

## KEYWORD RELATION OF LEISURE TOURISM BASED ON ENVIRONMENT-RELATED QOL USING SNS INFORMATION

SOJI LEE

School of Business Administration  
Tokai University  
9-1-1 Toroku, Higashi-ku, Kumamoto-shi, Kumamoto 862-8652, Japan  
soji.lee@tsc.u-tokai.ac.jp

Received August 2018; accepted November 2018

**ABSTRACT.** *Wellbeing has been a philosophical and sociological concern for long time. Leisure tourism studies have also focused on wellbeing because leisure tourism is one of the typical activities to realize one's wellbeing. The wellbeing is evaluated of the concept of QOL (Quality of Life). In this paper, we propose environment-related QOL (e-QOL) to expand the new concept of wellbeing relating environment. In addition, we proposed the two-word expanding method to capture the flow of concept using cooccurrence method between words based on tweets. In our method, we repeatedly captured tweets data, analyzed each sentence and got the cooccurrence relation. These words of cooccurrence reveal the leisure tourism and environment with wellbeing information. As the results of experiments, we could capture indicators between wellbeing feeling and leisure tourism based on SNS data. We suppose these indicators consisting of none or adjective words could represent e-QOL indicators.*

**Keywords:** Environment, Quality of life, SNS, Leisure tourism

**1. Introduction.** The United Nation adopted formally the new framework, Transforming Our World: the 2030 Agenda for Sustainable Development, which is composed of 17 goals and 169 targets to wipe out poverty, fight inequality and tackle climate change over the next 15 years in 2015. These goals called SDGs (Sustainable Development Goals) have the “good health and wellbeing”, “climate action” and “life on land”. Most of goals have the elements of QOL (Quality of Life) describing the human wellbeing. Wellbeing has been focused on diverse fields, such as philosophy, sociology, health science and psychology. Wellbeing has described a broad range of terms, such as “quality of life”, “life satisfaction”, “happiness” and “wellness” [1]. Leisure tourism is an easy way to realize for personal wellbeing and to get satisfaction. Leisure tourism information of SNS (Social Networking Services) is more reliable and important information for travelers than the tourist targeting Web site information due to a lot of personal-oriented information. “Word of mouth” information describing personal feeling and impression is more popular than officially published information. The requirements of tourists case sometimes conflict of wellbeing feeling for individual residences. These controversial problems cause the troubles in these days. We introduce the concept of e-QOL to find the trend of wellbeing feeling from the “word of mouth” information based on the SNS, because that natural environment introduces beautiful scenery and comfortable feeling for tourists. The motivation of our research is to analyze quantitatively based on tweets in terms of the relation between tourism and wellbeing. The analysis finally aims to find the obstacles for the feeling of wellbeing. We would extract the broad range of element of establishment of wellbeing. The innovation of our research is to find the new method to expand the concept based on the keyword cooccurrence relation. Our proposed two-word expanding method

could extract the expansion of diverse concepts and can aggregate a few words to the concept and could evaluate qualitatively the expansion of concept.

**2. Related Researches.** In discussion of the extraction of personal information, a questionnaire for targeted persons has been used in related researches. The questionnaire-based approach could easily classify the results of questions because the researcher can customize each question. The collection of negative words is difficult for other methods; however, these questionnaires could easily set to the negative words. The demerit of this type of research is the small number of samples and persons are restricted in some type of the property. On the other hand, a huge amount of SNS information could be sent with diverse themes. [2] developed an accurate and reliable data processing approach for social science researchers to examine behaviors and attitudes, as well as the demographic characteristics. In this research, Twitter data are used to analyze for social science using Twitter REST (Representational State Transfer) API and focus on the political action such as the poll in the election. This research treats keyword as the independent words and/or confronting concept. The purposes of our research are to find the confronting and containing concepts relating e-QOL and find keywords and relation of keywords creating the feeling of wellbeing. We should find the dependence relation between each keyword. [3] collected health research data with health consumers using Twitter data. This research concluded that use of Twitter in health research, including participant recruitment, data collection methods, and type of data collected, is similar across different qualitative and quantitative study designs.

The approach of these researches focuses on the specific research field. The data processing for these specific fields mainly consists of selection and filtering for dataset and does not clear the detailed natural language analysis. In our research, we use the tweets written in Japanese and have to conduct the morphological analysis for each sentence. The superiority of the proposed method is to repeatedly conduct data categorization for each step. Our proposed method could expand the concept based on the keyword cooccurrence relation. In addition, our research contributes the definition of QOL and enhances the concept of e-QOL.

**3. Indicators of e-QOL.** In this chapter, we firstly introduce the existing definition of QOL and then we will propose the definition of the e-QOL.

**3.1. Definition of QOL by EU-stat.** Eurostat is the statistical office of the European Unions, based in Luxembourg (LU) and provides the recent statistics on the quality of life in the EU [4]. Eurostat provides a detailed analysis of  $8 + 1$  dimensions which can be measured statistically to represent the different complementary aspects of quality of life. This metrics complements the economic and social development indicator: Gross Domestic Product (GDP). Eight of these dimensions concern the functional capabilities citizens should have available to effectively pursue their self-defined wellbeing, according to their own values and priorities. The last dimension refers to the personal achievement of life satisfaction and wellbeing [3]. These dimensions are as follows.

1) Material living condition, 2) Productive or other main activity, 3) Health, 4) Education, 5) Leisure and social interactions, 6) Economics security and physical safety, 7) Governance and basic rights, 8) Natural and living environment, 9) Overall experience of life.

Each element exists independently; however, we focus on both “leisure and social interactions” and “Natural and living environment” dimensions. In “leisure and social interactions” dimension, the individual wellbeing and mutual relationship are described in leisure and social interactions respectively. Participation in culture or sport activities is adopted in the leisure dimensions as the quality of leisure. On the other hand, the frequency of getting together with family and relatives or friend and participation in formal

and informal voluntary activities are adopted in social interaction’s dimension. These definitions are limited in personal living environment even if people tend to trip abroad and communicate to foreign people each other. We should expand this dimension to the global level. In “natural and living environment” dimension, which has, “pollution” and “landscape and the building environment” elements, negative and positive aspects are described in pollution and landscape and the building environment respectively. Landscape and the building environment, however, sometimes is limited in the local living place. We should expand these concepts to global level.

**3.2. Proposed definition of our e-QOL.** We defined the space-oriented e-QOL [5] to enhance each dimension to the global level. Our e-QOL definition is classified into four levels, individual level, local community level, society or country level and global level as follows.

- Individual level: People lives in the tourist attraction
  - Satisfaction and consciousness of the value of the local environment
- Local community level: Common understanding between individuals and tourists
  - Insiders and Outsiders satisfaction from consciousness of value of maintaining the natural environment in a region
- Country level: Inbound tourism
  - Sharing awareness about the satisfaction of the larger areas and the value of the natural environment
- Global level: Mutual cultural exchange policy
  - Sharing various models of satisfaction in different countries

Our research theme is to extract the indicators of wellbeing in leisure tourism. We should limit the discussion to the communication between individual level and local community level. Figure 1 shows the relation between the individual and visitors in surrounding the natural environment. Each individual makes a living comfortably in their own local environment. Natural environment gives happiness and wellbeing to individuals. On

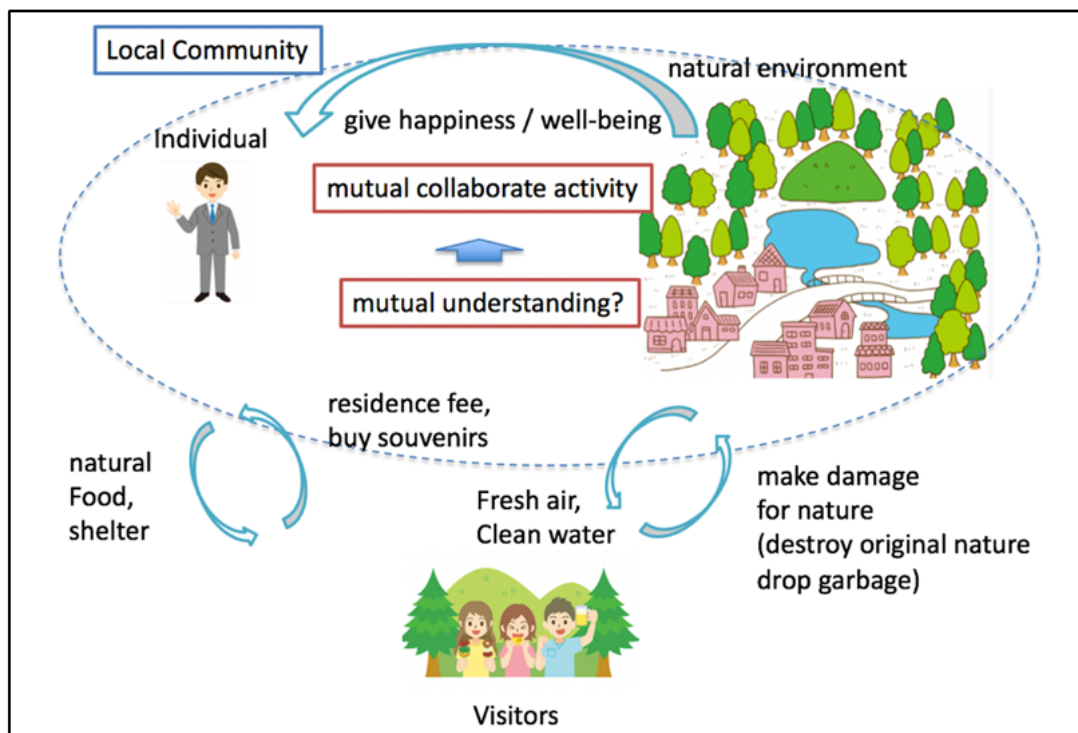


FIGURE 1. Problems of relation between two levels in nature

the other hand, the interactive mutual relation between an individual and a visitor sometimes makes conflicts. Visitors get fresh air and clean water from the natural environment and receive natural food and shelter from local residents as the positive aspects. On the other hand, visitors do damage to nature even if they pay for housing or buy souvenirs. As the negative aspects, this behavior does not create wellbeing for both individuals and visitors. We will discuss positive and negative aspects later.

**4. Proposed Method.** In this section, we discuss the theoretical foundation of our research. Our research is firstly the proposition of the evaluation method for leisure tourism focusing on wellbeing. Wellbeing has been a philosophical and sociological concern and research has been extended over time to disciplines such as psychology, health sciences and economics [1]. Our approach is to find the concrete structure of keyword relation using SNS data. Our research is secondly the research of expanding the definition for QOL. QOL is described in health science, and one of the qualitative evaluation values of wellbeing. We expanded the concept of QOL and proposed new concept e-QOL meaning that human feeling of wellbeing would be affected by the nature and environment. We suppose that keywords for e-QOL could be found in the leisure tourism using tweets. Our research is thirdly the research of the structure for meaning network based on the cooccurrence of important keywords. The cooccurrence of keyword has been used for metrics to evaluate the relationship between multiple documents. In this research, we suppose one tweet consisting of one document and extract relation data using cooccurrence metrics and create one concept that could be built by the tweet data with designated cooccurrence keywords. Our research is fourthly the research of the expansion of concept. We propose the two-word expanding model using one word based on the two-word cooccurrence relation. We implement the information gathering system and evaluate the experimental results.

**5. Experiments.** In this chapter, we will discuss the method of extracting the personal feelings on the viewpoint of e-QOL in leisure tourism. In addition, we discuss how positive feeling spreads to other persons and negative feeling, such as environmental disaster, and effects to the personal feelings. The analyzing data is not the questioner data but SNS based information. We will extract the negative aspect in environment and the relation between local area and natural disaster as the pre-experiments. We will design the data crawling and analyzing system, and then we will select a few words to extract from the Twitter data. The keywords of feeling of happiness and satisfaction will be considered in the next analysis.

**5.1. Experimental setup.** After the pre-experiments, we set up the extracting system written by Python program language. Figure 2 shows the overview of the data flow map of the experiments. Firstly, we used the Twitter REST API to collect sentences, written by JSON format, in several times a day. These Twitter data include many duplicate sentences because of multiple posts. We extracted unique data to eliminate multiple posts and eliminated commercial data. Then we applied the syntax analysis using Japanese dictionary and extracted related co-occurrence noun or adjective keywords. Finally, we measured the frequency of occurrence on tweets data in terms of none and adjective words and classified the type of words, such as positive and negative expressions.

**5.2. Stepwise concept expanding method.** In this research, we propose the stepwise concept expanding method aggregating a few concepts and advance the concept as following steps.

Step 1. We gather the tweets with two-word cooccurrence. Duplicated sentences and strongly political sentences are removed and remained sentences are applied in the morphological analysis. From the morphological analysis, we extracted the none and adjective

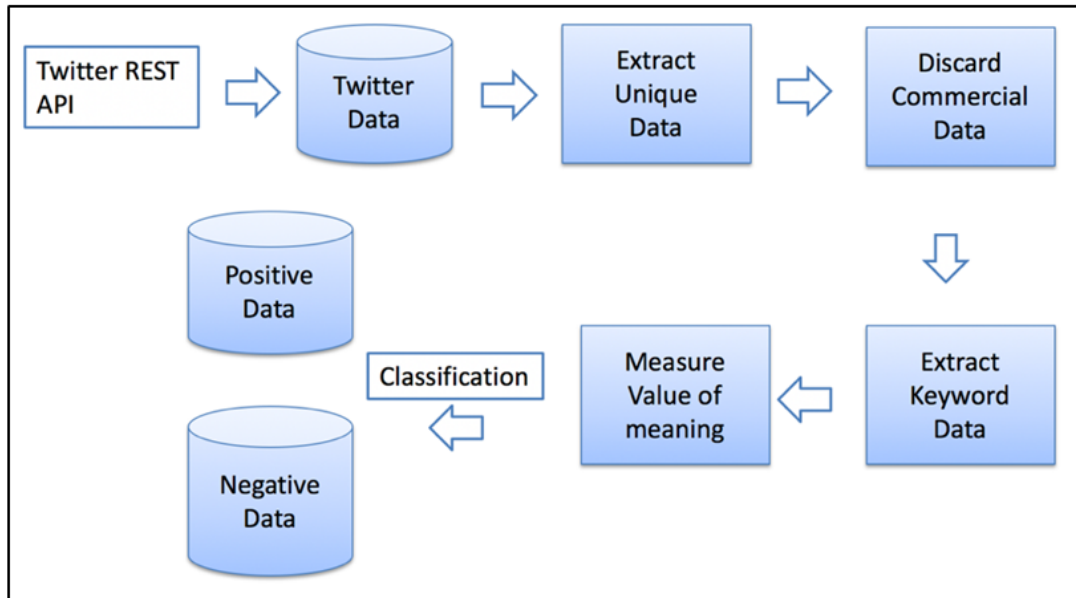


FIGURE 2. Overview of Twitter data extracting system

words with high frequency over the threshold value. Extracted words could be classified and categorized into new concept. We call this process “one step” and could get the one step expanding results. In another experiments, tweets containing three-word cooccurrence would be restricted contents meaning that the concept could not expand in the diverse types.

Step 2. We select one word from the categorized word set with high frequency from Step 1. We select one word from the categorized word and another word from the original two-word set and execute the same gathering process from tweets with the cooccurrence. As the results of this step, we could get the results of two step expanding results.

**5.3. One step expanding results.** To check the positive and negative expressions using noun and adjective words affecting the total Twitter data, we selected “beautiful” (positive) and “terrible” (negative) words, and “nature” (positive) and “disaster” (negative) in the Twitter keywords. In addition, “leisure tourism” word should be included to find the information of tourist. The results were classified of 4 patterns: for example, np-type means negative-positive type with “terrible” and “nature” keywords. We gathered about 20 days from September eleventh to October first including 541 lines.

Figure 3 shows that the most tweets are positive-positive type. The round circle, such as “Area name” includes multiple keywords and square figure, such as “affluent” means the single keyword. As the results, people do not tend to tweet negative related word in leisure tourism field, and positive-positive type keywords couple could find the other keywords related to happiness or wellbeing.

Figure 4 shows the results, based on the 1628 lines from September 20th to October 6th in 2018, using the different two positive expressions in noun and adjective parts. As the adjective part, we collected “happy” and “beautiful”, and “nature” and “environment” are collected in noun part. The nh-type means “nature” + “happy” samples. Most of tweets are comments related in “nature” and “beautiful”. This nb-type generates area names, and other related adjective keywords. This means that tweets tend to represent the positive images especially connecting the concrete places.

In previous experiment, the adjective word “beautiful” would make diverse concept on tweets. People could express differently in positive and wellbeing feeling surrounding in nature. We changed the keywords to “nature” + “leisure tourism” and “environment” + “leisure tourism” to capture the relating words of e-QOL. The data were gathered from

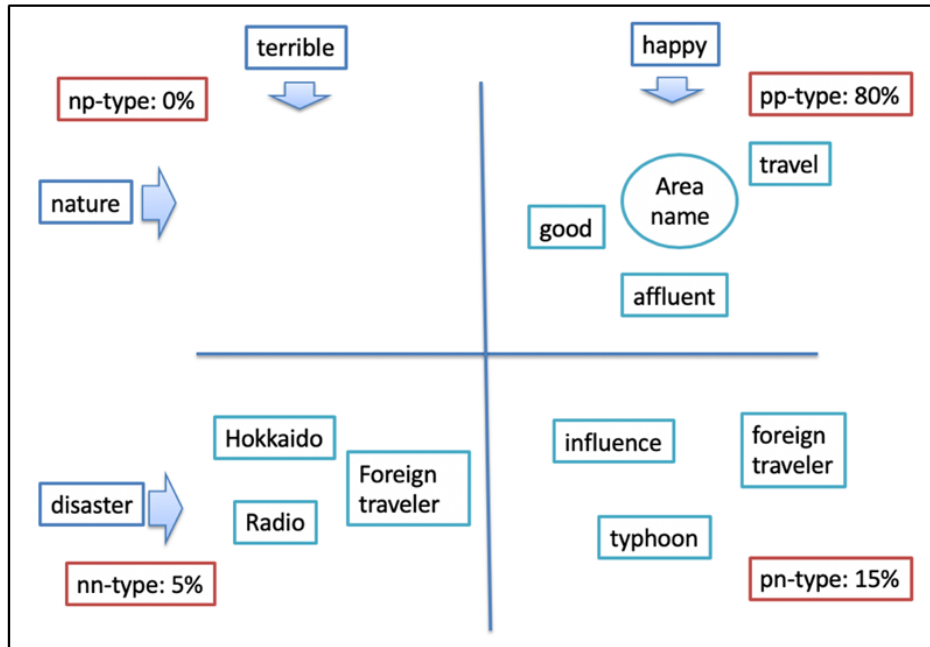


FIGURE 3. Twitter words based on the positive and negative keywords

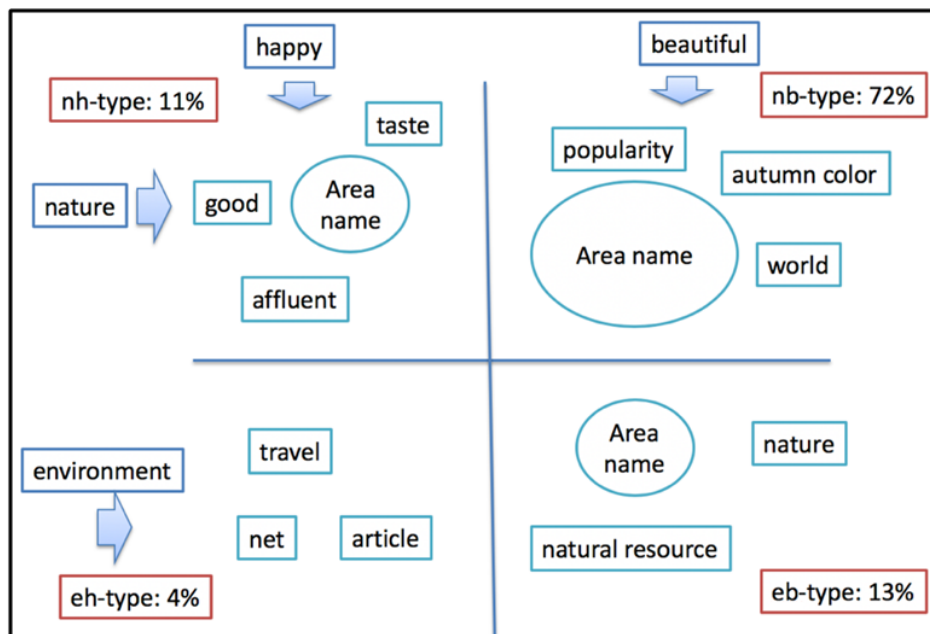


FIGURE 4. Twitter words based on the different environment keywords

October 4th to October 9th with accumulated 7184 lines. Both patterns are almost the same tweets volumes. Figure 5 shows the concept expanding pattern for two different types of tweets data. Upper part, “nature” oriented part, indicates that this part of concepts is introduced by only “nature” + “leisure tourism” search. On the other side, “environment” oriented part indicates that this part of concepts is introduced by only “environment” + “leisure tourism” search. The middle part appears on both two types of word selection. If the “environment” word exists in tweets, the tweets patterns tend to spread the conversation of policy of government. On the other hand, the “nature” could enhance the happiness feeling and objects to make person to be happy. As the results of these experiments, positive feeling causes to announce for leisure tourism on tweets.

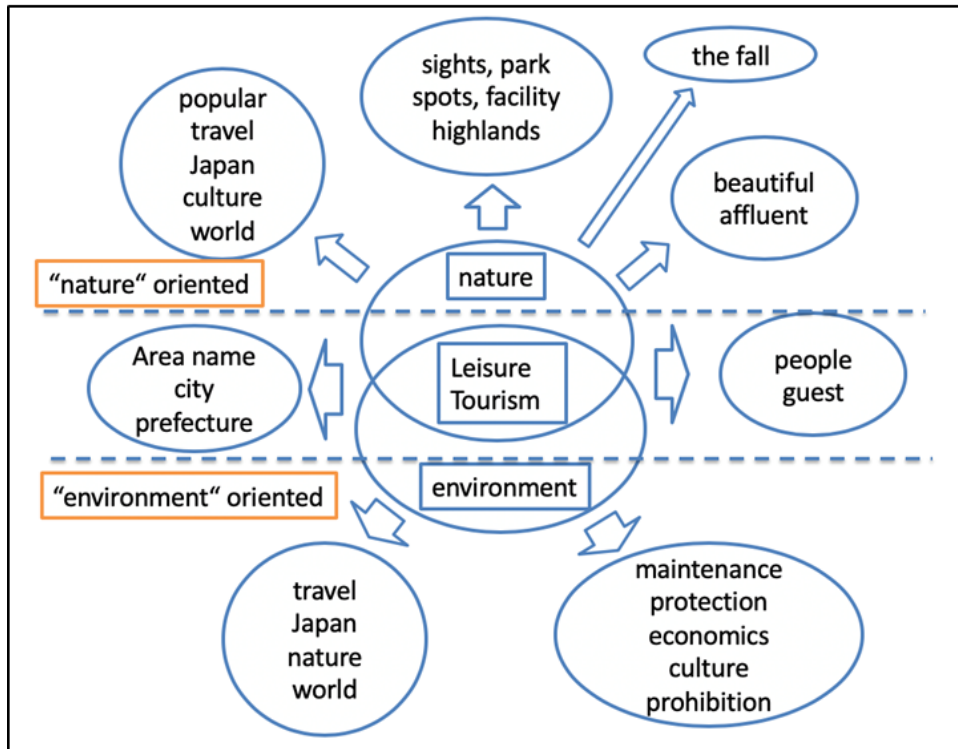


FIGURE 5. Keyword relation from Twitter related to e-QOL in leisure tourism

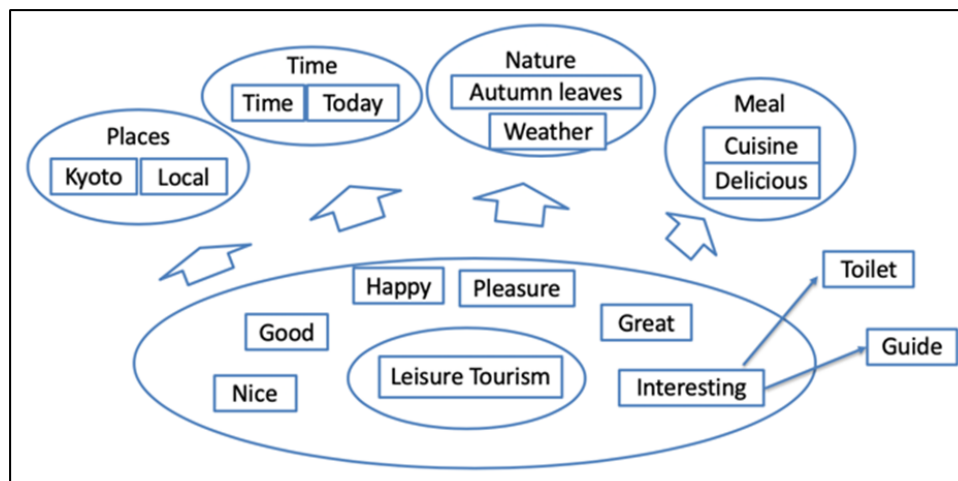


FIGURE 6. Positive affection for leisure tourism

5.4. **Two step expanding results.** The one step expanding results show the positive keyword has the important role of leisure tourism. In the two step expanding experiments, we chose six positive words and applied the two-word cooccurrence method for tweets data. We conducted the experiments using two keywords, “leisure tourism” and positive adjective words in Figure 6. It shows the five positive affections for leisure tourism expand the concept to “places”, “time”, “nature”, and “meal”. On the other hand, “interesting” generates other keywords, such as guide or toilet. We could mention that two step expanding results can indicate the features of e-QOL.

6. **Conclusion.** In this research, we discussed the value of wellbeing and the meaning of concept of e-QOL. In addition, we proposed the stepwise concept expanding model. To extract the relation of word with meaning of happiness, we built the extracting system from Twitter API, and conducted the experiments based on the expanding model. As

the results, we could find the e-QOL indicators in terms of leisure tourism. The target words of our research are limited noun and adjective words. In the future, we will extract verb words. The morphological analysis for Japanese is complicated compared to English natural language analysis because Japanese is not distributed in a sentence. The verb words especially are difficult to extract from a sentence due to the combined expression with noun and do. In Japanese, the meaning of verb is expressed in different ways in English. We will implement to extract these verbs with combined expression. In addition, we will analyze the feeling of local residence using our stepwise concept expanding model. We will capture the flow of feeling in residence for leisure tourists. The different feeling between local individuals and tourist will be focused on our research.

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