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Recommended Chocolate Applications Based On The Propensity To Consume Dining outside Using Big Data On Social Networks

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Abstract

In the past, eating outside was usually the purpose of eating. However, it has recently expanded into a restaurant culture market. In particular, a dessert culture is being established where people can talk and enjoy. Each consumer has a different tendency to buy chocolate such as health, taste, and atmosphere. Therefore, it is time to recommend chocolate according to consumers' tendency to eat out. In this paper, we propose a chocolate recommendation application based on the tendency to eat out using data on social networks. To collect keyword-based chocolate information, Textom is used as a text mining big data analysis solution.Text mining analysis and related topics are extracted and modeled. Because to shorten the time to recommend chocolate to users. In addition, research on the propensity of eating out is based on prior research. Finally, it implements hybrid app base.

1. Introduction

The rapid changes in population, economy and social environment are affecting food consumption propensity. In particular, online shopping for food is expanding as the number of single-person households increases. And, the proportion of dining outside costs in Korea is well above the OECD average. Although meat, snacks, and grains have a low proportion of consumption by food products, the cost of eating out such as general restaurants, group meals, and pubs and coffee shops is relatively high.[1] As consumers spend more money on dining outside, the fundamental diet simply to address hunger is now changing into a dining culture. In the past, consumers chose food in consideration of the taste and service of restaurants. However, modern consumers choose their food according to their preferred tastes and tendencies. In addition, we want to gain emotional experience through the atmosphere, style, and special experience of each restaurant.[2] Also, it promotes health through eating out, values the flavor of colors, scents, etc., and performs the functions of enjoyment. At the same time, it is developing into a way of expressing one's tendency. Consumption patterns

are clearly differentiated by the individual's preference for dining outside.[3] Past dining outside was done simply for dining purposes. However, it has recently expanded into a restaurant culture market that accepts food as a cultural and leisure life.[4] In particular, the dessert culture, which can be easily communicated and enjoyed among dining outside culture, is increasing and settling down.[5] The size of the chocolate market has been steadily increasing to 1.156 trillion won in 2017. The chocolate market is growing in size, with chocolate-related companies emerging and new products being released.[6][7] Each consumer has a different tendency to buy chocolate, such as health, taste, and the atmosphere of the store. Therefore, it is time to recommend chocolate based on consumers' propensity to eat out. In this paper, we propose a chocolate recommendation application based on the propensity of eating out using data on social networks. First, we utilize Textom, a text mining big data analysis solution, to collect data on social networks. It collects original text data from Naver and Daum, the social networks that people use the most. When collecting data, the keyword is set to chocolate. The collection period is from January 2019 to December 2019 to collect approximately one year of data.Duplicate words from collected data are deleted and analyzed. Then the text mining analysis and related topics are extracted. In addition, a sub-factor on the propensity to consume dining outside is determined based on prior research related to the propensity of consumers to consume dining outside. Each subfactor organizes questions and surveys consumers. The demographic characteristics are identified using SPASS 23.0 for data analysis. Finally, to reduce the time to recommend chocolates, we use topic map modeling. And produce applications. Chapter 2 of this paper describes big data on social networks and propensity to consume dining outside as related research. Chapter 3 describes research design such as research model diagrams, data collection on social networks, analysis methods and procedures, etc. Chapter 4 describes chocolate-recommended applications based on the tendency of eating out using social networking big data. Finally, Chapter 5 describes the conclusion.

2. Relevant Research

2.1 Food consumption propensity

Food consumption propensity is a particular lifestyle of consumers. A specific activity that appears as a service purchase or menu item purchase with awareness of dining outside consumption (Lee Seung-ha, 2005). Many factors are taken into account when consumers choose to eat out. In other words, consumers go through the purchasing decision-making process in the order of problem recognition → information exploration → alternative evaluation → purchase → post-purchase action. (Choi Min-sun, 2013) Looking at the prior study on the propensity of eating out, Jeong Hyo-sun and Yoon Hye-hyun (2007) examined the differences in eating habits of college students in five types: 'Health-seeking', 'taste-seeking', 'safety-seeking', 'fashion-seeking' and 'vividness-seeking'. According to a study by Chanbok, Lee Kwang-ok, and Lee In-sung (2008), it is significant to type four types of consumption of dining outside: 'mood-seeking type', 'rest-seeking type', 'authority-seeking type' and 'experience-seeking type' because some consumption trends can be predicted based on the behavior of consumers purchasing products. In addition, the consumption propensity of dining outside was characterized by three types: ' relationship pursuit type', 'rest-seeking type' and 'health-seeking type', proving that the consumption propensity of dining outside varies from the purpose of pure eating depending on the emotion and satisfaction level.. Finally, a study by Han Gyu-sang and Lee Jong-ho (2014) defined the propensity for consumption of dining outside as a specific lifestyle, including 'dividend-seeking type', 'health-seeking type' and 'taste-seeking type' reflecting social and economic phenomena related to food. Therefore, based on prior research, the factors of consumption propensity for dining outside were divided into health-seeking type, taste-seeking type, mood-seeking type, economic value-seeking type, and experience-seeking type. Details are shown below in <Table 1>.

Table 1. Defining the propensity for eating out

Factors of propensity to consume food at-out	Definition
health pursuit type	Types that have characteristics that consider health first and prefer the use of nutritious ingredients when purchasing chocolate.
Taste-seeking type	The type who thinks taste first when buying chocolate
mood-seeking type	When buying chocolate, think about the shape first and enjoy a meal at a restaurant with a good atmosphere.
economic value-seeking type	The type of chocolate that avoids overspending or uses coupons, discount events, events, etc.
experience-seeking type	The type that considers making experience rather than buying chocolates

2.2 empirical analysis

In this study, 200 men and women in their 20s and 60s were surveyed as food consumers based on a questionnaire about their propensity to consume dining outside. The survey was conducted from November to December 2019. Among them, 182 questionnaires were used for analysis, excluding 18 questionnaires of insincere answers.

2.3 general characteristics of a sample

Based on the questionnaire surveyed in this study, it was analyzed according to demographic characteristics using the SPASS 23.0 program and organized in <Table 2 >. Gender was 105 women (42.5 percent) and 77 men (57.5 percent), with more women than men. In terms of age, 68 people aged 20 to 29 (37.4%), 54 people aged 30 to 39 (29.7%), 30 people aged 40 to 49 (17.6%), 45 people (11.5%) aged 50 to 59 and over (3.8%). 108 people (59.4 percent) were not married, 74 (40.6 percent) were married, and more were unmarried. In terms of education level, 67 college students (36.8 percent), 52 college graduates (28.6 percent), 51 graduate students (28.0 percent), and 12 high school graduates (6.6 percent). In terms of education level, 67 students (36.8 percent), 52 college graduates (28.6 percent), 51 graduate students (28.0 percent), and 12 high school graduates (6.6 percent). The income level was 78 people (43.0 percent) with less than 2 million won, 61 people with less than 2 to 3 million won (33.5 percent), 29 people with less than 300 to 400 million won (15.9 percent), and 14 people with more than 4 million won (7.7 percent). It was analyzed that 53 students (29.1%), 36 sales/service jobs (19.9%), 31 professionals/free workers (17.0%), 24 technical/office workers (13.2%), 19 management/management positions (10.4%), 8 housewives (4.4%), other names (3.3%), and 5 self-employed (2.7%). Details are shown below in <Table 2>.

Table 2. The demographic characteristics of the survey\

Sortation	Detailed classification	Frequency	Percent (%)	Sortation	Detailed	Frequency	Percent (%)
Gender	Man	77	42.3%	Education	high school graduation	12	6.6%
	Woman	105	57.7%		university studies	67	36.8%
Marriage	Single	108	59.4%		college graduation	52	28.6%

	married	74	40.6%		More than Graduate school	51	28.0%
Career	professional/liberal	31	17.0%	profit	less than 2 million won	78	43.0%
	technical/office work	24	13.2%		less than 200 to 300	61	33.5%
	position/management	19	10.4%		less than 300 to 400	29	15.9%
	Sales/Service	36	19.9%		More than 400	14	7.7%
	self-employment	5	2.7%	age	20 to 29	68	37.4%
	housewife	8	4.4%		30 to 39	54	29.7%
	Student	53	29.1%		40 to 49	32	17.6%
	etc	6	3.3%		50 to 59	21	11.5%
					over 60 years of age	7	3.8%
	total	182	100.0		total	182	100.0

2.5 Reliability and Feasibility Verification

In this study, the propensity to consume dining outside consisted of health-seeking type, taste-seeking type, mood-seeking type, economic value-seeking type, and experience-seeking type. Accordingly, the results of the factorial analysis on the concepts of composition and subconcepts of each restaurant consumption propensity were as shown in <Table 3>. In addition, the reliability and validity tests in this study showed that the Cronbach' Alpha of all factors was higher than 0.6, so there was no problem with the reliability of the measurement variables.

Table 3. Survey Question Factor Analysis Result

Food consumption propensity	question	Cronbach' Alpha
health pursuit type	I choose chocolate that includes fresh ingredients, natural foods, and healthy foods.	.855
	I choose chocolate considering the health and nutritional value of the food..	.893
	I am willing to buy healthy food even if it is expensive.	.666
flavor-seeking type	If it tastes good, I tend to wait a long time to eat it.	.679
	Even if the traffic is inconvenient, I tend to go to a delicious restaurant to eat.	.771
	I don't spare money on eating out.	.677
mood-seeking type	When eating out, I prefer restaurants that have a good mood.	.541
	I prefer to eat at a luxury restaurant.	.456
	I tend to visit places that are introduced as restaurants with a good atmosphere in the social media	.530
economic value-seeking type	I tend to use coupons, discount events, and events when I eat out.	.696
	I prefer restaurant companies in the budget range.	.641
	I tend to choose a restaurant with a free side menu.	.745

experience-seeking type	I prefer a one-day class that I can make and experience myself rather than buying chocolate.	.841

As shown in <Table 3>, health-seeking, taste-seeking, mood-seeking, and economic value-seeking are each composed of three questions. Experience-oriented questions consist of one question, and a total of 13 questions are based on the questionnaire

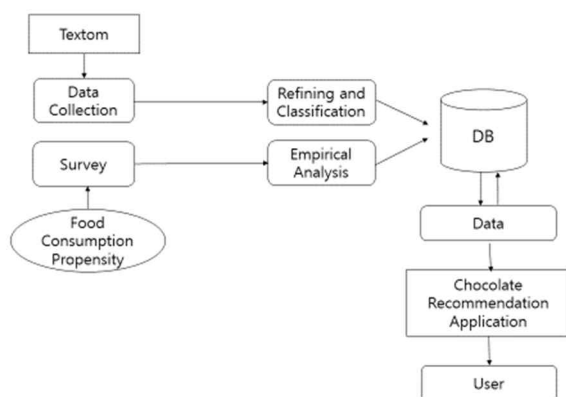# 3. Research design
3.1 Research Model Diagram

Figure 1. Research Model Diagram

In this paper, data is collected using Textom, a text mining analysis solution, as in <Figure 1>. It is based on the original text data of Naver and Daum, the social media that people use the most. When collecting data, the keyword is chocolate. The collected data is refined and analyzed. Then extract the text mining analysis and related topics. In addition, a sub-factor on the propensity to consume dining outside is determined based on prior research. For each factor, questionnaires are organized and the survey is conducted on consumers. The collected questionnaire uses SPASS 23.0 to identify demographic characteristics. Finally, collected chocolate social media data and survey data are stored in the database. Based on the data stored in the DB, the manager utilizes topic map modeling to implement it through the application.

3.2 Social network data collection

This study collected data using text mining big data analysis solution, TexTom. To use social network data to recommend chocolates according to your preference for eating out. The keyword for data collection is chocolate. We collected the original text data of Naver and Daum, the social network that people use the most. The collection period was approximately one year from January to December 2019. The amount of data collected totaled 76,283 document data. It was finally composed of 5,426 text through the refining process and analysis.

3.3 Analysis Methods and Procedures

Duplicate words were deleted and analyzed from the data collected based on keywords for chocolate. In addition, text mining analysis and related topics were extracted after pretreatment and morpheme analysis. The questionnaire was conducted for about one month from October 2019 to November 2019.

4. Recommended applications for chocolate based on the tendency of eating out using data on social networks

4.1 Chocolate Recommendation System Components

This section proposes chocolate recommendation applications based on each user's propensity to consume dining outside using data on social networks. <Figure 2> is a chocolate recommendation system component proposed in this paper, which includes chocolate data collection, chocolate topic category classification and mapping, restaurant consumption propensity survey, data analysis and storage, and application-based chocolate recommendation agents. The following describes the components of the chocolate recommendation system.
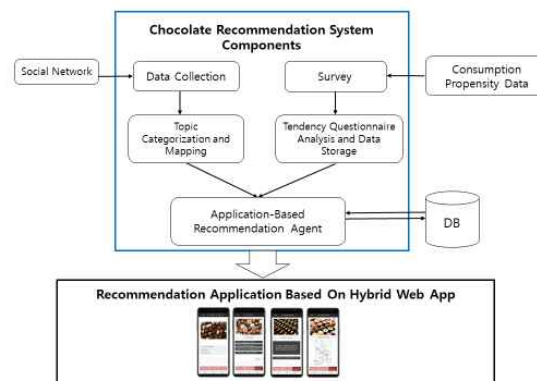

Figure 2. Chocolate Recommendation System Components

* Social Network : It collects data by utilizing text mining big data analysis solution called TexTom. When collecting data, the keyword is chocolate, which collects the original data of Naver and Daum, the social network that people use the most.

* Topic categorization and mapping : Chocolate data collected from data on social networks based on chocolate keywords are categorized and mapped.

* Consumption Propensity Data : Based on prior research, the sub-factors of restaurant consumption are divided into health-seeking type, taste-seeking type, mood-seeking type, economic value-seeking type, and experience-seeking type.

* Tendency Questionnaire Analysis and Data Storage : Survey questions are organized and investigated based on the five factors of restaurant consumption. The collected data is analyzed and the information is stored.

* Application-Based Recommendation Agent : Using the classification and mapping of topics categories and the analysis and data of dining outside propensity questionnaires, the agents underlying the implementation of chocolate recommendation applications are formed.

4.2 Chocolate Topic Map Model Results

We modelled through the topic map to reduce the time before recommending chocolate to consumers. The details are as detailed as <Figure 3> The results of the chocolate topic map modeling of <Figure 3> are provided as information on the Chocolate Topic Classification and Mapping process in the <Figure 2>system.
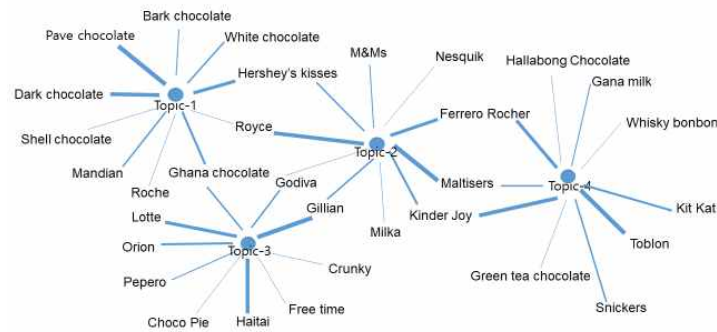
Figure 3. Chocolate Topic Map Model Results

As in <Figure 3>, the topic map modeling results comprise a total of four topics. Each topic consists of 10 chocolate-related keywords. Topic 1 is named the kind of chocolate with pave chocolate, mandiang, roche, etc. Topic 2 is named as an overseas chocolate company by Godiva, Gillian, and Hershey. Topic 3 was named as a domestic (Korean) chocolate company by Lotte Confectionery, Orion and Hate Confectionery. Topic 4 is named 2019's most-selling chocolate TOP10 by Ferreroche, Maltese, and Kinder Joy

4.3 syquins diagram

Until the chocolate recommendation interface is formed, managers collect chocolate data based on social media and analyze consumers' propensity to eat out. Finally, <Figure 4> summarizes the flow until the user uses the application.
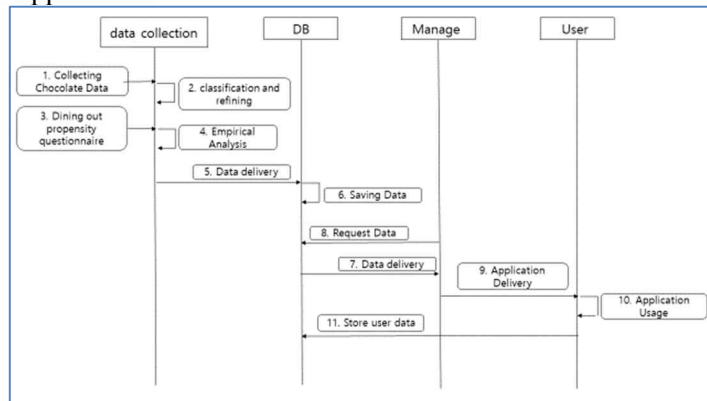

Figure 4. syquins diagram

Like <Figure 4>, managers collect data on chocolate and go through refining and sorting. In addition, it composes a survey of five factors that tend to consume dining outside. And survey consumers. The collected questionnaire is analyzed through SPASS 23.0. Collected chocolate data and data on restaurant consumption propensity are stored in the database. The database provides data at any time when the administrator requests the necessary data. Based on the data provided, the manager develops a system and suggests an application to recommend chocolate to the user. Through the application, users will receive chocolate information based on their preference for dining outside

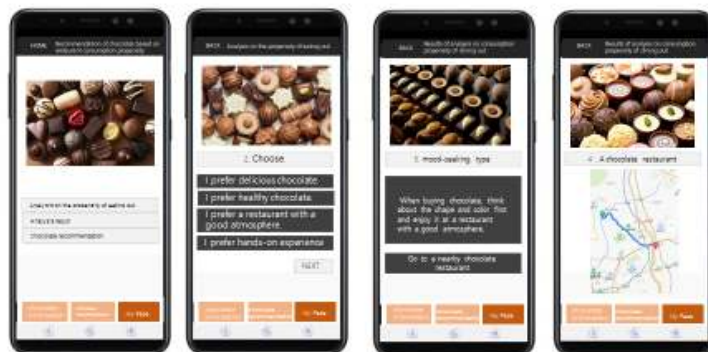### 4.4 chocolate recommendation application

Figure 5. Example of a chocolate-recommended application based on a hybrid web app

<Figure 5> is an example of a chocolate-recommended application. The first interface is divided into eating-out propensity analysis, analysis results, and chocolate recommendations on the screen when the app is launched. The second interface is a question to analyze users' propensity to eat out. The third interface informs consumers of their tendency to eat out as a result of analysis of their propensity to eat out. Finally, I recommend chocolate and chocolate shops that sell nearby.

5. Conclusion

In this paper, a chocolate recommendation application was proposed based on the propensity of eating out using social network data. Textom, a text mining big data analysis solution, was used to collect social network data. It was collected from the original text data of Naver and Daum, which people use the most. When collecting data, the keyword is chocolate. The collection period was from January 2019 to December 2019 and data was collected for about one year. These collected data were analyzed by deleting duplicate words. Then, the text mining analysis and related topics were extracted. In addition, based on prior research related to consumers' propensity to consume dining outside, the sub-factors of eating out were composed of health-seeking type, taste-seeking type, mood-seeking type, economic value-seeking type, and experience-seeking type. The questionnaire questions were organized and surveyed in accordance with these five factors. Finally, to shorten the time to recommend chocolate, we used the topic map modeling. As a limitation of this paper, first, it is not possible to generalize because there are few survey materials. Second, most people in our country think of chocolate from a confectionery company. And there is a strong perception that it is not good for the body. That's why they use the application mainly for chocolate lovers. Currently, there are many food-recommending applications, but not enough chocolate-recommending applications. Therefore, further surveys based on this study need to be conducted to collect additional data on the propensity to consume dining outside. Also, research is needed to expand to desserts rather than just applications that recommend chocolate.

Reference

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