

Interface for Looking Back at TV Dramas on Twitter

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Abstract—In recent years, while TV dramas are being broadcast, many comments and discussions on the dramas are posted on Twitter, which are called “live tweets.” After watching a drama, users can search for live tweets about scenes of interest to them, enjoy the impressions of other viewers, and deepen their thinking from a different perspective. However, in the current Twitter search function, even if the user searches for a keyword of the target scene, the tweets including the keyword are only presented in order of time, and it takes time for users to find the live tweets of the scene the user is interested in. This paper proposes an interface that can efficiently look back at dramas using live tweets by visualizing the similarity distribution of keywords by time for live tweets posted during the drama based on keywords entered by the user.

Index Terms—Twitter; social viewing; live tweeting; TV drama; looking back.

I. INTRODUCTION

In recent years, Social Networking Services (SNS) have become widespread worldwide. In particular, Twitter can be considered as one of the most popular SNSs that are used on a daily basis for a variety of purposes, including the dissemination of opinions and communication.

In this context, social viewing, where people post live tweets while watching a TV program, is becoming more and more popular. Live tweets are tweets posted while watching a TV program that include real-time reactions to the program, such as comments and opinions. By posting live tweets, SNS users can discuss the same programs with other users via Twitter, just as they normally do with their family and friends while watching TV programs.

Social viewing is not only fun for users who post live tweets, but also for users who only view the tweets without posting them. In this study, we focus on live-tweeting after watching TV dramas, where viewers may want to know what others think about a scene that left a strong impression on them or a scene that they have questions about. In such cases, they can look at the live tweets of other viewers of the scene and sympathize with the tweets that have similar opinions, or gain new knowledge by seeing tweets with a different perspective.

Viewing live tweets can allow viewers to look back at the content of the drama and enjoy the aftermath of the program more deeply. However, many live tweets can be posted for TV programs, and it is necessary to find the live tweets for the desired scene among them. In this paper, we propose a novel interface for finding live tweets of TV dramas. The term “TV drama looking back search” refers to the search for actual

tweets for a specific scene in order to look back on the content of a drama after viewing.

In the conventional Twitter search function, live tweets can be retrieved by using hashtags. Hashtags are tags that begin with a “#” to classify posts by a specific topic. Many live tweets are tagged with the title of the program or its abbreviation, so people can search by hashtag to see live tweets posted by other people. However, while this search function is ideal for viewing real-time tweets about a scene being broadcast, it poses some problems when viewing past tweets, such as when wanting to view tweets about an earlier scene after watching a TV program, or when wanting to record a TV program after it has aired. There are three problems when browsing past live tweets.

- 1) The number of live tweets of TV programs is huge, and it takes a lot of effort to check each result obtained by the tweet search function, and to go back to the tweets of the scene that the user is interested in.
- 2) The content of live tweets is often very brief. It is difficult to tell from the tweet alone which scene the comment is about.
- 3) One can also narrow down the tweets by searching for keywords that are characteristic of the target scene along with the title of the program or abbreviated hashtag, but only the tweets that match the keywords will be displayed, so if the keywords are ambiguous, users will not be able to get the tweets they want.

In this paper, we propose a tweet search interface that enables efficient looking back at TV dramas to overcome these problems. This interface helps users to efficiently discover live tweets of interest. The user inputs a tweet of interest, and the number of live tweets posted related to that keyword in the drama is visualized as a graph. Using this graph, the user can efficiently discover the time interval related to the interest and easily access the tweets of the scene the user is interested in. This paper is organized as follows. In Section 2, the proposed method is described. Section 3 concludes this paper.

II. PROPOSED METHOD

Live tweets of TV drama programs represent the real-time responses of users who watched the drama in question and are considered to strongly reflect the content of the scene being broadcast at that time. Ushijima et al. [1] obtained the characteristics of scenes in TV dramas by analyzing the viewer’s responses using live tweets.

In this study, we assume that the scenes associated with the keywords specified by the user have many live tweets with high similarity to the keywords. Then, the relevance of the keyword to the scene is estimated using the content of the live tweets associated with the scene. Specifically, the timeline consisting of live tweets posted during the drama broadcast time is divided into segments, and the relevance between segments and keywords is determined based on the similarity between the tweets and keywords in each segment. Then, by visualizing the transition of the relevance, users can easily find the segment they are interested in. When a user specifies a segment of interest, the user can access the tweets contained in the segment.

The procedure of the method proposed is shown as follows:

- 1) Collect live tweets about TV drama programs using Twitter Application Program Interface (Twitter API). Specifically, tweets that include the title of TV drama programs hashtag posted during the broadcast time of the target TV drama program are collected and stored in the tweet DB. Retweets and replies are excluded from the stored tweets.
- 2) The tweets of the TV drama program specified by the user are retrieved from the tweet Database (tweet DB), and the timeline of the collected tweets is divided into time segments in order to obtain the characteristics of the tweets by time. The segmented set of tweets is called a segment.
- 3) Perform morphological analysis on the tweets in the segment.
- 4) Vectorize the tweets and keywords in the segment.
- 5) Calculate the cos similarity of the vectors obtained from the tweets and keywords in the segment and calculate the similarity between each segment and the keyword.
- 6) The similarity of each segment is graphed and presented to the user.

A. Segmentation of the timeline

In the proposed method, we aim to estimate and visualize the excitement related to keywords for each unit of time according to the progress of the TV drama program. We divide the timeline of collected live tweets into segments of a certain time interval. The set of tweets in the segmented time interval is called a segment, and each segment is considered to strongly reflect the characteristics of the scene broadcasted at that time.

B. Creating a Word2Vec model

In order to calculate the similarity between a segment and a keyword, Word2Vec [2] is used to calculate the similarity between a tweet and a keyword in the segment.

Word2Vec is a word vectorization method that uses a neural network consisting of two layers for text processing. By learning the weights of the neural network using a corpus, a vector representation of words can be obtained.

C. Calculation of similarity

We vectorize the tweets and keywords in a segment and calculate the similarity of each segment. In order to find a

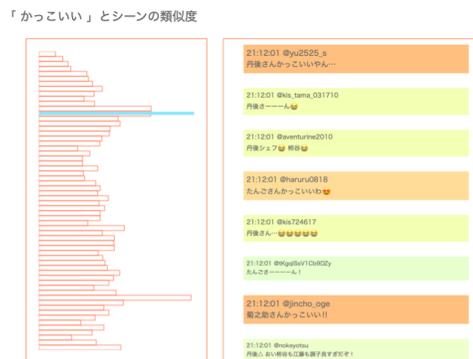


Figure 1. Example of timeline visualization.

better method, we use three methods to calculate and compare the similarity of each segment. Here, for the vectorization of tweets, we share the tweets, find the vector of each word, and take the average of them as the vector of tweets.

The tweets and keywords in the segment are vectorized using the Word2Vec model learned by the above method, and the cos similarity with the keywords is calculated for each tweet, and the average is the similarity of the segment. Equation (1) represents the definition of the similarity where \mathbf{q} is the vector of keywords, and \mathbf{S} is the vector of keywords, the vector of segments (the set of vectors of tweets), and t denotes the vector of tweets.

$$sim(\mathbf{q}, \mathbf{S}_i) = \frac{1}{S_i} \sum_{t \in S} sim_t(\mathbf{q}, t) \tag{1}$$

D. Visualization of similarity by time

In this method, we provided a user interface that visualizes and displays the obtained similarity of each segment as a graph. By looking at the graph, the user can find out at which time of the day the scene related to the keyword was broadcasted, and by pointing the mouse on the graph, the user can view the live tweets posted at that time. Figure 1 shows an example of timeline visualization.

III. CONCLUSION

In this paper, we propose an interface that allows users to efficiently view live tweets for a desired scene in order to review TV dramas. The interface divides the live tweets posted during the broadcast of a TV drama into segments by time interval, and calculates the similarity between the tweets and keywords in each segment to visualize the transition of the excitement related to the keywords of the drama.

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