

Analysis of Covid-19, Tourism, Stress Keywords Using Social Network Big Data _Semantic Network Analysis

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Abstract

From the 1970s to the present, the number of new infectious diseases such as SARS, Ebola virus, and MERS has steadily increased. The new infectious disease, COVID-19, which began in Wuhan, Hubei Province, China, has pushed the world into a pandemic era. As a result, Countries imposed restrictions on entry to foreign countries due to concerns over the spread of COVID-19, which led to a decrease in the movement of tourists. Due to the restriction of travel, keywords such as "Corona blue" have soared and depression has increased. Therefore, this study aims to analyze the stress meaning network of the COVID-19 era to derive keywords and come up with a plan for a travel-related platform of the Post-COVID 19 era. This study conducted analysis of travel and stress caused by COVID-19 using TEXTOM, a big data analysis tool, and conducted semantic network analysis using UCINET6. We also conducted a CONCOR analysis to classify keywords for clustering of words with similarities. However, since we have collected travel and stress-oriented data from the start to the present, we need to increase the number of analysis data and analyze more data in the future.

Keywords: COVID- 19, Travel, Stress, Meaning Network, Big Data

1. INTRODUCTION

All industrial sectors are suffering from crises and damage, but infectious diseases such as COVID-19 that are at high risk of transmission are urgently restricted from moving. From this point of view, the travel industry, which is primarily aimed at moving, is considered to be in a serious situation. In a survey conducted by the Korea Trauma Stress Society in late May, 18.6 percent of people complaining of depression due to COVID-19 were suffering from "Covid virus," up 1.1 percent from the March[1]. From February 2020, the situation of COVID-19 worsened and the fear of infection increased, reducing the desire for travel. But contrary to expectations, more and more people are traveling in the country to relieve psychological fatigue, such as Coronavirus, which has been suffering psychologically from COVID-19[2]. The reason why domestic travel was satisfactory was that the highest percentage of respondents said they could leave at any time (32.5%) [3]. As such, stress is present anytime, anywhere, and even if there are various internal and external influences, people will not get out of their

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desire to travel outside of their daily lives. Accordingly, big data analysis was judged to be the best to reflect the latest trends, and text mining was conducted through the big data analysis tool, Textom, for social network analysis. As a result, three research questions were derived.

First, what are the keywords for COVID-19 and travel and stress in social big data?

Second, which of the relevant key words in social big data is highly centralized?

Third, what subgroups are the words in the network classified into?

Based on these research problems, Chapter 1 of this study is the background and purpose of the study, Chapter 2 is the prior study, Chapter 3 is the research method, Chapter 4 is the result of the study, Chapter 5 is the conclusion and consideration. Specific research questions are as follows.

2. RELATED WORKS

COVID-19 affect a variety of places. However, the stress from infectious diseases varies and various studies are needed on the solutions. Kim, Sun, and Marcia C (2021) examined the relationship between the degree of disturbance in daily life and depression of social workers and verified the mediating effect of corona stress on this relationship [4]. Pak, Halil (2021) analyzed the job stressors of Korean teachers due to non-face-to-face classes caused by COVID-19 [5]. Panisoara, Ion Ovidiu (2020) analyzed the job stress of child care teachers due to COVID-19 [6]. Cho Hye-ji, Kim Hye-ok (2020) studied the relationship between the anxiety, stress and quality of life of small merchants in certain areas due to COVID-19 [7]. Most of these stress-related studies have been linked to job stress. In this study, various methods exist to identify the impact relationship of travel and stress with the main keywords, Corona 19, but research is needed in various aspects. In the case of COVID-19, the spread trend is not constant and the travel industry is rapidly changing. Therefore, this study seeks to use the big data analysis method because the big data analysis method can be used to collect data more comprehensively, the big data analysis method can be used. Alves, Jose C (2020) analyzed Corona 19 and the changes in family life with text mining techniques [8]. Choi Hong-Yeol, Park Eun-Kyung (2019) used social media big data analysis to analyze travel trends alone in Jeju Island [9]. Im Jong-Hun, Kim Young-Hyun (2020) used social media big data analysis to identify Iksan tourism issues [10]. As such, big data analysis for regional research is usually the majority, and various studies need to be examined by identifying post-corona 19 travel trends in the future.

3. METHOD

3.1 Analysis Target and Data Collection

This study utilized a big data analysis solution, TEXTOM, to collect social media postings, through which text mining was performed. Specific data collection and research methods are shown in Figure 1.

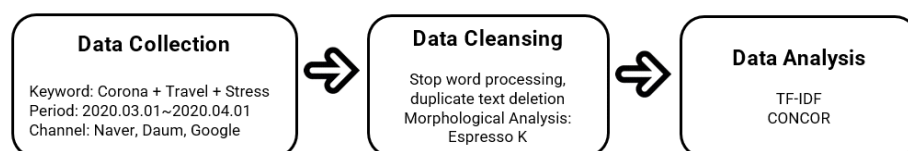


Figure 1. Data collection, Data Cleansing, and analysis procedures

The data collection period of this study was set as a collection period for a total of one year from March 2020 to April 2021, when the coronavirus phase was elevated. Data collection used the social media big data analysis site, TEXTOM, and collected related web documents posted on Naver, Daum and Google. The purpose of this study is to find out the relationship between travel and stress after the coronavirus outbreak and to understand the

overall trend. Therefore, the keyword collected documents that included words of COVID-19, travel, and stress. For morpheme analysis, nouns, verbs, and adjectives were extracted using Espresso K, an analyzer. After that, the terms were pre-processed in similar terms based on frequency and n-gram analysis results. Synonyms integration refers to the integration of words with similar meanings into a single word.

3.2 Data Analysis

Among the text mining techniques for COVID-19 travel stress-related social big data, we conducted a TF-IDF (Term Frequency-inverse document frequency) and CONCOR analysis. TF-IDF is a value that is primarily used to evaluate the importance of words extracted from text mining [11]. Therefore, in this study, 60 top words were identified and used for analysis to identify trends related to COVID-19, travel and stress. After constructing the Co-occurrence Matrix for the top 60 key words, we conducted a numerical centrality analysis. Finally, a CONCOR analysis linked to UCINET 6.0 was conducted to identify the network subpopulations of the top 60 key words related to Coronavirus 19 travel stress.

3.3 COVID-19, Travel, Stress Frequency Analysis

Table 1 shows the words that appeared in corona 19, travel, and stress documents for a year from March 2020 to April 2021.

Table 1. COVID-19, Travel and Stress-related documents TF-IDF Top 60 Words

TF						TF-IDF					
Rank	Word	TF	Rank	Word	TF	Rank	Word	TF-IDF	Rank	Word	TF-IDF
1	COVID-19	1898	31	Depression	46	1	Travel	572.5221	31	House	158.2125
2	Stress	1479	32	Thinking	45	2	Solution	478.5153	32	Depression	152.9103
3	Travel	808	33	Domestic Trip	45	3	Disease	345.1829	33	Thinking	148.475
4	Solution	326	34	JoongAng Ilbo	45	4	Blue	313.827	34	Stay at home	140.1699
5	Disease	158	35	Feeling of Depression	40	5	Way of Solution	302.3498	35	Safety	138.3439
6	Way	124	36	Safety	39	6	Generation	300.7327	36	Confirmed	137.5356
7	Blue	117	37	This Year	38	7	COVID-19	285.1894	37	Feeling of Depression	137.1799
8	Generation	117	38	Confirmed	37	8	Stress	274.1867	38	Way	133.7504
9	People	96	39	Blue	36	9	Confirmed People	246.0423	39	This Year	133.6273
10	Social-Distance	95	49	Method	35	10	People	245.6322	49	Depression	131.2459
11	Confirmed People	89	41	Plan	35	11	Abroad Trip	244.1221	41	Plan	130.1013
12	Abroad Trip	86	42	occurrence	34	12	Social Distance	241.9752	42	Food	126.5537
13	Daily Life	83	43	Stay at Home	34	13	Overcome	236.4124	43	Occur	126.3841
14	Overcome	81	44	interior of a country	34	14	Daily Life	233.0908	44	Way	124.1548
15	Heart	76	45	Family	34	15	Heart	210.1036	45	Domestic	123.9545
16	Social	67	46	Spread	34	16	Child	198.7939	46	Non Face to Face	123.9545

17	Child	62	47	Non Face to Face	34	17	Social	194.4435	47	Family	122.8018
18	Situation	60	48	Food	33	18	After	189.1748	48	Covid Blue	120.5185
19	Anxiety	59	49	News	33	19	Mentality	186.7141	49	News	120.3088
20	After	59	50	Express	31	20	Anxiety	184.1505	50	Spread	119.5613
21	2021s	58	51	Mask	30	21	Situation	183.7063	51	World	116.4025
22	Reporter	58	52	Untact	29	22	2021s	182.2253	52	Mask	116.3256
23	Infectious Diseases	56	53	Hotel	28	23	Health	170.318	53	Related	116.0448
24	Mentality	54	54	Drive	26	24	Infectious Diseases	167.3092	54	Untact	115.0863
25	Health	52	55	Effect	26	25	Time	161.4413	55	Hotel	112.4839
26	Situation	51	56	Prevention	26	26	Long Term	161.4413	56	Drive	111.9291
27	Time	50	57	Worries	25	27	JoongAng Ilbo	161.0563	57	Prevention	104.4494
28	Long Term	50	58	Healing	25	28	State	160.2326	58	Healing	101.7144
29	House	49	59	JEJU	23	29	Domestic Trip	159.6276	59	Vaccine	99.6184
30	Recommendation	48	60	Vaccine	22	30	Recommendation	158.3733	60	JEJU	99.01421

For a year from March 2020 to April 2021, we looked up documents related to COVID-19, travel, and stress, and a total of 6,782 documents related to travel and stress appeared at the time of COVID-19 and so far. It has been about a year since the start of the COVID-19 and in the meantime, fewer searches have been made for travel than in the past. In addition, this study determined that 6,782 cases of data can be used for analysis because it is intended to view travel stress related documents due to COVID-19 as big data. Currently, words with high TF values and TF-IDF values in keyword-related documents are 'Travel (TF: 3rd, TF-IDF: 1st), Solving (TF: 4th, TF-IDF: 2nd), Infectious diseases (TF: 5th, TF-IDF: 3rd), Blue (TF: 7th, TF-IDF: 4th), and Resolution (TF-IDF: 4th) Based on the results in <Table 1>

3.4 Centrality and Network Visualization of key words

The results of visualizing the network among the key words in this study are shown in Figure 2. Because the size of a node represents a connection centrality value, a large size of the node means a large connection centrality value. The thickness of the line represents the frequency of simultaneous appearance, so if the frequency of simultaneous appearance between the two words is high, the line appears thick.

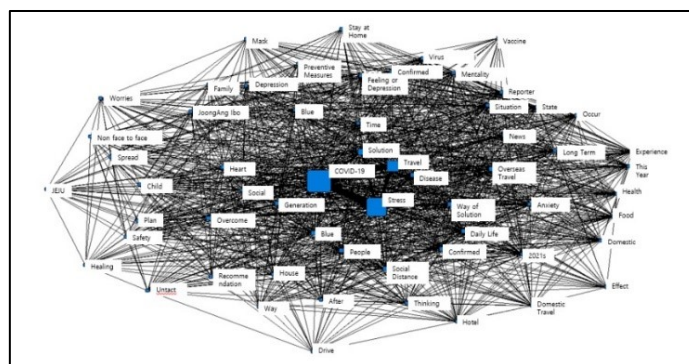


Figure 2. Visualize the network of key words

Figure 3 shows the formation of eight small clusters and four large clusters. Cluster 1 refers to the stress of COVID-19, Cluster 2 refers to the solution of COVID-19, Cluster 3 refers to the travel of COVID-19, and Cluster 4 refers to the anxiety caused by COVID-19.

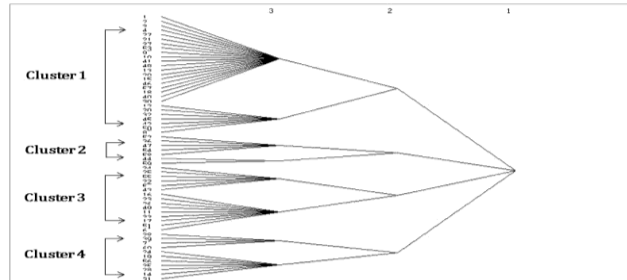


Figure 3. Key Words Related Cluster

3.5 CONCOR Analysis

The results of visualizing the CONCOR analysis for the cluster classification of Corona 19, travel and stress-related key words are shown in Figure 4. Groups are classified into four categories: one for stress behavior, two for travel impacts due to COVID-19, three for tourism and travel issues, and four for anxiety. Keyword factor types based on CONCOR analysis are shown in Table 2.

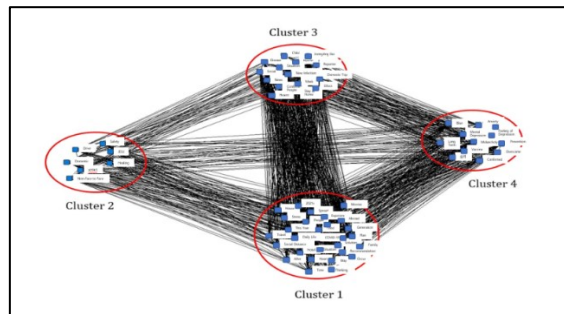


Figure 4. Key Words CONCOR Analysis

Table 2. Types of factors associated with COVID-19, Travel, Stress based on CONCOR Analysis

	Name	Key Words
Cluster 1	Stress Behavior	Stress, COVID-19, relieving, overseas travel, social distancing, 2021, hotel, this year, daily life. Afterwards, situations, minds, times, methods, thoughts, recommendations, occurrences, family, plans, times, food, people, homes, spread, experiences, worries
Cluster 2	COVID-19 Travel Impact	Drive, Safety, Domestic, Jeju, Healing, Non-face-to-face
Cluster 3	Tourism and Travel Issues	infections, domestic travel, solutions, JoongAng Ilbo, journalists, infectious diseases, situations, children, society, news, confirmed cases, masks, influences, stay at home, health
Cluster 4	COVID-19 Anxiety	Blue, depression, anxiety, quarantine, overcoming, organ, vaccine, psychology, confirmed.

People may have a negative perception of travel in the spread of infectious diseases such as coronavirus 4, but they choose domestic travel as a way to relieve the stress of travel restrictions such as cluster 3. As with Cluster 1, concerns about the spread and confirmation of cluster 2 are pursuing safety, domestic, healing, and non-face-to-face keywords such as Cluster 2, and among them, we could see that Jeju is mentioned a lot. Based on this study, it will be possible to recommend travel destinations that respond to people's stress in response to the Post-COVID era. As a result, we would like to build a travel platform that focuses on safety, and quarantine regarding issues.

4. CONCLUSION

This study sought to derive key words from COVID-19, travel, and stress-related documents posted on social media and examine key keyword-related topics through semantic network analysis. This study was subject to analysis of relevant documents for a total of one year from March 2020 to April 2021, as the pandemic began in December 2019. The main findings of the study are discussed as follows: First, 60 key words with high TF-IDF values were derived from the documents related to COVID-19, travel and stress, followed by "travel", "resolve", "infectious disease", "blue", and "solution". It can be seen that COVID-19 increases depression such as COVID Blue, and one of the solutions to this depression is to seek travel. Second, after conducting a CONCOR analysis to determine which subcluster the key words are classified into, the related key words were classified into four clusters. Therefore, social big data analysis is needed using various search terms in the future. However, it is significant that we have explored the overall impact of coronavirus on stress and travel. And while there was a clear impact between COVID-19 and stress, we could see that while refraining from traveling, it was found to find "travel" as a solution to stress. Therefore, stress is inevitable in the POST-COVID 19 Pandemic era, and the way to solve this problem is to lead the travel industry trend based on the meaningful network keywords suggested in this study.

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