Application to consider the selection of restaurants in Merauke Regency based on AHP

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Abstract. The development of Merauke Regency, followed by population development which also requires entertainment facilities such as restaurants, especially when gathering with large families from outside the city. The existence of several choices can make a doubt especially for events that are very rare with family. This study aims to create an application to assist in choosing restaurants based on the criteria of price, convenience and strategic location. The method used is AHP.

1. Introduction

The growing number of Merauke regencies, which can be seen from the increase in population and facilities and infrastructure, will certainly have an impact, including the emergence of new restaurants in the past few years. The restaurant offers cuisine with distinctive flavors, and of course at competitive prices [1].

For the people of Merauke, there may not be many who often go to restaurants, but sometimes want to occasionally eat typical dishes of restaurants in Merauke Regency. In addition, they also entertain family members from outside the city to eat food in the restaurant because of several factors such as cleanliness and comfort to give a good impression, especially if it is a very rare event [2].

The price, convenience and strategic location of the restaurant are two things considered to choose a restaurant, especially if the number of dishes to be ordered is quite a lot. If the excess budget is owned, it is possible for the community to choose the most expensive food house, but if the budget is limited, then of course restaurants will be chosen for the type of cuisine and the price is more friendly with the available budget. Therefore, the author tries to do research to make an application that is expected to help in comparing the types and prices of cuisine in several restaurants in Merauke Regency with the AHP method. The purpose of this research is to help people choose restaurants with strategic locations after the available budget [3,4].

2. Methodology

In this study, a sample of 3 easily accessible restaurants in Merauke City, namely Mega Rasa Restaurant, Seafood Restaurant and Kazoari Restaurant was taken. The method of data collection is to ask directly the price of food contained in the restaurant, while the method used to process decision
recommendations is the Analytical Hierarchy Process (AHP) method with the stages of the AHP model as follows [3,4].

Step 1: Form the hierarchy structure by identifying the objective, decision criteria and alternatives. Figure 1 shows the hierarchy level with top-level (main objective or main problem), middle level (decision criteria) and bottom level (decision alternatives).

![AHP Hierarchy Structure](image)

**Figure 1. AHP Hierarchy Structure**

Step 2: Conduct pairwise comparison for each element in middle and last level to obtain the relative importance of the elements. The pairwise comparison scale is shown below [5].

| Scale | Definition          |
|-------|---------------------|
| 1     | Equal Importance    |
| 3     | Moderate Importance |
| 5     | Strong Importance   |
| 7     | Very Strong Importance |
| 9     | Absolute Importance |
| 2, 4, 6, 8 | Intermediate importance |

Step 3: Develop the pairwise comparison matrices. If there are p numbers of decision criteria, there will be one (pxp) matrix. If there are q numbers of decision alternatives, there will be p numbers of (qxq) matrices that is comparison of each alternatives with respect to each criteria. The comparison matrix is as shown below [6].

\[ A = \begin{bmatrix}
    c_{11} & c_{12} & \ldots & \ldots & c_{1a} \\
    1/c_{12} & c_{22} & \ldots & \ldots & c_{2a} \\
    \ldots & \ldots & \ldots & \ldots & \ldots \\
    \ldots & \ldots & \ldots & \ldots & \ldots \\
    1/c_{1a} & 1/c_{2a} & \ldots & \ldots & c_{aa} \\
\end{bmatrix} \]

\( c_{ij} \) represents the degree of preference of element i to element j

Step 4: Apply the normalization method to calculate the weight of decision criteria and decision alternatives. New normalized matrices are formed by dividing each element in the column by
column’s sum. Next, the average of row represents the weight or priority of the decision criteria and decision alternative.

Step 6: Check for consistency ratio (CR) as shown below

\[ CR = \frac{c_{ij}}{RI} \]

Table 2. Random Index

| N | RI |
|---|----|
| 2 | 0.00 |
| 3 | 0.58 |
| 4 | 0.9 |
| 5 | 1.12 |
| 6 | 1.24 |
| 7 | 1.32 |
| 8 | 1.41 |
| 9 | 1.45 |
| 10 | 1.51 |

3. Results and discussion

In making the application to support the comparison decision of this restaurant, 3 criteria are determined, namely price, convenience and strategic location. These three restaurants were chosen because they were well known by the community and also on the main road of Merauke Regency, namely Jalan Mandala [2,7].

Figure 2. Application Chart

The first step is the writer determines the degree of value based on the questionnaire of several people, namely:

a. Price Criteria is worth 1
b. The Comfort Criteria is worth 2
c. Location Criteria is worth 4
From the above comparison a matrix can be made:

**Table 3. Comparison matrix**

|       | Price | Convenience | Place |
|-------|-------|-------------|-------|
| Price | 1     | 0.5         | 0.25  |
| Convenience | 2   | 1           | 0.5   |
| Place  | 4     | 2           | 1     |

when made into a matrix obtained:

\[
\begin{bmatrix}
1 & 0.5 & 0.25 \\ 2 & 1 & 0.5 \\ 4 & 2 & 1 \\
\end{bmatrix}
\]

Through the AHP process, the eigenvector value is obtained from the matrix:

\[
\begin{bmatrix}
0.2 \\ 0.35 \\ 0.44
\end{bmatrix}
\]

When looking for the next eigenvector value is:

\[
\begin{bmatrix}
0.21 \\ 0.36 \\ 0.43
\end{bmatrix}
\]

**Figure 3. Application**

4. **Conclusion**

Based on trials by several users, in their opinion, this application is indeed quite helpful in providing recommendations as a consideration, although this application has not shown photos of recommended restaurants.

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