Research Letter

Analyses of posts to Instagram relating to sightseeing locations

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Abstract

Utilization of SNS data has become the focus on attention for considering measures for understanding travellers' actions, interests, and concerns to promote tourism. In order to investigate the relationship between actual sightseeing locations and postings to SNS, this research conducted a survey on the degree to which there are postings to Instagram which has a growing base of users, relating to tourist spots in Kanazawa City, Ishikawa Prefecture, with the widespread use of photo-posting type SNS. Furthermore, the effects of the day of the week and the weather on posting, a correlation of the number of posts relating to each tourist spot, and the relationship between the number of posts and the number of visitors were analyzed. The main results were as follows: (1) there were 2.3 times the number of weekday posts on holidays, (2) posts relating to cultural tourism resources were not very effected by rainfall, (3) the distances between tourist spots did not affect the number of posts, and (4) the number of posts increased with the number of visitors.

Keywords

sns analysis, Instagram, hash tag, tourist spot, number of posts

1. Introduction

In recent years, research into the use of big data has been advanced energetically in a variety of fields, and it has been applied to the tourism field [Li et al., 2018]. The Japan Tourism Agency implemented a survey on the dynamics of tourism, using cell phone base state information (roaming data), cell phone GPS information, and information on posts using SNS to draft the "Guide for Conducting a Dynamic Survey for Foreign-visitor Sightseeing Utilizing ICT" as a reference to tourism measures that will utilize ICT in each region of Japan [Japan Tourism Agency, 2017]. According to this guide, understanding the sightseeing locations that travellers are interested in (things to see, eat, and shopping) is given as a method for using SNS data. According to the 2017 version of The Reality and Intentions of Sightseeing [Japan Travel and Tourism Association, 2018], there were 37.4 % of females in their teens, and 32.3 % in their 20s of people who use SNS as an information reference for considering travel, of people who travelled to sightsee and stayed at lodgings in Japan in 2016. Also, 26.2 % of the total number of people posted information regarding their trip on SNS. In this way, SNS data has become an important source of information from those undertaking efforts to develop tourist spots, and for those who plan to do some tourism. In addition to getting a grasp on areas of interest of travellers, it is necessary to study how to use SNS data to promote tourist spots. However, it cannot be said that research into the relationship of actual tourist spots and postings to SNS has been adequate.

The object of this research is to clarify the degree to which posts to Instagram [Ministry of Internal Affairs and Communications, Institute for Information and Communications Policy, 2018], which is gaining an increasing number of users in recent years, is being implemented regarding actual tourist spots, and what affects those posts, for a goal of further utilization of SNS data for promoting tourism.

2. Analysis method

This survey was taken on tourist spots in Kanazawa City, Ishikawa Prefecture, for the number of posts made with hash tags to Instagram between April 1 and June 30, 2018. It is possible to confirm the number of posts with hash tags that include undisclosed (private) users from hash tag pages in Instagram. In order to understand the number of posts made in one-day units, an investigation was implemented on the number of posts at 7:00 AM every morning. By finding the difference between that day and the following day, the number of posts for that day were calculated.

The following tourist spots were used for the survey. They include those with the most visitors in the 2017 Version Kanazawa City Sightseeing Survey Results Report [Kanazawa City, 2018]. Specifically, they were: Kenroku-en, Kanazawa Castle Park, Higashi Chaya District, Nishi Chaya District, Kazue-machi Chaya District, Omicho Market, Nagamachi Samurai District, and 21st Century Museum of Contemporary Art, Kanazawa. In the event that there were different hash tags (for example, #Kanazawa 21st Century Museum of Contemporary Art, and #21st Century Art Museum) for the same tourist spot, each was investigated and summed. An analysis was implemented for the effects of the day of the week and the weather on posting, a correlation of the number of posts relating to each tourist spot, and the relationship between the number of posts and the number of visitors. Weather data was obtained from the "Past weather data download" from Japan Meteorological Agency [2018].

3. Results and discussion

3.1 Number of posts

Figure 1 shows the transition of the number of posts relating to each tourist spot between April and June. Cyclical changes can be seen in the figure, excluding the beginning of April, and from the end of April to the beginning of May. Kenroku-en is one of the Three Great Gardens of Japan, and is famous for its Sakura trees. During the flower-viewing season, admission to Kenroku-en is free to the public every year. It was open, free

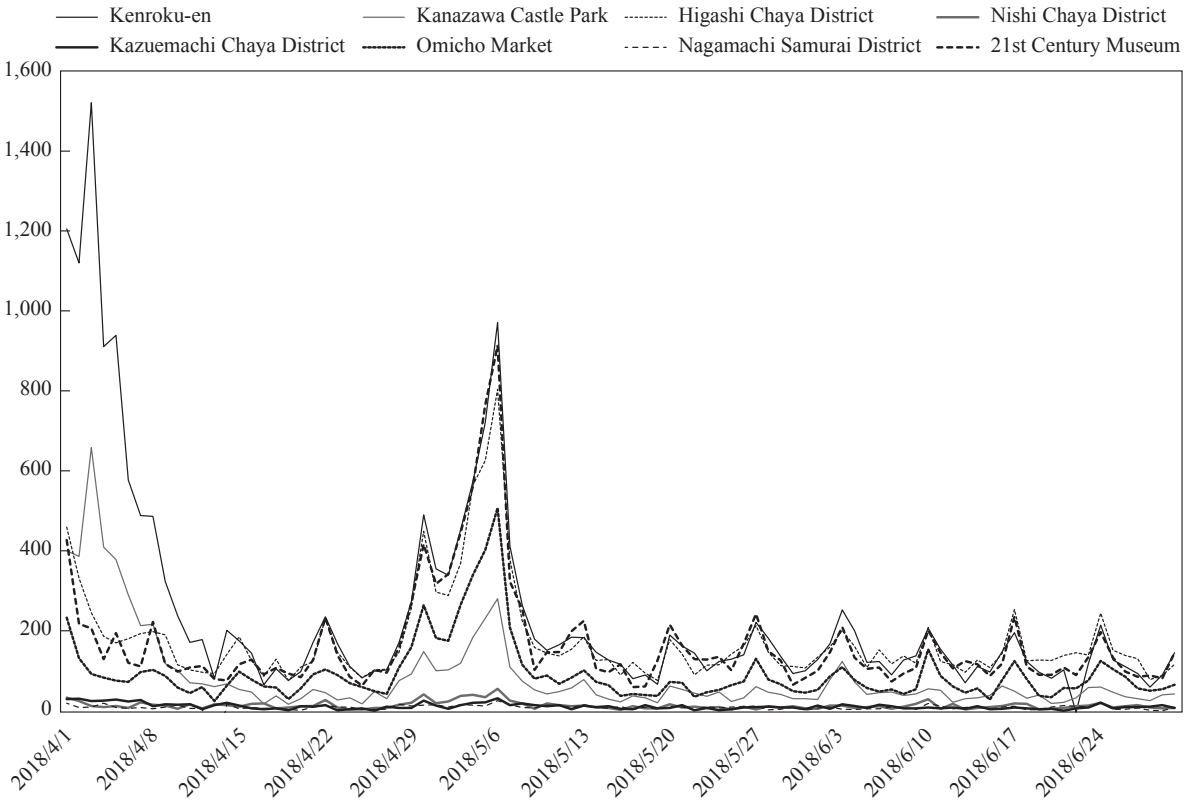

Figure 1: Transition of the number of posts relating to tourist spots

to the public, from March 31 to April 8 in 2018. Every year, not only sightseers, but also many of the local citizens visit the park to enjoy the Sakura flowers in season. The number of posts relating to Kenroku-en on April 3 projected compared to other periods. According to the Chunichi Shimbun Plus [2018], April 3, which is when the flowers were in full bloom, was the peak for park visitors during the free-admission period. 68,400 people visited the park. The number of posts on April 3 was 1,521. 2.2 % of the visitors to the park posted with the hash tag of "#Kenroku-en."

In Japan, there are many holidays between the end of April and the beginning of May. This period that includes many holidays is called Golden Week. During this period, there are many tourists. For that reason, it is thought that there are many posts for tourist spots in Kanazawa. Furthermore, because there are many companies that go on holiday on weekdays (May 1, and 2, in 2018) between the holidays during Golden Week, these were analyzed as holidays in this research.

Figure 2 shows the average number of posts per day that related to tourist spots. Kenroku-en was the highest, with 243 cases. Then, in order were Higashi Chaya District with 175, and 21st Century Museum of Contemporary Art, Kanazawa with 167. There were few posts relating to Nishi Chaya District, Kazuemachi Chaya District, and Nagamachi Samurai District.

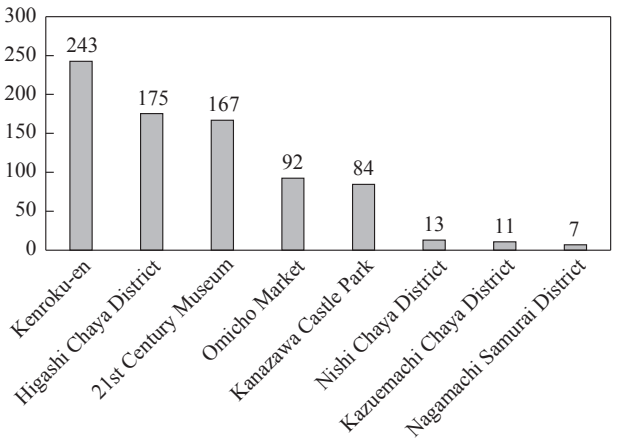

Figure 2: Average number of posts per day relating to tourist spots

3.2 Number of posts by day of the week

Figure 3 shows a ratio by day of the week for 85 days of posts for each tourist spot, excluding holidays. Sunday was the highest for each spot. Friday showed a negative for Nagamachi Samurai District. Once a hash tag for a posting was deleted, or that post was deleted, the number of posts displayed in the hash tag page was reduced. For that reason, days in which the number of deleted was higher than the number posted were derived as a negative. Because the number of cases declined by 130 cases on a specific Friday for Nagamachi Samurai District, its average value also was negative.

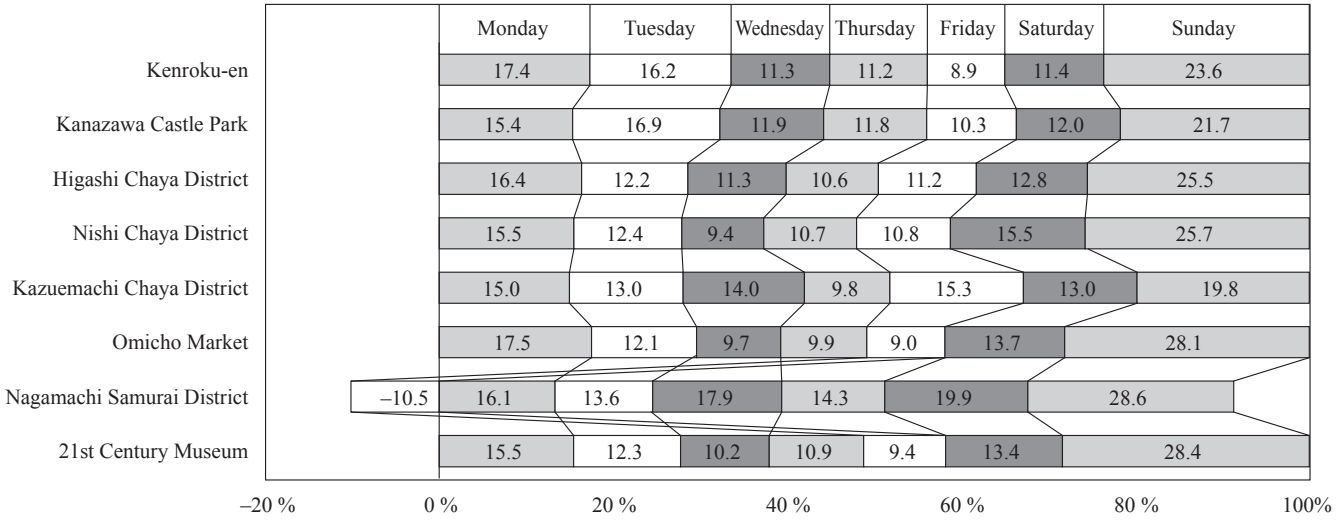

Figure 3: Posting ratio by day of the week for excluding holidays

3.3 Difference between weekdays and holidays

Figure 4 shows the result of calculating the average value by calculating weekdays (Monday to Saturday) and holidays (Sunday and holidays) for each tourist spot. The total number of posts for the 8 spots on a 72-weekday period was 44,540. The total for 19 holidays was 27,599. An average of 2.3 times posts were sent on holidays more than on weekdays. In particular, posts relating to 21st Century Museum of Contemporary Art, Kanazawa, and Omicho Market had a tendency to increase on holidays. The difference was 2.9 fold. Also, results of t-test of the number of posts on weekdays and holidays are shown in Table 1. A significant difference was found in the number of posts on weekdays and holidays for spots other than Nagamachi Samurai District. No statistical difference was found for Nagamachi Samurai District, but the number of posts was 2.4 fold for holidays.

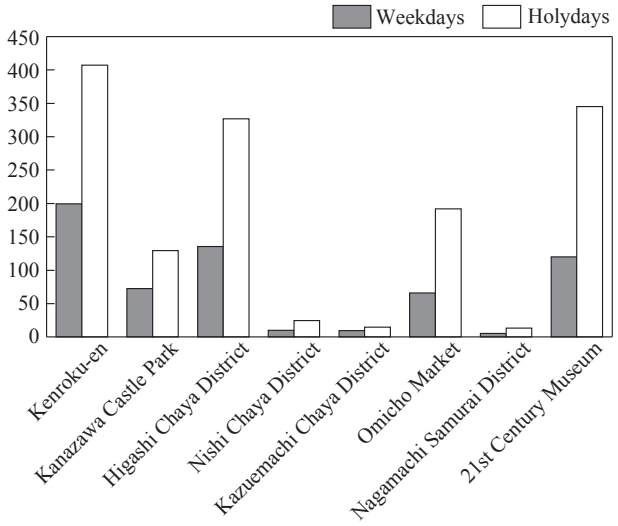

Figure 4: Average number of posts on weekdays and holidays

Table 1: Average number of posts on weekdays and holidays and *t*-test results

	Weekdays	Holydays	P-value (Two-tailed)
Kenroku-en	199.3	407.2	.002 **
Kanazawa Castle Park	72.7	129.3	.037 *
Higashi Chaya District	135.4	326.8	.000 **
Nishi Chaya District	10.1	24.5	.000 **
Kazuemachi Chaya District	9.7	14.9	.004 **
Omicho Market	66.1	191.8	.000 **
Nagamachi Samurai District	5.5	13.2	.051
21st Century Museum	119.9	344.9	.000 **

Note: ** $p < .01$, * $p < .05$.

3.4 Effect of weather

To investigate the effect of weather, a comparison was made to whether there was rainfall and the number of posts. Figure 5 shows the average number of posts on days that it did not rain, and the average number of posts on days that it rained. However, because it was clear that there was a large number of posts on holidays, the average value was taken only for weekdays. Of the 72 weekdays, 38 had no rainfall. 34 had rainfall.

In posts that included #Hirose River on Instagram, Kawamorita et al. [2017] compared the days without rainfall and days with rainfall, and found that there were 1.7 times more posts on the days without rainfall. Clearly, a significant difference was found. The relationship between the number of users of the Hirose River and rainfall is not clear, but it is believed that the number of users fell because of rainfall, and that affected the number of posts. In this research, the statistical difference of the number of posts depending on whether there was rainfall was not found for any tourist spot. It is thought that cultural resources that were targeted in this research were

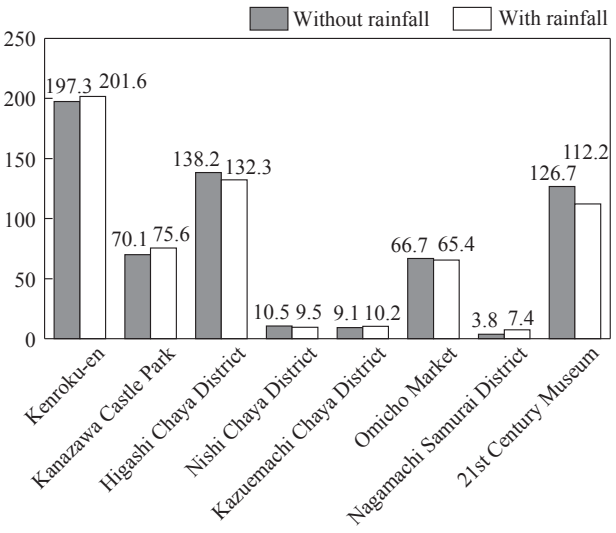

Figure 5: Average number of posts on weekdays depending on rainfall

not easily affected by rainfall, which differs from resources that target nature, such as rivers.

3.5 Relationship between tourist spots

Table 2 shows the correlation coefficient to the number of posts between tourist spots. There are many that indicate a high positive correlation. The correlation coefficient between Kenroku-en and Kanazawa Castle Park was 0.973, and it was highest.

Table 3 shows the distances between tourist spots. The correlation coefficient is a relist of that shown in Table 2. Popular tourist spots in Kanazawa are centralized in the city center. Many of the spots targeted in this research are combinations of those that can be walked to. The distance of Higashi Chaya District to Kazuemachi Chaya District is 400 m, but the correlation coefficient is 0.609. The distance of Higashi Chaya District to Omicho Market is 1.1 km, but the correlation coefficient like that described above, is a high correlation at 0.972. In this research, user-level data was not collected because private user posts were also counted. For that reason, if the correlation coefficient in Table 2 is high, it is unclear whether the posts were from the same user, or different users. However, for those with a low correlation coefficient, it is thought that the users sent many posts for only one spot.

3.6 Relationship to number of visitors and number of posts

Figure 6 shows the relationship between the number of posts and the number of visitors by month (April, May, June) to Kenroku-en, Kanazawa Castle Park, and 21st Century Museum of Contemporary Art, Kanazawa. However, the number of visitors is from 2017. There was little change in the trend for the number of visitors by month. The correlation coefficient for the number of visitors for 2016, and 2017 for three spots was an average value of 0.93. Therefore, it can be predicted as shown in Figure 6. This is a tentative comparison for three months. A comparison through one year is needed, but a correlation was found for the number of posts and the number of visitors for all three spots. It is easy to understand the number of visitors at tourist spots that have an entrance. However, it is very difficult to understand the number of visitors when a district or nature is the target. If it were possible to estimate the number of visitors from the number of posts to SNS, it would be expected that a survey of the number of visitors to tourist spots being implemented by municipalities every year would be unnecessary. However, of the participants in domestic lodging and tourists as described above, those who posted to SNS were 26.2 % of the total. The core was made up of young people. Also, because of the severe ebb and flow of individual SNS [Aihara, 2017], it is necessary to use caution in estimating the number of visitors.

Furthermore, the rate of people who posted that consist of visitors is clearly greatly different according to the tourist spot, in light of Figure 6. The dashed lines in the figure indicate the rate (1 %, 2 %, 3 %) of posters that make up the visitors. When three months were averaged, 0.9 % of visitors to Kanazawa Castle Park, 2.1 % to Kenroku-en, and 2.6 % of the visitors to 21st Century Museum of Contemporary Art, Kanazawa made posts. According to the 2017 Survey Report on Use Time of Information Communication Media and Information Behavior [Ministry of Internal Affairs and Communications, Institute for Information and Communications Policy, 2018], the usage rate of Instagram had a high tendency among young people. People

Table 2: Correlation coefficient to the number of posts between tourist spots

	2	3	4	5	6	7	8
1 Kenroku-en	.973 **	.660 **	.522 **	.770 **	.564 **	.191	.580 **
2 Kanazawa Castle Park	–	.521 **	.388 **	.742 **	.420 **	.126	.438 **
3 Higashi Chaya District		–	.861 **	.609 **	.972 **	.258 *	.961 **
4 Nishi Chaya District			–	.541 **	.860 **	.146	.833 **
5 Kazuemachi Chaya District				–	.521 **	.096	.495 **
6 Omicho Market					–	.274 **	.970 **
7 Nagamachi Samurai District						–	.242 *
8 21st Century Museum							–

Note: ** $p < .01$, * $p < .05$.

Table 3: Distances between tourist spots

Tourist spot A	Tourist spot B	Distance (km)	Correlation coefficient (repost)
Higashi Chaya District	Kazuemachi Chaya District	0.40	0.609
Kenroku-en	21st Century Museum	0.45	0.580
Kenroku-en	Kanazawa Castle Park	0.65	0.973
Kazuemachi Chaya District	Omicho Market	0.80	0.521
Nagamachi Samurai District	21st Century Museum	0.85	0.242
Kanazawa Castle Park	21st Century Museum	0.90	0.438
Higashi Chaya District	Omicho Market	1.10	0.972
Kanazawa Castle Park	Omicho Market	1.10	0.420
Nishi Chaya District	Nagamachi Samurai District	1.10	0.140
Kanazawa Castle Park	Kazuemachi Chaya District	1.20	0.742
Omicho Market	Nagamachi Samurai District	1.20	0.274
Kenroku-en	Nagamachi Samurai District	1.20	0.190
Kanazawa Castle Park	Nagamachi Samurai District	1.20	0.120
Nishi Chaya District	21st Century Museum	1.30	0.833
Omicho Market	21st Century Museum	1.40	0.970
Kenroku-en	Kazuemachi Chaya District	1.40	0.770
Kanazawa Castle Park	Higashi Chaya District	1.40	0.521
Kenroku-en	Omicho Market	1.50	0.564
Kazuemachi Chaya District	21st Century Museum	1.60	0.495
Kenroku-en	Higashi Chaya District	1.70	0.660
Kenroku-en	Nishi Chaya District	1.70	0.522
Higashi Chaya District	21st Century Museum	1.80	0.961
Kanazawa Castle Park	Nishi Chaya District	1.80	0.388
Kazuemachi Chaya District	Nagamachi Samurai District	2.00	0.090
Nishi Chaya District	Omicho Market	2.10	0.860
Higashi Chaya District	Nagamachi Samurai District	2.30	0.258
Nishi Chaya District	Kazuemachi Chaya District	2.90	0.541
Higashi Chaya District	Nishi Chaya District	3.10	0.861

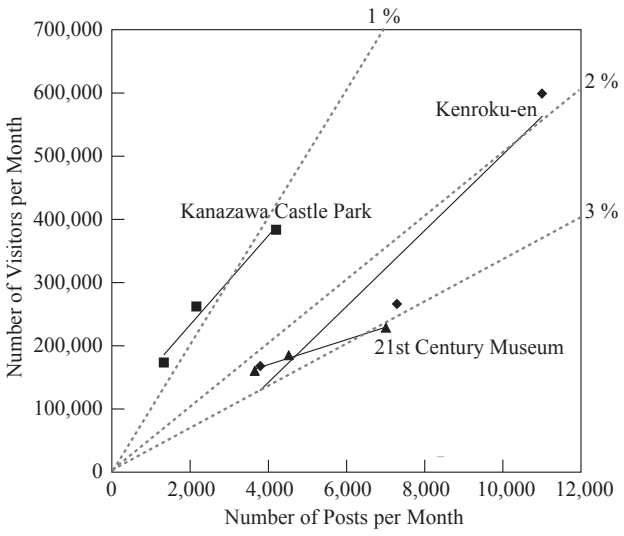

Figure 6: Relationship between number of posts and number of visitors by month

in their 20s were the highest at 52.8 %. By gender, 19.4 % of males sent posts, and 31.0 % of females made posts. Therefore, many of the posts targeted in this research are thought to be made particularly by females in the younger age bracket. The term "instagrammable" is becoming a social phenomenon. Many users post fashionable photographs focusing on young women. There were many instagrammable photos taken of 21st Century Museum of Contemporary Art, Kanazawa. Compared to other spots, it is thought that this resulted in the posting rate being high.

4. Conclusion

This research clarified to what degree posts to Instagram were related to tourist spots in Kanazawa City, Ishikawa Prefecture, and what affects those posts. The obtained knowledge is as follows:

- There were 2.3 times the number of weekday posts on holidays.

- Posts relating to cultural tourism resources were not very effected by rainfall.
- The distances between tourist spots did not affect the number of posts.
- The number of posts increased with the number of visitors. The rate was greatly different depending on the tourist spot. 0.9% of the visitors to Kanazawa Castle Park sent posts, 2.1 % of Kenroku-en, and 2.6 % of the visitors to 21st Century Museum of Contemporary Art, Kanazawa sent posts. How well a photograph looks is thought to greatly affect posts.

This research was a tentative analysis of three months of data. In the future, data must be collected through one year for analysis. Also, for those with the short distance between tourist spots and low correlation coefficients, factors with low correlation coefficients are clarified by field survey. Then it is necessary to consider the effective use of SNS to alleviate congestion in famous tourist spots.

Acknowledgements

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