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Employee Determination Decision Support System at Pt. Pos Indonesia in Medan using the TOPSIS Method (Case Study: Mail Processing Center Office)

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ABSTRACT

TOPSIS method is widely used to solve practical decision problems. the concept is simple and easy to understand, computationally efficient and has the ability to measure the relative performance of decision alternatives in a simple mathematical form. in this case the alternative in question is the determination of the right employees to run as a consideration that the company can improve based on the criteria of employees at PT. Pos Indonesia Medan. With this method, it is hoped that the assessment will be more precise because it is based on the criteria and weights that have been determined so that it will get more accurate results for the determination of employees to be carried out. This thesis will describe the decision support system for determining employees at PT.

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1. INTRODUCTION

One of the important problems faced by company leaders is how to increase the work productivity of their employees. With the determination of good employees so that the company can achieve the goals that have been set, effectively and efficiently. Success in achieving company goals is strongly influenced by individual employee performance [1]. Every company will always try to improve employee performance in the hope that the company's goals are achieved. The way the company does in improving the performance of employees is to carry out education, training, provide proper compensation, provide motivation, and create a conducive work environment. It seems that they work only as a condition as employees of the PT. Tanjung Morawa Mail Processing Center, without creation and it seems the employees do not have the responsibility of the workload. Therefore, the company will consider being able to assess each employee so that they can place employees according to their respective abilities in order to simplify the company and cannot be separated from work discipline and employee motivation.

Decision support systems are part of computer-based information systems (including knowledge-based systems (knowledge management) that are used to support decision making in an

organization or company [2] [3] [4]. DSS can also be said as a computer system that processes data information to make decisions on specific semi-structured problems DSS aims to provide information, guide, predict and direct information users to make better decisions Decision Support Systems (DSS) or decision support systems are a specific class of information systems computerized systems that support business and organizational decision-making activities [5] [6].

Employees are the main asset in the company to operate properly. In hiring employees, there is often a mismatch between positions and employee competencies. As a result, many employees resigned because of the incompatibility [7] [8]. The results of this study indicate that the TOPSIS method is appropriate to use as a method to determine the ranking of prospective employees who are eligible to be accepted. this is proven by the level of accuracy that reaches 85%. while the execution time of the TOPSIS method for 20 data only reached 0.7444 seconds.

The quality of employees in supporting the advancement of a company is very important, so many companies are trying to have quality employees. One way that can be done is by recruiting prospective employees according to the criteria desired by the company, it's just that so far many companies often have problems in the filing and sorting process because it is done manually, because it is very possible for errors to occur in this selection model so that the results are inaccurate. in accordance with the criteria for prospective employees desired by the company [9] [10] .

Decision problems are not only caused by uncertainty factors or information imperfections, the variety of selection criteria and also the weight value of each criterion is a very complex form of decision problem [11]. In this day and age, multi-criteria problem solving methods have been widely used in various fields. One of the methods that can be used to overcome multi-criteria problems is the Technique For Order Preference by Similarity to Ideal Solution (TOPSIS) method [12].

Yoon and Hwang developed the TOPSIS method based on intuition, namely the alternative choice is the alternative that has the smallest distance from the positive ideal solution and the largest distance from the negative ideal solution from a geometric point of view using Euclidean distance [13]. However, the alternative which has the smallest distance from the positive ideal solution, does not necessarily have the largest distance from the negative ideal solution. Therefore, TOPSIS considers both the distance to the positive ideal solution and the distance to the negative ideal solution simultaneously. The optimal solution in the TOPSIS method is obtained by determining the relative proximity of an alternative to the positive ideal solution [14] [15]. TOPSIS will rank alternatives based on the priority value of the relative proximity of an alternative to the positive ideal solution. The alternatives that have been ranked are then used as a reference for decision makers to choose the best desired solution. This method is widely used to complete practical decision making [16]. This is because the concept is simple and easy to understand, computationally efficient, and has the ability to measure the relative performance of decision alternatives.

2. RESEARCH METHODS

2.1 Data analysis

In an application development, analysis needs to be done before no design is done. Because without the analysis it will cause errors at a later stage. With this process, an overview of the system will be generated that allows it to have errors or weaknesses so that it is possible to make improvements.

Analyze and collect all the requirements needed to solve the problems that will be solved using the TOPSIS method. In the application of this TOPSIS method for determining employees based on the criteria. Employees are the main asset in the company to operate properly. In determining employees, there is often a mismatch between positions and employee competencies.

2.2 Application of TOPSIS Method

Here are the steps of the TOPSIS method:

a. TOPSIS begins by building a decision matrix. The decision matrix X refers to m alternatives that will be evaluated based on n criteria. The decision matrix X can be seen in the following equation:

$X=a1⋮am\ x11\cdots x1n⋮\ddots⋮xm1\cdots xmn$ ..... (1)

where ai (i = 1, 2, 3, . . . , m) are the possible alternatives, xj (j = 1, 2, 3,...n) is the attribute where the alternative performance is measured, xij is the alternative performance of ai with reference attribute xj.

b. Create a normalized decision matrix.

The equation used to transform each element xij is :

$rij= xij\ xij2mi=1$ ..... (2)

where i = 1, 2, 3,..., m; and j = 1, 2, 3,..., n;
where vij is an element of the normalized decision matrix R. □is element matrix of decision X.

c. Create a weighted normalized decision matrix.

With weight$wi= w1,2,w3,...,wn$ where wj is the weight of the j-th criteria and $wj=1nj=1$ then the normalization of the matrix weight V is:

$vij= wj\ rij$ ..... (3)

where i = 1, 2, 3, . . . , m; and j = 1, 2, 3, . . . , n;
where vij is an element of the V-weighted normalized decision matrix.
wij is the weight of the jth criterion
rij is an element of the normalized decision matrix R.

d. Determine the positive ideal solution matrix and negative ideal solution.

The positive ideal solution is denoted $A+$, while the negative ideal solution is denoted $A–$. The following is the equation of $A+$ and $A–$;

1). $A+ = (\max vij\ j\epsilon J\ ), \min vij\ j\ \epsilon\ J'\ ,i=1,2,3,...,m$
$= v1+,2+,v3+,...,vn+$

2). $A\ – = (\min vij\ \ ), \max vij\ j\ \epsilon\ J'\ ,=1,2,3,...,m$
$= v1–,2–,v3–,...,vn–$
$J= \{$ j = 1,2,3,. . . , n and J are the set of benefit criteria$\}$.
$J,= \{$ j = 1,2,3,. . . , n and □, is a set of cost criteria$\}$.
Where□is an element of the V-weighted normalized decision matrix.
$vj+$ (j = 1,2,3,... ,n) is an element of the positive ideal solution matrix.
$vj–$ (j = 1,2,3,... ,n) is an element of the negative ideal solution matrix.

3). $S+$ is the alternative distance from the positive ideal solution defined as:

$$S_i^+ = \sqrt{\sum_{j=1}^{n}\left(v_{ij} - v_j^+\right)^2},$$ with i = 1,2,3,. . . , m ..... (4)

4). $S-$ is the alternative distance from the negative ideal solution defined as:

$$S_i^- = \sqrt{\sum_{j=1}^{n}\left(v_{ij} - v_j^-\right)^2},$$ with i = 1,2,3,. . . , m ..... (5)

Where :
$Si+$ is the i-th alternative distance from the positive ideal solution,
$Si–$ is the i-th alternative distance from the negative ideal solution,
vij is an element of the weighted normalized decision matrix V
$vj+$ is an element of the positive ideal solution matrix,
$vj–$ is the element of the negative ideal solution matrix.

e. Calculates relative closeness to the positive ideal solution.

The relative closeness of each alternative to the positive ideal solution can be calculated by the following equation:

$$c_i^+ = \frac{S_i^-}{(S_i^- + S_i^+)}, 0 \le c_i^+ \le 1$$

with i = 1,2,3,. . . , m ..... (6)

Where *ci+* is the relative proximity of the i-th alternative to the positive ideal solution, *Si+* is the i-th alternative distance from the positive ideal solution and *Si–* is the i-th alternative distance from the negative ideal solution.

f. Alternative Ranking.

The alternatives are sorted from the largest C+ value to the smallest value. The alternative with the largest C+ value is the best solution.

3. RESULTS AND DISCUSSION

3.1 System Implementation

At this stage, this implementation is the application of the application as well as the program display from the results of the existing system design to achieve a desired goal.

a. Login Form

This form is the first display when the program is run. This login form serves as the entrance to be able to access all processes in the program. In this form the user must enter a username and password, so not just any user can access this program. The login button is used to validate or check the entered username and password. The display form of the login form can be seen in Figure 1 below:

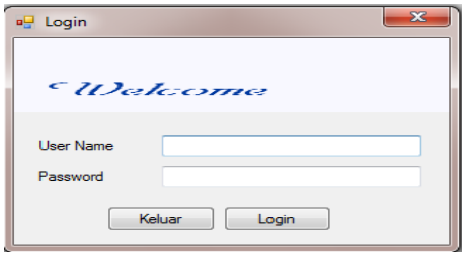

Figure 2. Login Form

b. Main Menu Form

The main menu form page is the initial display when the application is run. The main menu form display can be seen in Figure 2 below:

Figure 2. Main course

c. Employee Data Form

The employee data form page is a form for entering employee data to be selected to be employed at the company. The display form for the employee data input form can be seen in Figure 3 below:.

Figure 3. Employee Data Form

d. Employee Assignment Report Form

This form is used as a display of the results of the selection of employees who will be assigned to work according to the specified criteria, as for the appearance of the employee assignment report form can be seen in Figure 4 below:

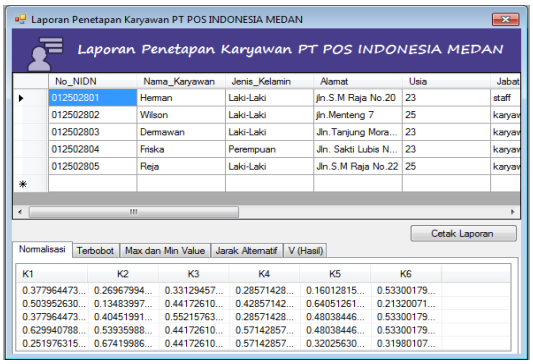

Figure 4. Employee Assignment Report Form

e. About

This form is useful as the About display of the application that the author built, it can be seen in the following image:

Figure 5. About

4. CONCLUSION

After starting the testing phase on the decision support system for determining employees at PT. Pos Indonesia jln.Tanjung Morawa Medan, it was concluded that; This decision-making system can sort data on the determination of employees who are eligible to be assigned to the company. By applying the TOPSIS method in determining employees as well as answering the question of determining employees and the selection process becomes more efficient and faster. The application of the decision support system for determining employees at PT. Pos Indonesia jln. Tanjung Morawa Medan, helps to get a solution or advice appropriately in selecting employees who have the right to be assigned to work.

REFERENCES

[1] E. Martinus and B. Budiyanto, "Pengaruh Kompensasi Dan Motivasi Kerja Terhadap Kinerja Karyawan Pada PT. Devina Surabaya," *J. Ilmu dan Ris. Manaj.*, vol. 5, no. 1, 2016.

[2] S. Saliman, "Mengenal DEcision Support System (DSS)," *EFISIENSI-Kajian Ilmu Adm.*, vol. 10, no. 1, 2015.

[3] D. Andayati, "Sistem Pendukung Keputusan Pra-Seleksi Penerimaan Siswa Baru (PSB) On-Line Yogyakarta," *J. Teknol.*, vol. 3, no. 2, pp. 145–153, 2010.

[4] M. Syafrizal, "Sistem Pendukung Keputusan (Decisin Support System)," *Data Manaj. dan Teknol. Inf.*, vol. 11, no. 3, p. 77, 2010.

[5] R. Swastika, "Sistem Pendukung Keputusan Pemilihan Karyawan Berprestasi dengan Metode Simple Additive Weighting (SAW) di PT Krakatau Daya Listrik," *STIKOM AK*, p. 145.

[6] J. A. Saputro, "SISTEM PENDUKUNG KEPUTUSAN SELEKSI PEMAIN SEPAKBOLA UNTUK MENENTUKAN PENYERANG DENGAN MENGGUNAKAN METODE SIMPLE MULTI ATTRIBUTE

RATTING TECHNIQUE (SMART)(STUDI KASUS SSB PUTRA MANDIRI MAGELANG).” Skripsi, Universitas Muhammadiyah Magelang, 2018.

[7] A. N. Pramudhita, H. Suyono, and E. Yudaningtyas, “Penggunaan Algoritma Multi Criteria Decision Making dengan Metode Topsis dalam Penempatan Karyawan,” *J. EECCIS*, vol. 9, no. 1, pp. 91–94, 2015.

[8] A. N. Pramudhita, “Komparasi Algoritma Multi Criteria Decision Making Dengan Metode AHP dan SAW dalam perangkingan calon karyawan,” *SENTIA 2018*, vol. 10, no. 1, 2018.

[9] C. Oktaviani, “SISTEM PENDUKUNG KEPUTUSAN REKOMENDASI PENCARI KERJA TERBAIK DI PT. PLN WILAYAH RIAU DAN KEPULAUAN RIAU MENGGUNAKAN METODE TOPSIS.”

[10] C. Kusuma and S. Nadriati, “Student Presidential Election or BEM STMIK Dharmapala Riau,” *J. Ilmu Komput. dan Bisnis*, vol. 10, no. 2, pp. 2212–2216.

[11] C. Surya, “Penilaian Kinerja Dosen Menggunakan Metode TOPSIS (Studi Kasus: Amik Mitra Gama),” *J. RESTI (Rekayasa Sist. dan Teknol. Informasi)*, vol. 2, no. 1, pp. 322–329, 2018.

[12] L. N. Hidayat, “Metode TOPSIS Untuk Membantu Pemilihan Jurusan Pada Sekolah Menengah Atas,” *Tugas Akhir Progr. Stud. Inform. Komputer, Univ. Dian Nuswantoro. Semarang*, 2014.

[13] A. Sachdeva, D. Kumar, and P. Kumar, “Multi-factor failure mode critically analysis using TOPSIS,” 2009.

[14] F. Riandari, P. M. Hasugian, and I. Taufik, “Sistem Pendukung Keputusan Menggunakan Metode TOPSIS Dalam Memilih Kepala Departemen Pada Kantor Balai Wilayah Sungai Sumatera II Medan,” *J. Inform. Pelita Nusant.*, vol. 2, no. 1, 2017.

[15] G. Ramayanti and H. Ulum, “Sistem Penentuan Supplier Kawat Las Dengan Metode Analitycal Hierarchy Process (AHP) dan Technique for Order Preference by Similarity to Ideal Solution (TOPSIS),” *J. Sist. Dan Manaj. Ind.*, vol. 1, no. 1, pp. 12–18, 2017.

[16] D. Arbian, “Sistem Pendukung Keputusan (SPK) Pemberian Beasiswa Berbasis TOPSIS (Studi Kasus Yayasan Pendidikan Al-Hikmah Bululawang Malang),” *J. Ilm. Teknol. Inf. Asia*, vol. 11, no. 1, pp. 29–44, 2017.