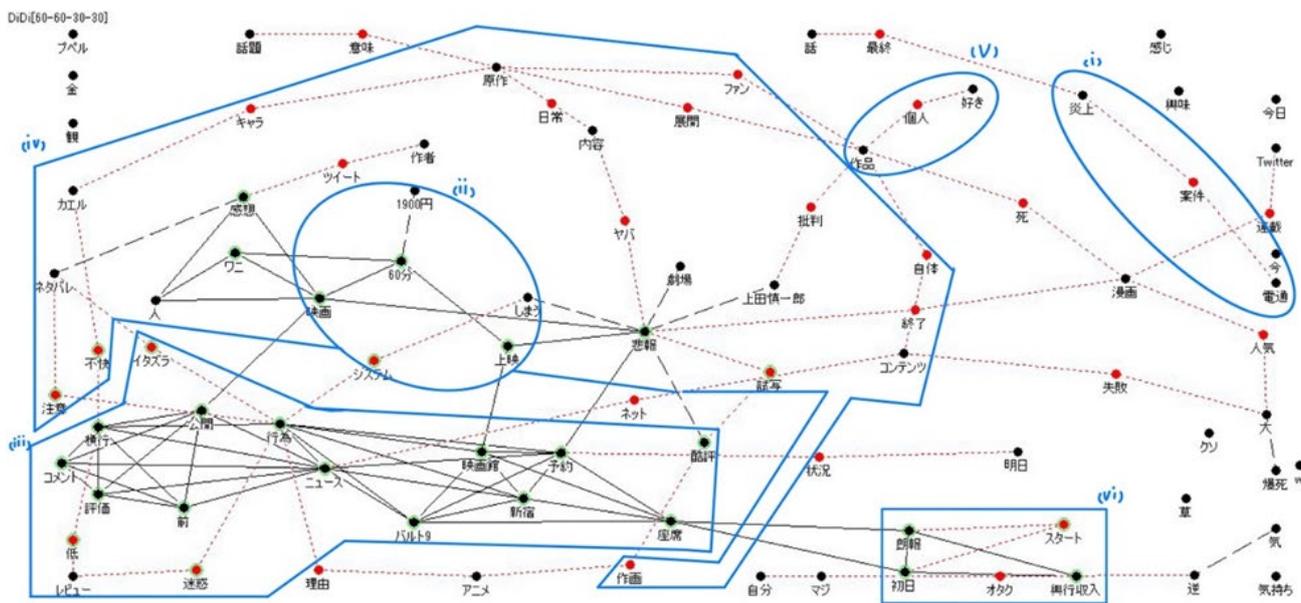


Fig. 6: Tweet data Period II (July 1, 2021 - August 8, 2021)





attributed to reactions to author's exhibitions, judging from the clusters (Fig. 8).

#### *Comparison of Tweet data and Reply data*

In the comparison of emotions between Tweet data and Reply data, the ratio of positive emotions such as "like" and "excitement" was high in the Reply data, while the ratio of negative emotions such as "dislike" and "anger" was low. This is thought to be due to the difference in Tweets and replies. This can be explained by the fact that replies, unlike Tweets, are issued to communicate to the author and are therefore more likely to contain positive content. This is supported by the fact that clusters of support and clusters of positive responses to the author's exhibition were actually generated (Fig. 7, Fig. 8).

In addition, the percentage of "joy" in both the Tweet and Reply data is large and remains high in the overall data. However, from the results of the Key Graph analysis that there are different reasons for this in both data, at least in Period I. In both the Tweet data for Period I and the Reply data for Period I, nearly 30% of both data are perceived as "joy" (Fig. 3, Fig. 4). In the Reply data, there are some clusters that show reactions about the flaming, but clusters that are expected to have positive feelings, such as support for the author, favorable reactions to commercial development, and reactions to the author's new content, stand out. However, no clusters with expected positive Emotion were found in the tweet data, and several clusters were noticeably derisive of this content. In response to this result, an examination of the original data from which the classification was made suggests that the cause lies in the limitations of the Emotion analysis. Emotion analysis estimates emotion by counting each emotional expression from the words that make up the text based on the words in the Dictionary of Emotional Expressions. Therefore, Emotion analysis cannot correctly estimate texts in which sarcasm or euphemisms are used. For example, if a sarcastic text in which the word "enjoyment" is used is read, it will be counted as "joy" based on the word fit. An actual review of the classified data revealed that most of the Tweets classified as "joy" in Period I were negative Tweets. Compared to replies, Tweets are more likely to use euphemisms than replies because they are not uttered to communicate to the recipient, making this phenomenon more likely to occur.

In addition, the reason for the high level of "joy" in the Tweet data may be due to the content of flaming, as

shown in the Increase/ decrease of collected data (Fig. 1), Emotion analysis results (Fig. 3), and Key Graph analysis results (Fig. 5, Fig. 6). The flaming period was unremarkable since it was seen as an issue to be discussed, but since then it has become content as "flaming content," and there is a segment of the population that gleefully watches court cases brought against harassment and slander by the authors. Here, ridicule and sarcasm are also included, in our view. Although the content has changed in nature and has not led to sales due to its topicality, it is also clear that the number of Tweets has increased with the release of the movie (Fig. 1).

#### *Increase/ decrease of collected data*

In Period II, there are clusters of criticism and ridicule of the commercial development of this content, but even so, positive content such as support for the author, positive reactions to the commercial development, and positive reactions to the author's new content and author's exhibitions are prominent in the replies. However, as shown in Fig. 2, the total number of replies has decreased significantly compared to the start and duration of serialization. Not only did the author lose the fans he was able to gain, but he also received an average of 52.5 replies per month for the five months prior to the posting of this content (July 1, 2019, to November 1, 2019), whereas the average number of replies from September 2021 to June 2022 was 33.2 per month, which indicates that the It is possible that existing fans may have left due to the impact of this content posting. In contrast, the number of Tweets still exceeded 2,000 during the same period, as shown in Fig. 1. In addition, the number of Tweets exceeded the number of replies throughout the entire period, indicating the influence of Tweets. The power of Tweets to transmit not only buzz and flaming but also to influence the image and brand of the subject of attention.

#### *Future research*

This paper does not fully investigate the bias of the users. In the case of a specific flaming, it is possible that the noisy minority phenomenon is being caused [5]. This phenomenon is the diffusion of information only by users belonging to a specific community.

Therefore, it is necessary to quantitatively evaluate whether the information spread at the time of the flaming incident is biased toward users in a certain community by

investigating user bias using KL Divergence, as in the previous study.

### Conclusions

The purpose of this paper is to visualize “A Crocodile Who Will Die in 100 Days,” flaming, which is a flaming period, and to understand how the flaming has affected peoples' emotions.

The following three points were considered in our analysis of the impact of trending and flaming on content. First, humans want to mourn the death of an Artificial Life (a mere comic strip character) with whom they shared a universal daily life in the same days.

Second, during a flaming period on social media, there is a large gap between the tendency of comments directly directed from recipients to senders and the tendency of comments shared for a whole user. Comments directed directly to the sender tend to be relatively positive throughout the entire flaming period, thus they do not fully reflect the feelings of the recipients.

Third, even if the content has experienced trending, it will continue to receive criticism for a long period, and the fact that it has gone up in flames itself will be consumed as content, thus there is a possibility that it will not only lose fans, but also potential fans and consumers.

### Acknowledgments

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### Authors Introduction

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