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Culinary Business Recommendation Application Using Promethee-II Method

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***Abstract*— This research discusses the application that can help determine consumer segmentation and provide recommendations for culinary business, including its selling price. The technology used in this research is a GPS sensor, Google API and JavaScript Object Notation. An Android-based mobile application platform uses GPS sensors to determine the new business location. This research used the Promethee-II method for the recommendation process, and it was based on certain criteria, particularly the factors influencing consumers to purchase. Five criteria were applied, and eight alternatives were calculated. The application was developed with the waterfall model. Based on the results of the alpha testing and user acceptance test, it is concluded that the application which was successfully built could provide prospective business makers with information regarding recommended types of culinary businesses including their selling price, recommended business location, and information about the consumer segmentation.**

Keywords*— *customer segmentation; recommendation process; factors influencing consumers to purchase; mobile technology; business makers

1 INTRODUCTION

Micro, Small, and Medium Enterprise (MSME) is one of the business sectors that play significant roles in Indonesia's economic growth [1]. There are three kinds of creative industries within the MSME with the highest percentage in Indonesia: culinary, fashion, and craft [2].

Sundanese traditional food is one of the featured ethnic foods in Indonesia's culinary tourism. It has unique characteristics and represents the cultural identity of the Sundanese. There are many Sundanese restaurants with various concepts, ranging from casual to fine dining restaurants. During the holidays, a large number of tourists flock to Sundanese traditional restaurants, in this way, they help promote Bandung as a culinary tourism destination [3].

The traditional culinary industry is still primarily hereditary, with the scale of household business. Indonesia's food culture is shaped by several factors such as nature, history, and culture [4]. However, even though this business is constrained by management, knowledge, marketing, networks, technology, and capital, the business actors continue to run the business for years even though the business development is not significant [5].

Studying consumer behaviour including the buyer's responsibility for the success of a marketing system becomes very important because consumer behaviour is not static but continues to change, along with the factors that influence it. There are four factors that influence purchasing decisions: cultural, social, personal, and psychological [6]. It is necessary to understand specific consumer behavior while identifying the factors that influence them to buy a thing. For example, the factor that affects purchase intentions towards traditional foods can come from personal factors, external factors and the properties of the food itself [7]. Other than that, price, location, trust, comfort, product quality, service quality [8], and food tastes influence purchasing decisions in the culinary business [9].

The application in this research was made with a decision support system. The decision support system is an interactive information system that provides information, modelling, and manipulates data. The system is used to assist decisions in semi-structured situations and unstructured situations, where no one knows how decisions should be made. The method used for the recommendation system is the Preference Ranking Organization Methods for Enrichment Evaluations II, abbreviated as Promethee-II, which is participatory in nature [10] that offers users a flexible and straightforward way to analyze multi-criteria problems [11].

The Promethee-II method is suitable for use in the selection process [12][13][14]. In this research, this method is expected to be able to recommend a type of business to run by comparing the data results from the questionnaire with the population data in a sub-district to produce a relevant recommendation.

The prospective business makers often find it is difficult to determine which Sundanese traditional culinary business is potential. They also need to know the mapping of similar business that can be their competitors in an area. Thus, it is necessary to have an application that can help people who want to start a culinary business by recommending the most suitable culinary business at a particular location.

This research aims to assist prospective culinary entrepreneurs in determining consumer segmentation, the recommended selling price of Sundanese food, and the best-selling Sundanese menu in a certain location or place. The application is suitable for both website and android mobile, using the Promethee II method as a decision support system. This application is expected to be able to give recommendations for people who want to start a Sundanese culinary business.

1.1 Promethee-II method

This research uses the Promethee-II method to get a complete ranking of alternatives for a particular application. Procedural steps, such as those involved in the method, are as follows:

Step 1: Normalize the decision matrix using the following Equation (1):

$$R_{ij} = \frac{[x_{ij} - \min(x_{ij})]}{[\max(x_{ij}) - \min(x_{ij})]} \; (i = 1,2,\dots,n; j = 1,2,\dots,m) \quad (1)$$

where *Xij* is the *i*-th alternative performance measure concerning the *j*-th criterion. The usage of this equation can be seen in the discussion of the implementation of Promethee-II method.

For unfavorable criteria, Eq. (1) can be rewritten as that in Equation (2):

$$R_{ij} = \frac{[\max(x_{ij}) - x_{ij}]}{[\max(x_{ij}) - \min(x_{ij})]} \quad (2)$$

Step 2: Calculate the preference function, $P_j(i, i')$.

There are mainly six types of general preference functions as proposed by Brans and Mareschal. However, this preference function requires defining some preferential parameters, such as the threshold of preference and indifference. In real-time applications, it might be difficult for decision-makers to determine the specific form of which preference functions are suitable for each criterion and determine the parameters involved. The following simplified preference function is adopted here in Equation (3) and (4):

$$P_j(i, i') = 0 \; if \; R_{ij} \leq R_{i'j} \quad (3)$$

$$P_j(i, i') = (R_{ij} - R_{i'j}) if \; R_{ij} > R_{i'j} \quad (4)$$

Step 3: Calculate the aggregate preference function by considering the criteria weights of aggregated preference function as in Equation (5):

$$\pi(i, i') = \frac{[\sum_{j-i}^{m} W_j \, x \, P_j(i,i')]}{\sum_{j-i}^{m} W_j} \quad (5)$$

where *wj* is the relative importance (weight) of criteria *j*.

Step 4: Determine leaving and entering the outranking current as follows:

Leaving or positive flow for the *i*-th alternative using Equation (6),

$$\varphi^{+}(i) = \frac{1}{n-1}\sum_{i'}^{n}\pi(i,i') \qquad (i \neq i') \tag{6}$$

Entering or negative flow for the alternative *i*-th using Equation (7)

$$\varphi^{-}(i) = \frac{1}{n-1}\sum_{i'}^{n}\pi(i',i) \qquad (i \neq i') \tag{7}$$

where *n* is the number of alternatives.

Here, each alternative faces (*n* - 1) several other options. Leaving flow states how much an alternative dominates other alternatives while entering flow shows how much other alternatives dominate an alternative. Based on this outranking flow, the Promethee-II method can provide a complete preorder using a clean flow, even though it loses much information about the preference relationship.

Step 5: Calculate net outranking flow for each alternative using Equation (8).

$$\varphi(i) = \varphi^{+}(i) - \varphi^{-}(i) \tag{8}$$

Step 6: Determine the ranking of all alternatives considered depending on the value φ (*i*). The higher the value φ (*i*), the better the choice. Thus, the best option is one that has the highest φ (*i*) value.

1.2 Technology Used in this Application

In the order of the making, here is the list of the technology used in this research:

1. GPS sensor

A G*lobal Positioning System* is a device receiver aiming to get coordinates that will provide coordinates and determine the user's device position. GPS is a location-based service for providing information about the position of a device or a user [15]. GPS is also used for geographic information systems that map culinary in Indonesia [16]. In this research, the GPS sensor determines the location that the user visits to determine the number of current restaurants.

2. Google API

Google API is a set of application programming interfaces developed by Google that enables communication with Google services and their integration into other services. Third-party applications can use this API to utilize or extend existing service functionality. The services used in developing this application are Google SDK for Android, Google maps JavaScript, place API, and geocode, which is the reverse geocode.

Geocode is a matching process between an address to a geographical location. In the form of longitude and latitude, or a local census area, reverse geocoding changes the geographical coordinates, latitude, and longitude into physical addresses that humans can read [17]. This process is critical in getting sub-districts and villages obtained from input in latitude longitude, which is a combination of lat and long previously obtained from GPS or long clicks to get new lat longitude.

3. JavaScript Object Notation

JavaScript Object Notation (JSON) is currently one of the most popular formats for exchanging data on the Web [18]. JSON is a text format that does not depend on any programming language. JSON is a data-interchange format that can easily convert server-side data structures into JavaScript object data format [19]. These characteristics make JSON ideal as a data-exchange language [20].

2 METHOD

As for the method, this research was conducted in two stages: data collection and software development. To build the application, it applies the software development life cycle with a waterfall model, often used when building applications [21]. The waterfall model is suitable for project management [22] and software development. The whole system model can be seen in Figure 1.

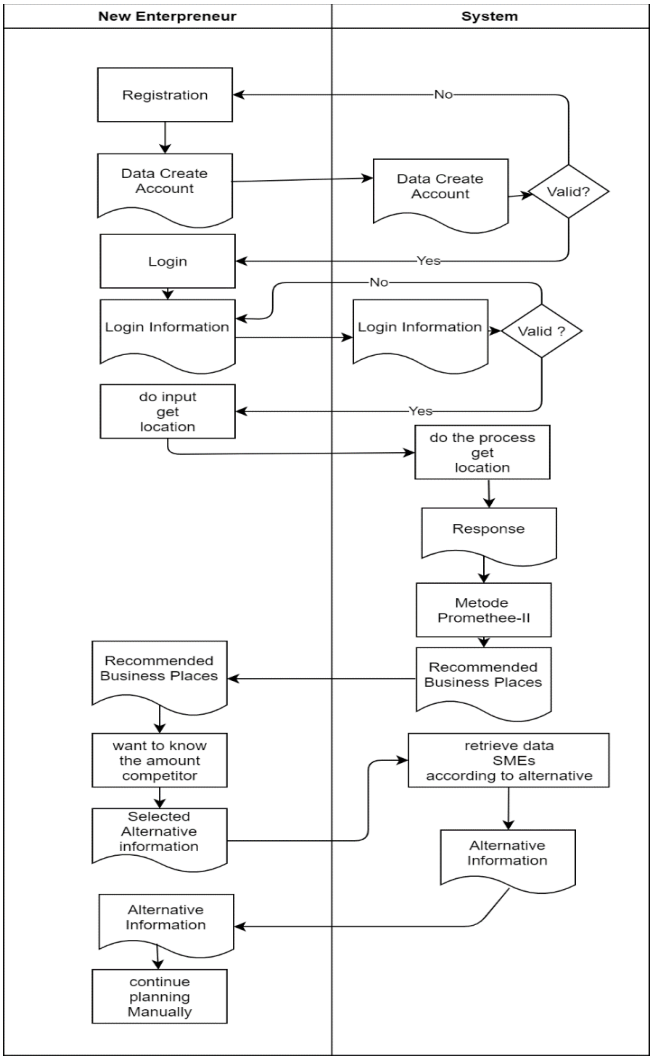

Figure 1. The model of the whole application

The system was built with two web and mobile networks, plus one API system for mobile devices. The web system served to process the data, so they were adequately maintained. The cellular system functioned as a medium for prospective business makers to get recommendations and materials to be negotiated in the planning process when doing business. Meanwhile, the mediator between the processing of the mobile application and the database was the API system that outputs JSON, where all cumbersome processes would be run. The architectural picture is depicted in Figure 2 as follows:

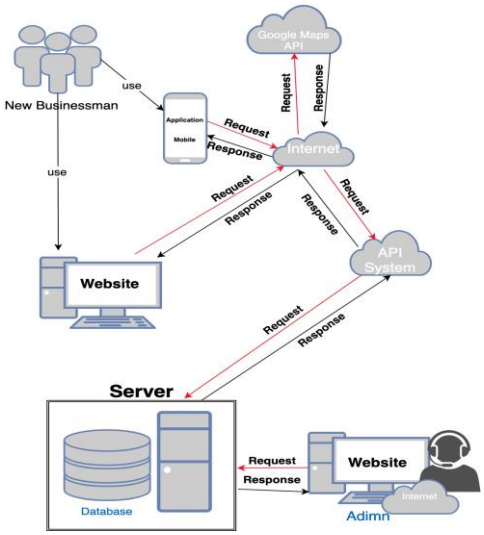

Figure 2. The architecture system of this research

3 RESULT AND DISCUSSION

3.1 Promethee-II Method Implementation

In the process of giving recommendations, five criteria were considered. They were based on the factors that influence consumers the most when buying traditional snacks [23]. The five criteria are gender (C1), marital status (C2), education (C3), profession (C4), and age (C5) (Figure 3).

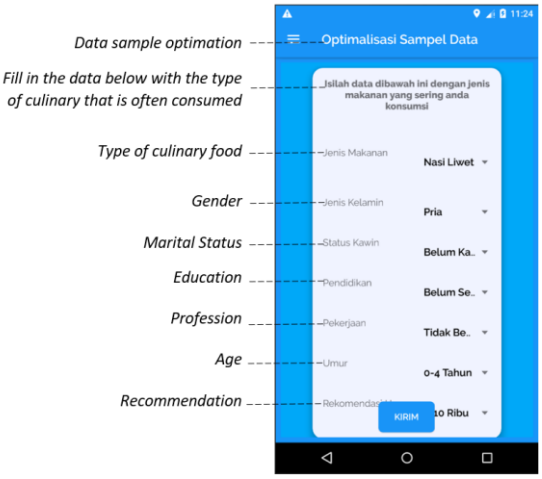

Figure 3. Optimization of data sample of criteria

Every user who wanted to register and created an account on the application was asked to fill in the data related to the five criteria to optimize the sample data. The data usage model can be seen in Figure 4.

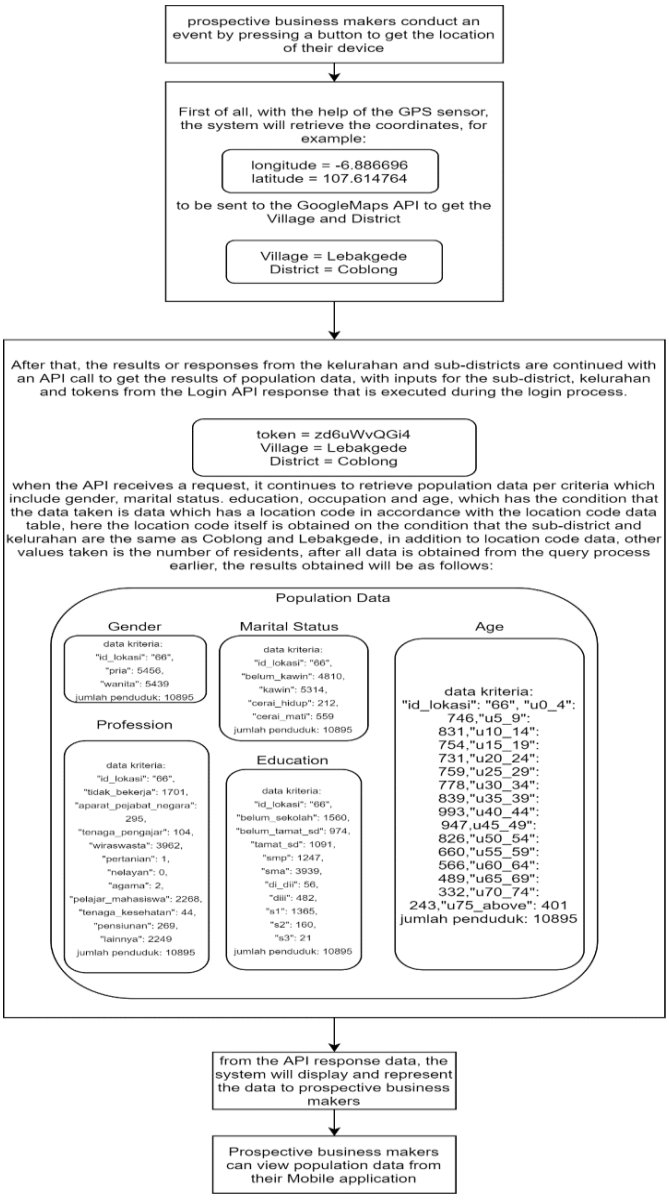

Figure 4. Data model for criteria

There are eight alternatives were used as materials for the recommendation obtained from the results of the questionnaire distributed in the city of Bandung as the target location, including Liwet Rice, Batagor, Seblak, Lotek, Kupat Tahu, Surabi, Siomay, and Timbel Rice. Below is the coding of the alternatives:

A1 = Nasi Liwet	A2 = Batagor
A3 = Seblak	A4 = Lotek
A5 = Kupat Tahu	A6 = Surabi
A7 = Siomay	A8 = Nasi Timbel

Before using the Promethee-II method, the system requires some data input to determine the weight of each criterion using Equation (9):

$$N(C_i\ A_j) = \frac{(\sum_{k=1}^{n(Ci)} Fc_k(C_i) * Fc_k(C_i\ A_j))}{(Jp * Js(Aj))} \quad (9)$$

$N(C_i\ A_j)$= value of a criterion in the alternative
$Fc_k(C_i)$ = The k criteria field of the i criteria
$Fc_k(C_i\ A_j)$= The k criteria field of the i criteria with j alternative
Jp = Number of populations
Js (*Aj*) = Number of samples from j alternative
n (*Ci*) = Total number of fields of a criterion

The calculation of each field the criterion in the alternative can be seen in Table 1.

Table 1. Population Data Subject to Marital Status (C2)

Not Married (Fc_1)	Married (Fc_2)	D.ivorce (Fc_3)	Divorced by death (Fc_4)
4810	5314	212	559

Total population (*Jp*): 10.895

The sampled population according to their marital status can be seen in Table 2.

Table 2. Population Sample Data Subject to Marital Status in Alternative 1 (C2A1)

Not Married (Fc_1)	Married (Fc_2)	Divorce (Fc_3)	Divorced by death (Fc_4)
0	5	0	0

Total population samples (*Jp*): 5

When entered into the formula, the calculation is as follows:

$$N(C2A1) = \frac{(4810 * 0) + (5314 * 5) + (212 * 0) + (559 * 0)}{(10895 * 5)} = 0.4877466727856815$$

This calculation was conducted until it obtained all the values from *N* (*C*1*A*1) to *N* (*C*5*A*8), as shown in Table 3.

Table 3. Alternative Values by Criteria

X	i	1	2	3	4	5
j	**N**	**C1**	**C2**	**C3**	**C4**	**C5**
1	A1	0.49953	0.48775	0.31429	0.24920	0.07411
…	…	…	…	…	…	…
8	A8	0.50015	0.48775	0.15633	0.20642	0.06667

After determining the weight above, Promethee-II method was applied. The first step was to normalize using Formulas 1 and 2. The calculation results can be seen in Table 4.

Table 4. Maximum and Minimum Value

Criteria	Maximum value (max(*X*))	Minimum value (min(*X*))
C1	0.50078 (X_{17})	0.49953 (X_{11})
C2	0.48775 (X_{21})	0.44149 (X_{26})
C3	0.31429 (X_{31})	0.13812 (X_{34})
C4	0.30111 (X_{46})	0.16630 (X_{43})
C5	0.08156 (X_{54})	0.05819 (X_{55})

From here, the max formula for normalization was used with the following example calculation:

$$R_{11} = \frac{[X_{11} - \min(X_{11})]}{[\max(X_{17}) - \min(X_{11})]}$$

When applied in the formula, the following calculation was formulated:

$$R_{11} = \frac{[0.49953189536484627 - 0.49953189536484627]}{[0.5007801743919229 - 0.49953189536484627]} = 0$$

The calculation results can be seen in Table 5.

Table 5. Value After Going Through the Normalization Process

	C1	C2	C3	C4	C5
A1	0	1	1	0.61492	0.68107
…	…	…	…	…	…
A8	0.50000	1	0.10336	0.29766	0.36292

An alternative evaluative difference was calculated concerning other alternatives. This step involved calculating the difference in the value of the criteria between various alternatives, while the example calculation is as follows *D* (*A*1-*A*2) in criterion *C*1.

Here the *A*1 value in *C*1, 0, and the *A*2 value in *C*1, were 0.4999999999999997774, so the following calculation was done:

D (*A*1-*A*2) in *C*1 =*A*1 in *C*1 - *A*2 in *C*1
= 0 - 0.49999999999997774
= -0.4999999999999777474

This calculation was carried out up to *D* (*A*8-*A*7), while for the calculation of *D* (*A*1-*A*2) is done for each criterion, so as to produce the values in the following Table 6:

Table 6. D (A1-A2) Values for Each Criteria

	C1	C2	C3	C4	C5
D(A1-A2)	-0.50000	0.40000	0.29280	0.08401	-0.10526

After that, this research used preference, *Pj* (*i*,*i*') as given on Formula 3 and 4. Formula 3 was for D(Ma-Mb) ≤ 0 and formula 4 was when D(Ma-Mb) > 0. If the result was less than 0, it would be 0, and if it was more than and equaled to 0, then the value would remain. Sample calculation from the formula above in *P* (*A*1-*A*2) in *C*1 criteria is as follows:

First, the researched took the *D* (A1-A2) value of *C*1, and here was the value *D*(*A*1-*A*2) = -0.49999999999997774.
Then, formula constraints were entered, as follows:

D(*A*1-*A*2) ≤0

After that, the value was entered. If the value and boundary value are true, then the formula will be applied in accordance with the law described above. The following is the calculation in this research:

-0.49999999999997774 ≤ 0 (true)

Therefore, the value was *P*(*A*1-*A*2) di *C*1 = 0
These steps were repeated. The values obtained can be seen in Table 7:

Table 7. D (A1-A2) Values for Each Criteria

	C1	C2	C3	C4	C5
P(A1-A2)	0	0.40000	0.29280	0.08401	0

Then, the aggregate preference function was calculated by considering the weight of the criteria. It should be seen that there had to be a weight (w) as a priority criteria reference. For example, if we have 0.2 as a weight, it produces 1, using the formula in Equation 5. Here, actually $\sum_{j-i}^{m} W_j$ will always be equal to 1, because the weight itself is a total of 100% of all criteria. The values found in this research is described in Table 8:

Table 8. Weight per Criteria

Criteria (C)	Type of Criteria	Weight (w)
C1	Gender	0.2 (20%)
C2	Marital Status	0.2 (20%)
C3	Education	0.2 (20%)
C4	Profession	0.2 (20%)
C5	Age	0.2 (20%)
	Total	1 (100%)

Therefore, the formula was used as that in Equation (10):

$$\pi(i, i') = [\sum_{j-i}^{m} W_j \; x \; P_j(i, i')] \qquad (10)$$

From the formula above, the first thing to do was to get the value of each *W_j* x *P_j* (*i*, *i* '), then we first multiplied the weight and the preference result in line *P* (*A*1-*A*2):

Wj* P(A1-A2) on C1 = 0.2*0 = 0
Wj* P(A1-A2) on C2 = 0.2*0.40000000000000047= 0.08
Wj* P(A1-A2) on C3 = 0.2*0.2927998332812338 = 0.058559966656247
Wj* P(A1-A2) on C4 = 0.2*0.08401416122004357 = 0.016802832244009
Wj* P(A1-A2) on C5 = 0.2*0 = 0

After that, the researcher added the results to get the findings in each criterion for one alternative. Below is the calculation:

Wj* P(A1-A2) = $[\sum_{j-i}^{m} W_j \; x \; P_j(i, i')]$ =

$$W_1 \; x \; P_1(A1 - A2) + W_2 \; x \; P_2(A1 - A2) + W_3 \; x \; P_3(A1 - A2) + W_4 \; x \; P_4(A1 - A2) + W_5 \; x \; P_5(A1 - A2)$$

(0) + (0.08) + (0.058559966656247) + (0.016802832244009) + (0)
= 0.1553627989002556

This calculation was done until it reached the last row of the preference. The results can be seen in Table 9:

Table 9. The Aggregate Value Preference Function

	A1	A2	A3	A4	A5	A6	A7	A8
A1	-	0.15536	0.23568	0.45469	0.22424	0.28569	0.39236	0.30641
…	…	…	…	…	…	…	…	…
A8	0.10000	0.08000	0.18953	0.22326	0.09492	0.2	0.16000	-

Next, determine the current leaving and entering outranking using Formulas 6 and 7. The example of leaving value can be seen as follows:

$$\varphi^{+}(A1) = \frac{1}{n-1} \sum_{x=1}^{n} \pi(A1 - Ax) \quad (A1 \neq Ax)$$

Where:
When *A*1 = *Ax*, the value is not calculated

n = 8, is the number of alternatives in iteration $\sum_{x=1}^{n} \pi(A1 - Ax)$ can also be described to be $\sum_{i=0}^{n}(W_i \; x \; P_i(A1 - Ai))$

$$\varphi^{+}(i) = \frac{1}{8-1}((0) + (0.1553627989002556) + (0.23568326965439526) + (0.45469406065647017) + (0.22424507658643336) + (0.2856920379920375) + (0.39236371963546623) + (0.3064092543320394))$$

= 0.293492888251014

The example of entering value is the difference from leafing value, by reversing between $\sum_{x=1}^{n} \pi(A1 - Ax)$ to $\sum_{x=1}^{n} \pi(Ax - A1)$ such as entering value at A1 is =

$$\varphi^{-}(i) = \frac{1}{8-1}\big((0) + (0.12105263157894287) + (0.05000000000000222) + (0.05000000000000222) + (0.17536040557446908) + (0.17701525054465783) + (0.2) + (0.09999999999999555)\big)$$

= 0.12477546967115283

The calculation continued until all the results were found (Table 10):

Table 10. Leaving Value and Entering Value

$\varphi^{+}(i)$	$\varphi^{-}(i)$
0.29349	0.12478
…	…
0.14967	0.21685

Finally, the researcher calculated the net outranking flow for each alternative using Equation 8. The data obtained are given in the following Table 11.

Table 11. Net outranking value

$\varphi^{+}(i)$	$\varphi^{-}(i)$	$\varphi(i)$
0.29349	0.12478	0.168721
…	…	…
0.14967	0.21685	-0.06718

The result of this method is culinary recommendation by producing ranking from highest to lowest according to many alternatives (Table 12):

Table 12. Ranking Results

$\varphi(i)$	Ranking	Alternative	Alternative Name
0.16872	1	A1	Nasi Liwet
0.12950	2	A2	Batagor
-0.0435	5	A3	Seblak
-0.2938	8	A4	Lotek
0.11285	3	A5	Kupat Tahu
0.04452	4	A6	Surabi
-0.05113	6	A7	Siomai
-0.06718	7	A8	Nasi Timbel

Therefore, if sorted according to ranking and alternative names, the data obtained were as those in Table 13:

Table 13. Results of Promethee-II Recommendation

Ranking	Alternative	Alternative name
1	A1	Nasi Liwet
2	A2	Batagor
3	A5	Kupat Tahu
4	A6	Surabi
5	A3	Seblak
6	A7	Siomai
7	A8	Nasi Timbel
8	A4	Lotek

3.2 System Implementation

A use case was performed in order to formulate a conceptualization of the needs analysis, and in the process, it used Unified Modeling Language [18]. In general, every feature in this API was called according to the use case in the mobile system, with the GET method. A key parameter was needed to indicate that the user had entered the system.

Figure 5 shows the stages of recommending business alternatives generated by the application. Interface implementation is a picture of the system interface built before in the interface design. The system interface built is the Android mobile-based front end and the web-based back end. Implementation of the interface in the front-end application can be seen in Figure 6 up to Figure 9.

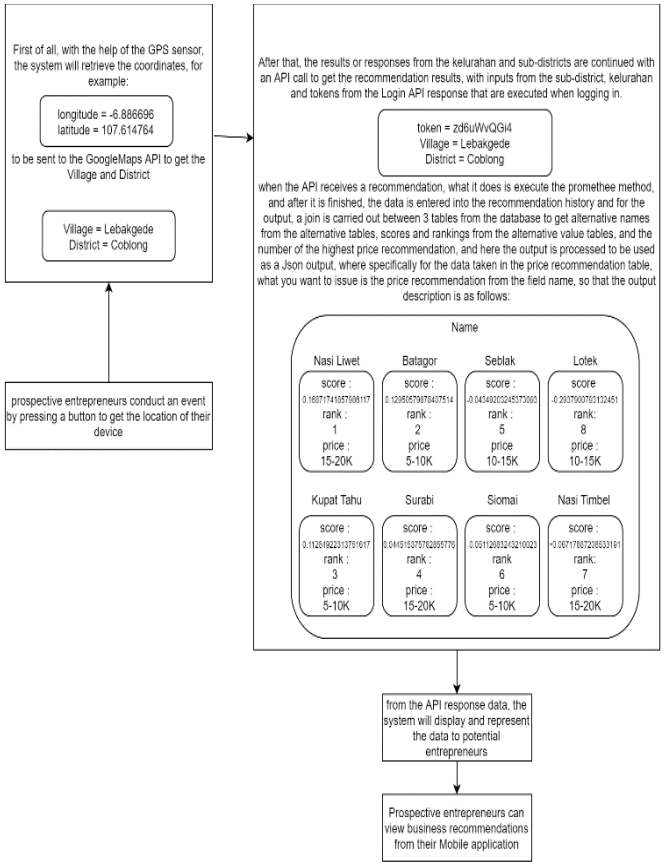

Figure 5. Stages of recommending business alternatives

Figures 5 until 8 show the main features of the mobile-based application, which is a page that shows business recommendations, then a page that shows business competitors around, and a page that displays data about the population. The display of results in the mobile application can also be viewed through a website-based application. This can be done using the application programming interface. Every data that became the criteria was stored in a database on the website server. The recommendation results displayed on a website can be seen in Figure 10. The website can be used by administrator users to process MSME data and process population data in each region. Population data was used in calculation using Promethee II, while business data for MSMEs is used to determine competitors in a selected area.

To connect between website applications and mobile-based using the API, the Reverse Geocode API was implemented to change the coordinates—in this case, latitude and longitude into readable addresses, which would later be taken to be only sub-districts and villages.

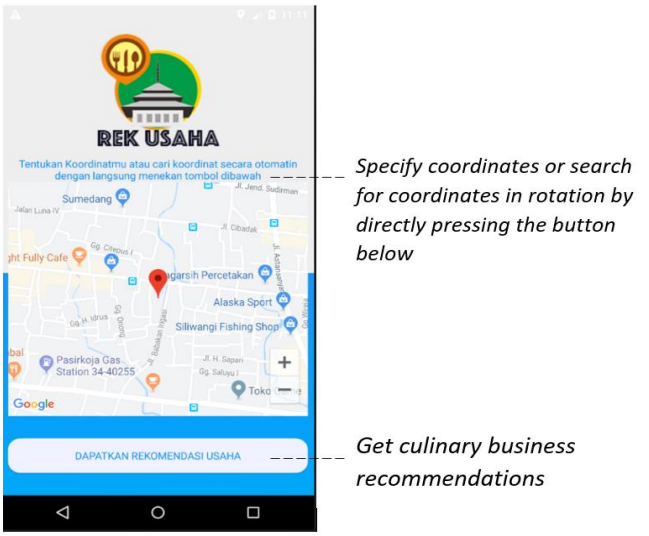

Figure 6. Mobile app main page

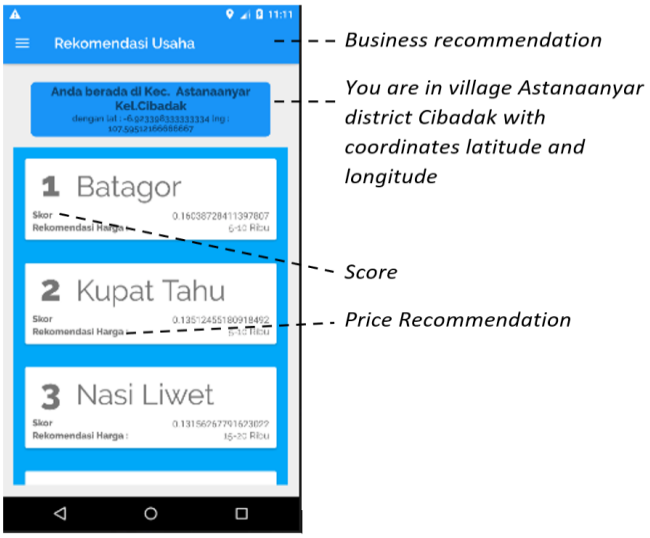

Figure 7. Culinary recommendation display

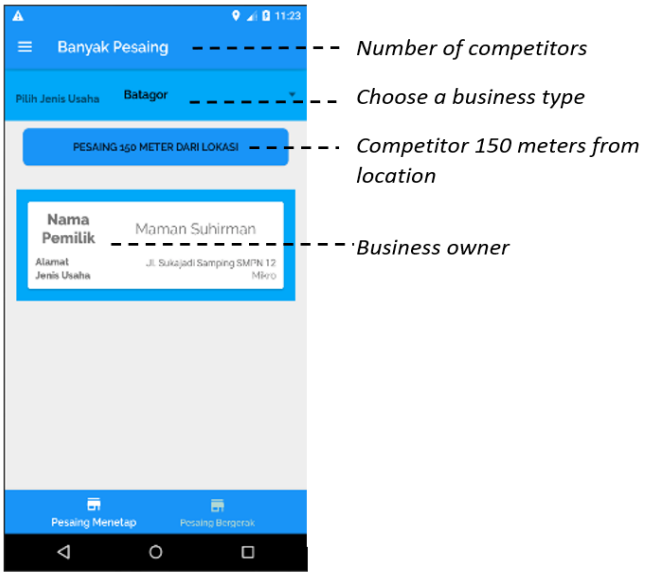

Figure 8. Business competitor display

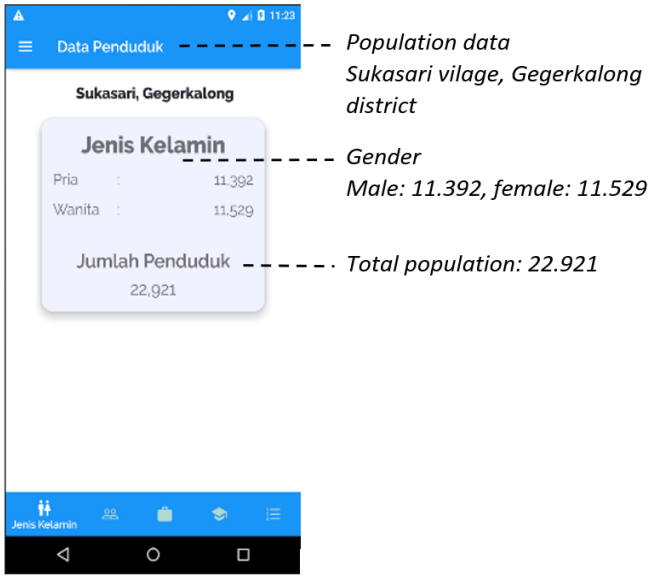

Figure 9. Population data display

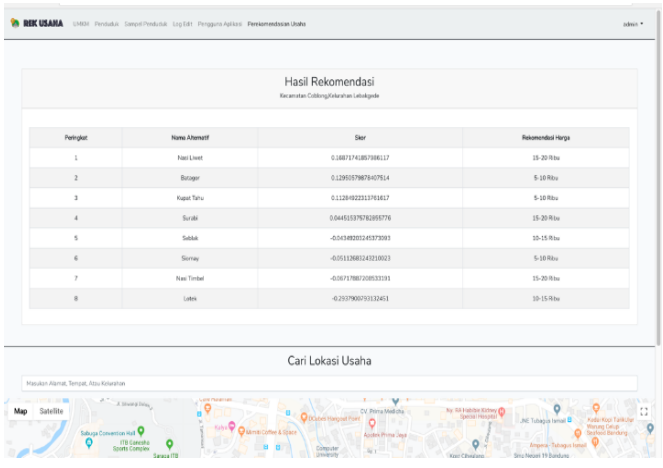

Figure 10. Implementation of the main features interface of the website

As for all data processing carried out in the main activity data model, the calling of the Async process had been facilitated by using the Android Asynchronous HTTP Client, which was enough to add dependencies. With this use, the sub-districts and villages could be obtained with the display that appears as shown in Figure 11.

The Place API Implementation was to capture business places based on the type of business selected in the range of 150 meters. It displayed the results as shown in Figure 12.

3.3 System Testing

The black box testing focuses on the performance of the system's functionality [18]. This method has two testing stages: alpha testing and beta testing. Alpha testing focuses on the functionality of the system that is built, which is done directly by the manufacturer or the creator of the environment itself [19]. A beta testing was carried out by a group of users who tried all features in the application to provide feedback and suggestions on its functionality [20]. In the Alpha testing, the black box's performance testing was done directly by the researcher with a test plan which had been previously designed.

Figure 11. Display the use sub-districts and villages values

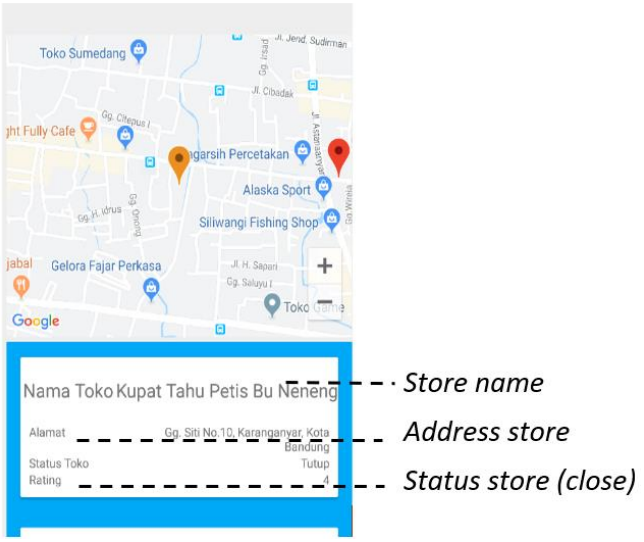

Figure 12. Display the Places API implementation

In this research, the alpha test results are shown in the main features, and the details can be seen in Table 14. Whereas, the main test results on the website are described in Table 15.

Based on the Alpha test results, the systems ran as expected. This application could be downloaded in Google Playstore. To be able to see direct feedback from the users, the application was uploaded to the Playstore account.

Table 14. Results on the recommendation feature on the mobile application

Cases and Test Results (Correct Data)			
Data Input	**Expected results**	**Observation**	**Conclusion**
Tap location from user Latitude: -6,8869 Longitude: 107,6153	Will bring up a recommendation page with the results of the recommendation	Bring up a recommendation page with the results of the recommendation	accepted
Cases and Test Results (Incorrect Data)			
Data Input	**Expected results**	**Observation**	**Conclusion**
Tap location from user Latitude: -6,8972891 Longitude: 107,5153716	Will bring up an alert "sorry, the sub-district of South Cimahi, Cibeber sub-district is not yet available in the entrepreneur application"	Bring up an alert "sorry, the sub-district of South Cimahi, Cibeber sub-district is not yet available in the entrepreneur application"	accepted

Table 15. Results on the recommendation feature on the website

Cases and Test Results (Correct Data)			
Data Input	**Expected results**	**Observation**	**Conclusion**
Tap location from user Latitude: -6,8869 Longitude: 107,6153	Will bring up a recommendation page with the results of the recommendation	Bring up a recommendation page with the results of the recommendation	Accepted
Cases and Test Results (Incorrect Data)			
Data Input	**Expected results**	**Observation**	**Conclusion**
Tap location from user Latitude: -6,8972891 Longitude: 107,5153716	Will bring up an alert "sorry, the sub-district of South Cimahi, Cibeber sub-district is not yet available in the entrepreneur application"	Bring up an alert "sorry, the sub-district of South Cimahi, Cibeber sub-district is not yet available in the entrepreneur application"	Accepted

The application could be searched with the name "Rek Usaha" uploaded to the "Eko1819-2" account. Fig. 13 shows the app description. User acceptance test was conducted by distributing questionnaires to 20 respondents. The respondents were prospective business makers who intended to start a type of business (Table 16).

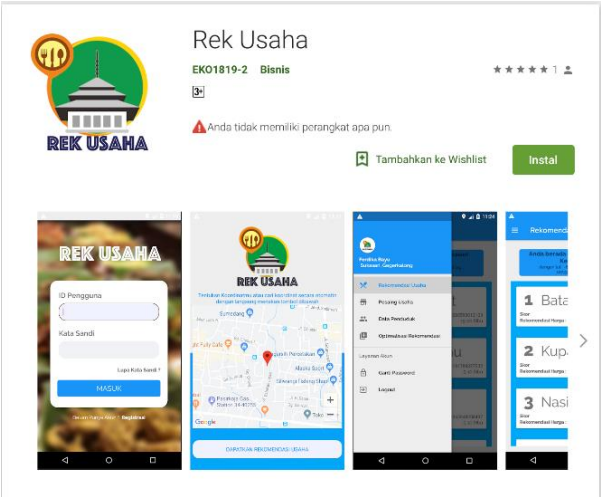

Figure 13. Application in Playstore

Table 2. Questionnaire Results

No.	Question	Respondents' Answers					Total
		SS	S	RG	TS	STS	
1	Do you agree that the existence of this application can help you determine your consumer segmentation?	7	11	2	0	0	85 % agree
2	Do you agree that the existence of this application can help you determine what type of business you will make?	9	10	1	0	0	88 % agree
3	Do you agree that the existence of this application can help you determine the price to be the benchmark selling price?	11	7	2	0	0	89 % agree

From the beta testing results, the application could help prospective business makers determine the segmentation of consumers. It could also help determine the type of business, and provide price recommendations for the business.

To measure the concurrency level of the built API system, Apache Jmeter tools was used. This handy tool could test the robustness of the API. The results obtained were a one-time execution limit of 21 users, with details in Table 17.

Table 17. Concurrency Test Results

Samples	Latest sample	Average	Deviation
10	2003	1748	400
15	3052	2287	520
20	3087	2346	571
21	4074	3152	677

4 CONCLUSION

The results from the calculation using the Promethee II method such as the one used in this research may differ from one region to another. This is because the data that become the criteria in each region are also different. It concludes that the application that had just been built can help prospective culinary businessmen or businesswomen determine consumer segmentation, the recommended selling price of Sundanese food, and the types of most favorable Sundanese menu in a particular location or place. Future research will focus on improving the computational process so it can be used in other areas with different alternatives and assessment criteria.

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AUTHOR CONTRIBUTION

Eko Budi Setiawan's role is data collector, analyzes the system and writes articles. Ferdika Bayu Herlambang is a software developer who developed the application. Angga Setiyadi tested the application. All authors work together to produce scientifically acceptable writing.

COMPETING INTEREST

There is no competing interest in this research.

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