

## APPLICATION OF PROFILE MATCHING ALGORITHM IN SELECTION OF THE BEST EMPLOYEES IN PROPERTY COMPANY

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### Abstrak

Pemberian penghargaan bagi karyawan yang memiliki kelebihan dan kinerja kerja yang baik merupakan salah satu cara untuk meningkatkan daya saing yang positif antar karyawan di suatu perusahaan. Penelitian ini bertujuan untuk mencari keunggulan yang dimiliki setiap karyawan agar dapat mengetahui karyawan yang berprestasi. Melalui prestasi dalam dunia kerja dapat menjadi tolak ukur untuk mencari karyawan terbaik yang layak mendapatkan penghargaan. Analisa data yang digunakan dalam penelitian ini bersumber dari data penjualan perusahaan properti selama tiga bulan terakhir. Penelitian ini menggunakan Metode *Profile Matching* untuk menentukan karyawan terbaik di perusahaan properti. Penelitian dengan ini dilakukan dengan cara membandingkan karyawan satu dengan kandidat karyawan yang lainnya berdasarkan kriteria – kriteria yang telah ditentukan. Hasil dari penelitian ini berupa perangkingan yang menunjukkan urutan karyawan terbaik yang berhak mendapat penghargaan dari perusahaan.

Kata kunci: Profile matching, Sistem pendukung keputusan, GAP

### Abstract

*Giving awards to employees who have advantages and good work performance is one way to increase positive competitiveness among employees in a company. This study aims to find the advantages of each employee to find out which employees excel. Through achievements in the world of work, it can be a benchmark for finding the best employees who deserve awards. Analysis of the data used in this study is sourced from data on sales of property companies for the last three months. This study uses the Profile Matching Method to determine the best employees in property companies. This research was conducted by comparing one employee with another employee candidate based on predetermined criteria. The results of this study are in the form of rankings that show the order of the best employees who are entitled to an award from the company.*

Keywords: Profile matching, Decision support system, GAP

### INTRODUCTION

Human resources are one of the main factors to create an effective and efficient performance in a company (Sholihaningtias, 2018). The placement of employees according to their knowledge and skills will improve the performance of the employee (Sugiartawan, Ardriani, & Kusuma, 2021). Finding the right person worthy of appreciation is not easy. A person's performance is influenced by many factors such as personality and behavioral factors (Herlambang, Dewanto, Harjanta, & Setyawati, 2018) The selection of the best employees aims to increase the competence of employees (Idam, Junaidi, & Handayani, 2019).

Computerization or the use of computers on a large scale in terms of processing data, one of which is the decision-making process for selecting the best employees can minimize the occurrence of inaccuracies in decision making (Fitriana, Ripanti, & Tursina, 2018). To make a decision, of course, it is necessary to do careful analysis and calculations by predetermined criteria. Decision-making is generally done using more than one criterion or even many criteria. Therefore, an assessment decision model is needed to make it easier for the assessment team to make decisions about who deserves to be the best employee at property company. The assessment factors that will be carried out include several criteria, including based

on discipline, number of absences, accumulation of surveyed consumers, the number of bookings, the number of consumers of credit contracts, and length of work.

The Profile Matching method is one of the approach methods from several studies in decision support systems (Fitriana et al., 2018). The final result of this method aims to produce data in the final form of ranking (Ermawita & Fauzi, 2020). With a decision support system, it is hoped that it can support decisions that will be taken by the selection team in a company (Wahyudi & Utama, 2019). Currently, at this property company's marketing performance assessment is still not available. To overcome this problem, manual calculations and systems are made using the Profile Matching algorithm. This method was chosen in the hope of being able to produce the best data and is also expected to help determine who is the best marketing actor who deserves a reward from the property company. The purpose of the study was to produce a decision support system for selecting the best employees according to predefined criteria.

## RESEARCH METHODS

### Types of Research

The data obtained in this study is sourced from primary data provided directly by the marketing manager of one of the property companies in Indonesia. The data provided is sales data in the last three months (August, September, and October).

### Time and Place of Research

The research was conducted over the last three months from August 2021 to early November 2021. The research was conducted at the marketing office of a property company in Cibinong. Sales data from the last three months was obtained after the interview ended.

### Decision Support System

Decision Support Systems (DSS) is a part of a computer-based (including knowledge-based) information system that is used to support decision-making in an organization or company (Wahyudi & Utama, 2019). DSS by utilizing data and models to identify, solve problems, and make decisions aims to help make better decisions (Sutinah, 2017). In general, a decision support system is designed as a support for decision-making in a problem that involves many criteria (Fauzi, 2019).

The stages of the Decision Support System are problem definition, collecting data or relevant information elements, processing data into

information in the form of graphic and written reports, and determining alternative solutions (can be in percentages). The objectives of DSS include helping to solve semi-structured problems, supporting managers in making decisions about a problem, and increasing the effectiveness not the efficiency of decision making.

### Profile Matching

Profile Matching is a component that expects an ideal indicator variable level with a base level that should be met or passed by workers (Kurnia, 2021). In Profile Matching, the minimum value for each variable is called the GAP value. The smaller the GAP value, the greater the weight (Herlambang et al., 2018). The profile matching method is commonly used in solving semi-structured problems in solving problems of determining the best employees, selecting scholarships, and selecting collaboration partners (Indriyani, 2019).

### Procedure

The Profile Matching process includes several stages as follows:

1. Investigation of a problem
2. Determine criteria, sub-criteria, and values
3. Determining the value of each alternative
4. Determination of target values
5. Determine the GAP

The gap is the difference in the value obtained from the selection team for employees who are nominated for the best employee (Saputra, Regasari, & Sutrisno, 2017). Gap collection for each attribute has a different calculation for each problem. The gap value is obtained from the following formula.

$$\text{Gap} = \text{Value} - \text{Standard Value} \dots \dots \dots (1)$$

6. Convert GAP to the weighted value
7. Calculation of core factor and secondary factor

In the calculation of the Profile Matching method, the core factor and secondary factor have different assessment weights (Sudarmadi, Santoso, & Sutrisno, 2017). The core factor is the attribute that takes precedence or is the most prominent in a position (Pungkasanti & Nurma'arif, 2019). The core factor aspect is estimated to produce optimal performance. The calculation of the core factor is formulated as follows.

$$NCF = \frac{\Sigma NC}{\Sigma IC} \dots \dots \dots (2)$$



Description :  
NCF = average core factor  
NC = total number of core factor values  
IC = number of aspects core factor (Malau, 2020).

The secondary factor is supporting aspects other than those in the core factor (Pungkasanti & Nurma'arif, 2019). The Secondary factor calculation can be seen in the following formula.

Description :  
NSF = average value of secondary factor  
NS = total number of secondary factor scores  
IS = number of aspects of a secondary factor  
(Kusumantara, Pamuji, & Putri, 2019).

8. Sum of core factor and secondary factory value
9. Calculation of criteria value
10. Determine the total value

The calculation of the total value is obtained from the following formula.

Description:  
NP = total score of criteria  
NFS = average score secondary factor  
NFC = core average factor  
(x) % = the percent value that input.

## 11. Rank

After going through the calculation process above, researchers will get conclusions about the value of several alternatives that have been inputted. The highest scoring alternative will be a priority to choose the best employee and will be entitled to a gift from the property company.

## Data, Instruments, and Data Collection Techniques

This study uses primary data. The technique of collecting criteria and alternative data that will be used in system testing is obtained by conducting direct interviews with the marketing manager of a property company. For information on sales data for the last three months, it was obtained directly in hardcopy form by the marketing manager of the property company after the interview.

## Data Analysis Technique

The data in this study consisted of quantitative and qualitative data. For qualitative data, researchers convert it into numbers (quantitative data) to make it easier to calculate both manual and system calculations.

## RESULTS AND DISCUSSION

The first step for Profile Matching is to determine the alternatives and criteria used. Alternatives can be seen in table 1.

Table 1. Alternatives

Alternate Code	Alternative Name
A1	Kahfi
A2	Hendri
A3	Surya
A4	Winda

After determining the alternatives, the criteria and values are determined as in table 2.

Table 2. Criteria

Criteria Code	Criteria Name	Type of Criteria
C1	Discipline	<i>Core Factor</i>
C2	Number of Absences	<i>Core Factor</i>
C3	Consumer accumulation survey	<i>Core Factor</i>
C4	Number of Bookings	<i>Core Factor</i>
C5	Number of Consumer Credit Agreements	<i>Core Factor</i>
C6	Length of Work	<i>Secondary Factor</i>

Table 2 contains the type of each criterion specified by the company. The score for the criteria obtained from the property company can be seen in table 3

Table 3. Criteria Value of Each Alternative

Criteria	Alternative			
	Kahfi	Hendri	Surya	Winda
Discipline	Good	Excellent	Enough	Enough
Number of Absences	1	0	4	3
Accumulated Consumer Survey	15	12	10	20
Number of Bookings	5	5	5	12
Jumlah Credit Akad Consumer	5	4	4	10
Long Work	7 Years	7 Years	5 Years	3 Years



After knowing the information about the value of each criterion for 4 predefined alternatives. The weight value of the criteria expected by the company can be seen in table 4.

Table 4. Criteria Weight Value from the Company

Criteria	Selected Assessment Factors	Weight
Discipline	Excellent	5
Number of Absences	0	5
Accumulated Consumer Survey	>15	5
Number of bookings	>12	5
Number of consumers credit agreements	>9	5
Long Work	5-6 years	4

The next step is to determine the value of the core factor and secondary factor. The value can be seen in table 5.

Table 5. Weight of Core Factor and Secondary Factor

Core Factor	60%
Secondary Factor	40%

The next step is to determine the gap mapping. The results can be seen in table 6.

Table 6. Gap Mapping

Criteria	Assessment Factor	Weight
Discipline	Excellent	5
	Good	4
	Enough	3
	Less	2
	Ineligible	1
Number of Absences	0	5
	1 - 3	4
	4 - 6	3
	7 - 9	2
	>9	1
Accumulated Consumer Survey	>15	5
	11 - 15	4
	6 - 10	3
	1 - 5	2
	0	1
Number of Bookings	> 12	5
	9 - 12	4
	5 - 8	3
	1 - 4	2
	0	1

Number of Consumer Credit Agreements	> 9	5
Consumer Credit Agreements	7 - 9	4
Credit Agreements	4 - 6	3
Agreements	1 - 3	2
	0	1
Working Period	> 6 Years	5
	5 - 6 Years	4
	3 - 4 Years	3
	1 - 2 Years	2
	< 1 Year	1

The results of the gap calculation can be seen in table 7.

Table 7. Gap Calculation

Employees	c1	c2	c3	c4	c5	c6
A1	4	4	4	3	3	5
A2	5	5	4	3	3	5
A3	3	3	3	3	3	4
A4	3	4	5	4	5	3
Department Profile	5	5	5	5	5	4
A1	-1	-1	-1	-2	-2	1
A2	0	0	-1	-2	-2	1
A3	-2	-2	-2	-2	-2	0
A4	-2	-1	0	-1	0	-1

The next step is determining the weight of the gap value based on table 8.

Table 8. Weighted Gap Value

Difference	Value Weight	Information
0	5	There is no difference (competence as needed)
1	4,5	Individual competence is 1 level advantage
-1	4	Individual competence lacks 1 level
2	3,5	Individual competence is 2 levels advantage
-2	3	Individual competence lacks 2 levels
3	2,5	Individual competence is 3 levels advantage
-3	2	Individual competence lacks 3 levels
4	1,5	Individual competence is 4 levels advantage
-4	1	Individual competence lacks 4 levels

The results can be seen in table 9.

Table 9. Weighted Results



Employees	Weight					
	c1	c2	c3	c4	c5	c6
A1	4	4	4	3	3	4,5
A2	5	5	4	3	3	4,5
A3	3	3	3	3	3	5
A4	3	4	5	4	5	4

The next step is to calculate the value of the core factor and secondary factor which is then multiplied directly by the weight. The results can be seen in table 10.

Table 10. Calculation Results of Core Factor and Secondary Factor

Employees	NCF	NSF	Core Factor 60%	Secondary Factor 40%
A1	3,6	4,5	2,16	1,8
A2	4	4,5	2,4	1,8
A3	3	5	1,8	2
A4	4,2	4	2,52	1,6

The final assessment calculation is determined using formula 4. The final calculation results can be seen in table 11.

Table 11. Ranking Values

Employees	NP	Ranking
Hendri	4,2	1
Winda	4,12	2
Kahfi	3,96	3
Surya	3,8	4

Based on table 11, it is known that the order of employees who deserve to be appreciated are Hendri, Winda, Kahfi, and Surya.

### System Result

Implementation to determine the best employees as shown in figure 1. Input the username and password to enter the system. Input alternatives, criteria, core factor value, and secondary factor value.



Figure 1. System Main Page

After successfully inputting the value, click the "Continue To Process" button. To find out the rankings, click the "Save and View Ratings" button.

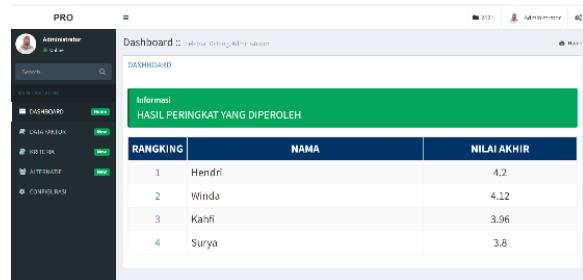


Figure 2. Ranking Results

Figure 2 is the result of the calculation according to the criteria and alternatives that have been determined at the beginning.

### Evaluation Result

Accuracy testing aims to find out how much accuracy the level of the system has been made. For accuracy testing, the results of the decision support system with the profile matching method will be compared between manual calculations and the system. Accuracy is determined by the following formula.

$$Accuracy = \frac{TP+TN}{TP+TN+FP+FN} \times 100\% \dots \dots \dots (5)$$

Description :

TP = True Positive

TN = True Negative

FN = False Positive

FN = False Negative

The research was conducted using 30 sample data. By using the formula above obtained an accuracy value of 100%.

### CONCLUSIONS AND SUGGESTIONS

#### Conclusions

Decision Support Systems using Profile Matching Algorithms can help the role of property management in objective decision making with more effective time. The implementation of the Profile Matching method for the selection of the best employee selection at property company obtained excellent results by its accuracy rate of 100%.

#### Suggestions

In the next research, Decision Support Systems using Profile Matching Algorithms could be

created not only to determine the best employees in property companies but also to be applied to other fields to increase the variety of use of Profile Matching Algorithms.

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