Decision Support System in Recommending Climbing Tourism Destinations with Profile Matching Method

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Abstract. Climbing is one of the extreme sports categories and recreational activities that are in great demand in the last decade, especially teenagers. Climbing offers a different sensation and challenge from other sports, besides this sport also offers a beautiful view when the climbers have reached the top of the mountain that is intended, of course, also improves fitness and health. The purpose of this study is to provide climbing tourism destination recommendations to groups of organizations and individuals who have a hobby or are the first to want to do this sport. Data collection in this study was carried out by giving questionnaires to 3 groups of nature lovers organizations, each organization was given 10 questionnaires. In this study, there are 5 alternatives used, including Mount Jaya Wijaya, Mount Ijen, Mount Kerinci, Mount Rinjani and Mount Bromo with 6 Criteria, including Beauty, Altitude, Location, Cost and Pathway. Based on calculations using the Profile Matching method, the results are obtained that Mount Rinjani is a recommended climbing tourism destination.

1. Introducing

Climbing is a trip that has the purpose of getting to the top of the mountain, climbing is also included in the category of extreme sports and recreational activities that are in great demand, especially young people. Climbing is also one of the new hobbies that are being loved lately, usually done by people who love adventure and natural organizations. A climber usually has a reason why he wants to be involved in this activity. For example, this sport has its own challenges that make it feel its own satisfaction because it can conquer the mountain, and can also be integrated with nature. However, in undergoing this sport it is necessary to pay attention to safety factors because usually, the road that will be traversed is quite difficult and steep, so information is needed before heading to the mountain to be climbed both the route, location distance, mountain height and so on [1]. In recent decades, the sport of climbing has received considerable attention from the community. This is because climbing sports for enthusiasts offer sensations and challenges that are different from other sports, besides this sport also offers a beautiful view of the climbers have reached the top of the mountain that is intended, of course, can also improve fitness and health [2]. However, the many mountains in Indonesia that can be used as a climbing tourist destination, make the fans of this sport confused. Therefore we need a system that can recommend climbing tourism destinations in Indonesia, as information for beginners and who are used to climbing. There are many branches in the field of computer science that are able to solve complex problems, this is evident from the many studies that have been done, such as research in the field of data mining [3]–[10], the field of artificial
neural networks [11]–[24], and the field of decision support systems [25]–[32]. Based on this explanation, researchers used a decision support system to resolve the above problem. In this case, the researcher uses the Profile Matching method, because this method is one of the decision support system methods that works by comparing the GAP between Alternative values and criteria. There are several things that are known about GAP Analysis, one of which is a table of GAP weight values. In addition, this GAP analysis must also understand the concept of Priority Scale, because in making weights with a range of 0-5 based on the priority of each criterion.

Many previous studies discuss the profile matching method, including research propose a privacy-preserving multi-hop profile-matching protocol for Proximity-based mobile social networks (PMSNs) [33]. In this study, the profile matching method can be applied well. Subsequent research discusses the method of matching profiles to resolve the selection problem to a decision. This study uses 5 sample data, each of which has its own credit score. This study divides credit scores between 1 and three where number 1 becomes the lowest value (worst) while number 3 is the highest value (best) [34]. In this study, the profile matching method can also be applied well. Subsequent research Using the Profile Matching Method to Employee Position Movement. The position of employee mutations discussed in this study is in Tanggamus Regency. This research generates a ranking sequence of prospective employees who have good performance that has been selected, and the output of the application can help decision-makers (Decision makers) to choose an alternative task transfer or employee office mutation in Tanggamus Regency in order to increase employment and better performance better at a new workplace again. Based on this background, the research was conducted. It is expected that by using this Profile matching method, the results will be obtained in the form of recommendations for climbing tourism destinations to groups of organizations and individuals to be used as information before climbing activities.

2. Methodology

2.1. Method of collecting data

The data collection techniques in this study are:

a. Library Research (Library Research), which uses the library as a means to collect data and make books as references relating to research cases.

b. Field Research (Field Work Research) is research conducted directly using several techniques, namely as follows.

1. Questionnaire
   The questionnaire is the process of collecting data or information by giving a question or statement to someone else. The author gives questionnaires to several members of the nature lovers community in the city of Denpasar.

2. Interview
   The Interview is the process of collecting data face-to-face between the questioner and the questioner or answerer who aims to get the right information from a trusted resource person (nature lover community).

2.2. Data analysis

Data analysis in this study uses quantitative analysis. The data analysis technique used is the type of inferential statistics. Inferential statistics are statistics relating to data analysis (samples), then conclusions are generalized to the entire population and used to draw inference from sample to population.

2.3. Research Location and Data Collection Time

The location of the study was conducted in the city of Denpasar, with the time of data collection conducted from November 21 to December 4, 2019.
3. Results and Discussion

Profile Matching Method is one of the simplest methods in decision support systems by comparing the GAP between Alternative values and criteria. There are several things that are known about GAP Analysis, one of which is a table of GAP weight values. In addition, this GAP analysis must also understand the concept of Priority Scale, because in making weights with a range of 0-5 based on the priority of each criterion. The following is the weighting of the GAP value in the Profile Matching method as follows.

| No | Difference (GAP) | Weight Value (Wj) | Explanation |
|----|------------------|-------------------|-------------|
| 1  | 0                | 6                 | There is no GAP (Competency as needed) |
| 2  | 1                | 5.5               | Individual competency over 1 levels |
| 3  | -1               | 5                 | Individual competencies lack 1 level |
| 4  | 2                | 4.5               | Individual competency over 2 levels |
| 5  | -2               | 4                 | Individual competencies lack 2 levels |
| 6  | 3                | 3.5               | Individual competency over 3 levels |
| 7  | -3               | 3                 | Individual competencies lack 3 levels |
| 8  | 4                | 2.5               | Individual competency over 4 levels |
| 9  | -4               | 2                 | Individual competencies lack 4 levels |
| 10 | 5                | 1.5               | Individual competency over 5 levels |
| 11 | -5               | 1                 | Individual competencies lack 5 levels |

The weights and criteria in this study can be seen in the following table.

| No | Criteria Name | Profile Criteria | Weight Value |
|----|---------------|------------------|--------------|
| 1  | Beauty (C1)   | 5                | 45% = 0.45   |
| 2  | Height (C2)   | 4                | 25% = 0.25   |
| 3  | Location (C3) | 3                | 15% = 0.15   |
| 4  | Cost (C4)     | 2                | 10% = 0.1    |
| 5  | Pathway (C5)  | 1                | 5% = 0.05    |

Then based on the following survey respondents are the results of several respondents' assessment of the Alternative Profile of Mount Bromo (A1), Mount Kerinci (A2), Mount Ijen (A3), Mount Rinjani (A4) and Mount Jaya Wijaya (A5).

| No | Alternative  | C1 | C2 | C3 | C4 | C5 |
|----|--------------|----|----|----|----|----|
| 1  | Mount Bromo (A1) | 5  | 5  | 2  | 2  | 2  |
| 2  | Mount Kerinci (A2) | 5  | 4  | 5  | 3  |    |
| 3  | Mount Ijen (A3)   | 5  | 3  | 4  | 4  | 5  |
| 4  | Mount Rinjani (A4) | 5  | 4  | 3  | 3  |    |
| 5  | Mount Jaya Wijaya (A5) | 5  | 2  | 4  | 4  |    |

Then the GAP value is calculated between the subject's profile and the required profile. For more details can be seen in the following table.

| No | Criteria Name | A1 | A2 | A3 | A4 | A5 | GAP Criteria | GAP A1 | GAP A2 | GAP A3 | GAP A4 | GAP A5 |
|----|---------------|----|----|----|----|----|--------------|--------|--------|--------|--------|--------|
| 1  | Beauty (C1)   | 5  | 5  | 5  | 5  | 5  | 0            | 0      | 0      | 0      | 0      | 0      |
The next thing to do is calculate the GAP Mapping Value derived from the GAP analysis. For more details can be seen in the following table.

Table 5. GAP Mapping (Based on the GAP map table)

| No | Criteria Name | A1 | A2 | A3 | A4 | A5 | MAP GAP A1 | MAP GAP A2 | MAP GAP A3 | MAP GAP A4 | MAP GAP A5 |
|----|---------------|----|----|----|----|----|------------|------------|------------|------------|------------|
| 1  | Beauty (C1)   | 0  | 0  | 0  | 0  | 0  | 6          | 6          | 6          | 6          | 6          |
| 2  | Height (C2)   | 1  | 0  | -1 | 0  | -2 | 5.5        | 5          | 6          | 6          | 4          |
| 3  | Location (C3) | -1 | 2  | 1  | 0  | 1  | 5          | 4.5        | 5          | 6          | 5.5        |
| 4  | Cost (C4)     | 0  | 3  | 2  | 1  | 2  | 6          | 3.5        | 4          | 5          | 4.5        |
| 5  | Pathway (C5)  | 1  | 2  | 4  | 2  | 3  | 5.5        | 4.5        | 2.5        | 4          | 3          |

Explanation:
GAP = Alternative Profile - Criteria profile

The next thing to do is calculate the GAP Mapping Value derived from the GAP analysis. For more details can be seen in the following table.

Table 6. GAP Mapping (Based on GAP Map Table)

| No | Alternative Name   | Final Value | Explanation |
|----|---------------------|-------------|-------------|
| 1  | Mount Bromo (A1)    | 5.7         | Rank 2      |
| 2  | Mount Kerinci (A2)  | 5.45        | Rank 3      |
| 3  | Mount Ijen (A3)     | 5.35        | Rank 4      |
| 4  | Mount Rinjani (A4)  | 5.875       | Rank 1      |
| 5  | Mount Jaya Wijaya (A5) | 5.15   | Rank 5      |

4. Conclusion

Based on the problems studied and testing that has been done, it can be concluded that the analysis of the Profile Matching method in recommending climbing tourism destinations, that Mount Rinjani which is Alternative 4 is recommended as the most important climbing tourism destination. Mount Rinjani is a mountain located on the island of Lombok, West Nusa Tenggara. The mountain which is the second-highest volcano in Indonesia with an altitude of 3,726 m above sea level and is located at latitude 8°25' latitude and 116°28' east longitude. Followed by Mount Bromo in East Java and Mount Kerinci in Jambi province.
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