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EMPLOYEE PERFORMANCE MEASUREMENT MODEL WITH ROUGH SET APPROACH

Dori Mittra Candana
Universitas Putra Indonesia YPTK Padang
Email: dorimittra@upiyptk.ac.id

Abstract

Performance is a behavior that every person has as a work performance that is produced by employees in accordance with their role in the company. Timeliness, Effectiveness, Work Commitment and Independence are believed to be able to influence employee performance in achieving predetermined goals. Data mining has grown rapidly and adds value to information stored in databases. One of the fairly simple data mining algorithms is the Rough Set. The research application of the Rough Set algorithm is to analyze employee performance using the rought set method on the employees of Café Dapoer Enha Sago, Pesisir Selatan Regency by analyzing 10 employees with the results in this study are as follows; Based on the number of 10 samples of Dapoer Enha Sago employees who have been tested using the Rought set application, it can be seen that the results are that the performance appraisal of 10 Dapoer Enha Sago employees shows good results 3 employees and 7 employees who have very good performance.

Keywords: Employee Performance, Rough set

INTRODUCTION

In a company, the potential for Human Resources is basically one of the capital and plays the most important role in achieving company goals, therefore companies need to manage Human Resources as well as possible, because the key to the success of a company is not only technological excellence and availability of funds. however the human factor is the most important factor. Humans can be said to be the main resource capable of managing, analyzing, and controlling problems within the company. In addition, humans have various desires, thoughts, feelings, status and backgrounds that are brought into the company to achieve company goals. Restaurants and cafes are service, food and beverage businesses, this is explained in Law 10/2009, which states "that what is meant by a food and beverage service business is a food and beverage service business that is equipped with equipment and equipment for the manufacturing process, which can be a restaurant, café, catering services, and bars / taverns ". Regulation of the Minister of Culture and Tourism Number PM.87 / HK.501 / MKP2010 concerning the registration procedure for food and beverage service businesses, provides a definition that restaurants and cafes are businesses providing food and beverage equipped with equipment and equipment for the process of making storage or serving them, in one a place that doesn't move. A restaurant or café is an organization engaged in the service industry, which means that it involves a lot of competent, professional workforce, and is a major

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asset for the culinary tourism industry. The key to the success of the culinary tourism industry is determined by the service and hospitality provided by all café employees from the top leaders to the officers in the field. One important aspect in efforts to improve performance in a restaurant or café is the use of manpower management and management based on the Manpower [1].

Employee performance will not be optimal if it only relies on production machines without paying attention to human aspects. It must be remembered that in a corporate organization, the human aspect who is capable, skilled, and responsible as an employee is a company asset that is very valuable for the survival of the company. Humans as workers are expected to be able to achieve optimal levels of work productivity with certain standards. With the workforce who has received education and training, they will be better able to accept the tasks assigned by the company and will certainly reduce the risk of work accidents that can adversely affect employees and the company. An employee with responsible skills will be able to complete everything, taking into account what he produces and is done responsibly. Someone who has a high level of education or knowledge (in this case an understanding of knowledge, skills and application in the world of work) [2].Rough Set was built by Zdzislaw Pawlak in the early 1980s. The philosophy of this method is that information (knowledge, data) can be associated with objects. In a Rough Set, a data set is represented as a table, where the rows in the table represent objects and the columns represent the attributes of these objects [3] The stages in using the Rough Set algorithm are as follows: 1 Data Selection (Selection of data to be used) 2. Formation of a Decision System that contains attributes of conditions and attributes of decisions. 3. Forming an Equivalence Class, namely by eliminating repetitive data. 4. The formation of the Discernibility Matrix Modulo D, which is a matrix that contains comparisons between different data attributes, conditions and decision attributes. 5. Generating reduct using boolean algebra. 6. Generating rules (knowledge).

Data mining is the process of finding knowledge, patterns, and interesting information from large data sets through a descriptive, understanding and predictive process using a model or algorithm [4] Data mining is a process that uses statistical techniques, mathematics, artificial intelligence, and machine learning to extract and identify useful information and related knowledge from various large databases [5]. Data mining is one of the important stages in the process. Knowledge Discover in Database (KDD). The terminology of KDD and data mining is different. KDD is the whole process of finding useful knowledge from a data set while data mining is one of the stages in KDD and focuses on efforts to find useful knowledge using algorithms [6].

Dapoer Enha is a new culinary business that offers customer facilities and comfort as its main points. Competition in the world of food business in the tourist areas of the southern coastal district makes: Dapoer Enha must be more careful in determining the marketing strategy that will be used .. Cafe Dapoer Enha is a new culinary business that offers customer

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facilities and comfort as its main points. [7] Competition in the culinary business world in the tourist area of Pesisir Selatan Regency has made Dapoer Enha ready to compete with other culinary businesses, namely by making internal improvements to Cafe Dapoer Enha by looking at the performance of employees who work at Cafe dapoer Enha Sago. The data used in this activity were 10 Dapoer Enha Sago Employees. Based on the number of data from the Dapoer Enha Sago Employees, 10 employees will be tested using the rought set method. The sample of this research takes data from 10 employees to examine their performance. The research objective of this study is to analyze the performance of Dapoer Enha Sago employees by using the Rough Set Method in order to help the management of the Employees or the owner of Dapoer Enha Sago in knowing the possibility of employee performance based on data and field surveys.

RESEARCH METHODS

Consistency of Employee Performance or Employee performance is a very influential thing for the success of a company or organization. Good employee performance or performance will be directly proportional to good results in business development and the existence of a business. In this study, analyzing employee performance using the Rough Set method because the Rough Set can represent the data set as a table, where the rows in the table represent objects and columns and represent the attributes of these objects. Using the Rough Set method, it can be used to produce output in the form of rules or rule patterns with various conditions that result in decisions being accepted, processed and rejected. From these rules, it is possible to make the right decision in solving a study related to employee performance at Cafe Dapoer Enha Sago.

The data used are employee data at Cafe Dapoer Enha Sago along with the attributes: Timeliness, Effectiveness, Work Commitment and Independence. With the performance analysis assessment criteria as follows,

Nama Karyawan	Posisi
Anngi Pratama	Koki
Ari agusman	Koki
Jefri Saputra	Barista
Riski	Barista
Nanda Putra	Waiter
Defrianto	Waiter
Beni Irawan	Waiter
Dinda Putri Hasanah	Waiter
Eci wati	Dishwasher
Teti	Dishwasher

Table 1. Sample of employees on Café Dapoer Enha Sago

The data used are Dapoer Enha Sago employee data along with the attributes: Punctuality, Effectiveness, Work Commitment and Independence. In order to assess and analyze Dapoer Enha Sago employees it is based on a number of assessment components such as:

1. On Time (KW) Max. 60%
2. Effectiveness (E) Max. 15%
3. Work commitment (KK) Max. 15%
4. Independence (K) Max. 10%

In the research methodology, there is a sequence of frameworks that must be followed, the order of this framework is

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the steps taken in writing. Following are the steps for the work carried out [8]:

1. Identifying Problems: a system review will be carried out to observe and conduct deeper exploration and explore problems that exist in the current system. This stage is the first step in determining the problem formulation of the research.

2. Determining Objectives: Based on the understanding of the problem being analyzed, the objectives to be achieved from this research are determined. This goal determines targets to be achieved, especially those that can overcome existing problems.

3. Studying the Literature: The literature used as reference material in this study is from scientific journals and books on data mining, especially using the Rough Set method and other reading materials that support research. These literature will serve as guidelines for conducting research in order to facilitate the research process.

4. Collecting Data: The method of data collection was done by direct observation of Café Dapoer Enha.

Apart from making observations, database sampling was also carried out to support this research.

5. Analyzing the Rough Set Algorithm: At this stage an analysis of the methods used will be carried out using the literature that has been prepared in the previous literature study stage to determine the feasibility of providing grant assistance.

6. Implementing the Rough Set: In this study the authors implemented the Rough Set method to classify the grant application data using Rosetta software. Rosetta software was chosen because it provides a special function for classification.

7. Testing Research Results: At this stage, testing of the system being developed is carried out. Testing is done by applying the Rough Set method based on existing sample data. The testing mechanisms that will be carried out are: a. Manual testing using a formula, to classify the applicants for assistance using the Rough Set method. b. Testing the Rough Set method using Rosetta software.

8. Analyzing Test Results: At this stage, observations and analyzes will be carried out on the results of the implementation of the Rough Set method in determining employee performance.

In addition, literature study is also carried out by reading books that support the analysis of the data and information obtained.

The components of the timeliness assessment are shown in Table 2,

Kriteria yang dinilai	Bobot
a. Mengerjakan tugas dengan tuntas sesuai dengan waktu	**15 %**
b. Masuk dan pulang kerja sesuai dengan peraturan jam kerja	**15%**
c. Bersungguh-sungguh dan teliti dalam menyelesaikan tugas	**15%**
d. Mampu mempercepat menyelesaikan pekerjaan sebelum batas waktu yang ditentukan	**15%**

Table 2. Punctuality

The components of the effectiveness assessment are seen in Table 3.

Kriteria yang dinilai	Bobot
a. Kemampuan memenuhi jumlah barang sesuai permintaan	**10%**
b. Kecepatan menyelesaikan pekerjaan	5%

Table 3. Effectiveness

Kriteria yang dinilai	Bobot
a. Berusaha meminimalkan kesalahan dalam	**5%**

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melakukan pekerjaan	
b. Mampu menyelesaikan semua pekerjaan yang diamanahkan kepada saya	**5%**
c. Bisa membantu karyawan lain yang sedang sibuk	**5%**

Table 4. Work Commitment

Kriteria yang dinilai	**Bobot**
a. Mampu memilih dan melihat masalah dari sudut pandang yang berbeda dengan karyawan yang lain	**10%**

Table 5. Independence

RESULTS AND DISCUSSION

Data Transformation

The total result of the assessment is then made into a form

category with the following conditions:

<50 is said to be less = 1

62 ≤ X ≤ 74 is categorized as Enough = 2

75 ≤ X ≤ 84 categorized as Good = 3

85 ≤ X ≤ 100 categorized as Very Good = 4

The Decision System for existing Cafe Dapoer Enha Sago employees can be seen in the table where the data to be used is 10 (ten) data.

Nama Karyawan	Nilai KW	Nilai E	Nilai KK	Nilai K	Jumlah Nilai	Keputusan
Anngi Pratama	60	15	15	8	98	Sangat Baik
Ari agusman	58	14	15	10	97	Sangat Baik
Jefri Saputra	50	10	14	9	83	Baik
Riski	60	14	15	10	99	Sangat Baik
Nanda Putra	58	15	14	9	96	Sangat Baik
Defrianto	52	8	14	10	84	Baik
Beni Irawan	60	15	15	8	98	Sangat Baik
Dinda Putri Hasanah	58	14	15	10	97	Sangat Baik
Eci wati	60	14	15	10	99	Sangat Baik
Teti	60	15	14	8	97	Sangat Baik

Table 6. Decision Systems

Nama Karyawan	**Nilai KW**	**Nilai E**	**Nilai KK**	**Nilai K**	**Keputusan**
Anngi Pratama	4	4	4	3	4
Ari agusman	4	4	4	4	4
Jefri Saputra	4	3	4	3	3
Riski	4	4	4	4	4
Nanda Putra	4	4	4	4	4
Defrianto	4	2	4	4	3
Beni Irawan	4	4	4	3	4
Dinda Putri Hasanah	4	4	4	4	4
Eci wati	4	4	4	4	4
Teti	4	4	4	3	4

Table 7. Establishment of the Decision System after The 2nd transformation at Café Dapoer Enha Sago

Analyzing the Rough Set Algorithm: At this stage an analysis of the method used will be carried out using the literature that has been prepared in the previous literature study stage to determine the feasibility of providing grant assistance. 6. Implementing the Rough Set: In this study the authors implemented the Rough Set method to classify the grant application data using Rosetta software. Rosetta software was chosen because it provides a special function for classification. 7. Testing Research Results: At this stage, testing of the system being developed is carried out. Testing is done by applying the Rough Set method based on existing sample data. The testing mechanisms that will be carried out are: a. Manual testing using a formula, to classify the applicants for assistance using the Rough Set method. b. Testing the Rough Set method using Rosetta software[9]. 8. Analyzing the Test Results: At this stage there will be observations and analysis of the results of

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the implementation of the Rough Set method in determining before we make the equivalent class determination, the first step is to transform back to attribute A (Timeliness), attribute B (Effectiveness), Attribute C (Commitment to work), and Attribute D (Independence)[10].

For attribute A, it is grouped into 4 groups, namely:

$0 \leq X \leq 15 = 1$

$16 \leq X \leq 30 = 2$

$31 \leq X \leq 45 = 3$

$46 \leq X \leq 60 = 4$

For attribute B, it is grouped into 4 groups, namely:

$0 \leq X \leq 4 = 1$

$5 \leq X \leq 8 = 2$

$9 \leq X \leq 12 = 3$

$13 \leq X \leq 15 = 4$

For attribute C, it is grouped into 4 groups, namely:

$0 \leq X \leq 4 = 1$

$5 \leq X \leq 8 = 2$

$9 \leq X \leq 12 = 3$

$13 \leq X \leq 15 = 4$

For attribute D is grouped into 4 groups, namely:

$0 \leq X \leq 2 = 1$

$3 \leq X \leq 5 = 2$

$6 \leq X \leq 8 = 3$

$9 \leq X \leq 10 = 4$

The formation of the Equivalence Class is done by eliminating data that has similarities, so that in the Equivalence Class the data is left with 1 (one) record. The results of the formation of the Equivalence Class.

	A	B	C	D	K
EC1	4	4	4	3	4
EC2	4	4	4	4	4
EC3	4	3	4	3	3
EC4	4	4	4	4	4
EC5	4	4	4	4	4
EC6	4	2	4	4	3
EC7	4	4	4	3	4
EC8	4	4	4	4	4
EC9	4	4	4	3	4
EC10	4	4	4	3	4

Table 8. Equivalence Class Café Dapoer Enha Sago

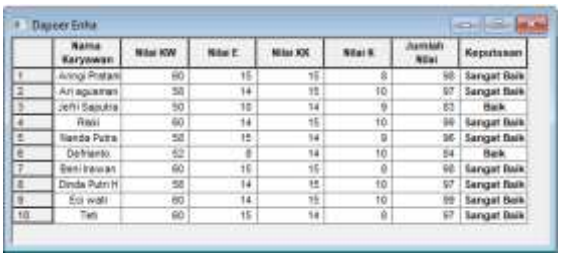
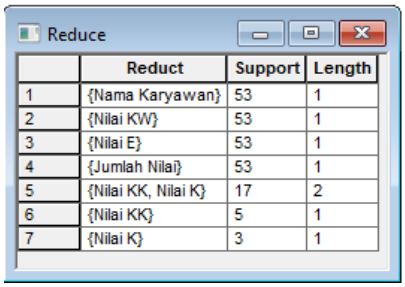


Figure 1. Decission System Rosetta

The next stage in the Rosetta tool will carry out the Equivalence Class and Dicernibility Matrix Modulo D process, but the results are not directly displayed in the form of the Equivalence Class and Dicernibility Matrix Modulo D tables.



	Reduct	Support	Length
1	{Nama Karyawan}	53	1
2	{Nilai KW}	53	1
3	{Nilai E}	53	1
4	{Jumlah Nilai}	53	1
5	{Nilai KK, Nilai K}	17	2
6	{Nilai KK}	5	1
7	{Nilai K}	3	1

Figure 2. Reduct

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Shows the results of the reduct of the process that has been done with the Rosetta Application. Later, these attributes will be used as a reference in carrying out the General Rule. The results of the general rule in this study are presented through the Rosetta process.

Generate rules

	Rule	LHS Support	RHS Support	RHS Accuracy	LHS Coverage	RHS Coverage	RHS Stability	LHS Length	RHS Length
1	Nama Karyawan(Anngi Pratama) => Keputusan(Sangat Baik)	1	1	1.0	0.1	0.125	1.0	1	1
2	Nama Karyawan(Ari agusman) => Keputusan(Sangat Baik)	1	1	1.0	0.1	0.125	1.0	1	1
3	Nama Karyawan(Jefri Saputra) => Keputusan(Baik)	1	1	1.0	0.1	0.5	1.0	1	1
4	Nama Karyawan(Riski) => Keputusan(Sangat Baik)	1	1	1.0	0.1	0.125	1.0	1	1
5	Nama Karyawan(Nanda Putra) => Keputusan(Sangat Baik)	1	1	1.0	0.1	0.125	1.0	1	1
6	Nama Karyawan(Defrianto) => Keputusan(Baik)	1	1	1.0	0.1	0.5	1.0	1	1
7	Nama Karyawan(Beni irawan) => Keputusan(Sangat Baik)	1	1	1.0	0.1	0.125	1.0	1	1
8	Nama Karyawan(Dinda Putri Hasanah) => Keputusan(Sangat Baik)	1	1	1.0	0.1	0.125	1.0	1	1
9	Nama Karyawan(Eci wati) => Keputusan(Sangat Baik)	1	1	1.0	0.1	0.125	1.0	1	1
10	Nama Karyawan(Teti) => Keputusan(Sangat Baik)	1	1	1.0	0.1	0.125	1.0	1	1
11	Nilai KW(60) => Keputusan(Sangat Baik)	5	5	1.0	0.5	0.625	1.0	1	1
12	Nilai KW(58) => Keputusan(Sangat Baik)	3	3	1.0	0.3	0.375	1.0	1	1
13	Nilai KW(50) => Keputusan(Baik)	1	1	1.0	0.1	0.5	1.0	1	1
14	Nilai KW(52) => Keputusan(Baik)	1	1	1.0	0.1	0.5	1.0	1	1
15	Nilai E(15) => Keputusan(Sangat Baik)	4	4	1.0	0.4	0.5	1.0	1	1
16	Nilai E(14) => Keputusan(Sangat Baik)	4	4	1.0	0.4	0.5	1.0	1	1
17	Nilai E(10) => Keputusan(Baik)	1	1	1.0	0.1	0.5	1.0	1	1
18	Nilai E(8) => Keputusan(Baik)	1	1	1.0	0.1	0.5	1.0	1	1
19	Jumlah Nilai(98) => Keputusan(Sangat Baik)	2	2	1.0	0.2	0.25	1.0	1	1
20	Jumlah Nilai(97) => Keputusan(Sangat Baik)	3	3	1.0	0.3	0.375	1.0	1	1
21	Jumlah Nilai(83) => Keputusan(Baik)	1	1	1.0	0.1	0.5	1.0	1	1
22	Jumlah Nilai(99) => Keputusan(Sangat Baik)	2	2	1.0	0.2	0.25	1.0	1	1
23	Jumlah Nilai(96) => Keputusan(Sangat Baik)	1	1	1.0	0.1	0.125	1.0	1	1
24	Jumlah Nilai(84) => Keputusan(Baik)	1	1	1.0	0.1	0.5	1.0	1	1
25	Nilai KK(15) AND Nilai K(8) => Keputusan(Sangat Baik)	2	2	1.0	0.2	0.25	1.0	2	1
26	Nilai KK(15) AND Nilai K(10) => Keputusan(Sangat Baik)	4	4	1.0	0.4	0.5	1.0	2	1
27	Nilai KK(14) AND Nilai K(8) => Keputusan(Baik) OR Keputusan(Sangat Baik)	2	1, 1	0.5, 0.5	0.2	0.5, 0.125	1.0, 1.0	2	2
28	Nilai KK(14) AND Nilai K(10) => Keputusan(Baik)	1	1	1.0	0.1	0.5	1.0	2	1
29	Nilai KK(14) AND Nilai K(8) => Keputusan(Sangat Baik)	1	1	1.0	0.1	0.125	1.0	2	1
30	Nilai KK(15) => Keputusan(Sangat Baik)	6	6	1.0	0.6	0.75	1.0	1	1
31	Nilai KK(14) => Keputusan(Baik) OR Keputusan(Sangat Baik)	4	2, 2	0.5, 0.5	0.4	1.0, 0.25	1.0, 1.0	1	2
32	Nilai K(8) => Keputusan(Sangat Baik)	3	3	1.0	0.3	0.375	1.0	1	1
33	Nilai K(10) => Keputusan(Sangat Baik) OR Keputusan(Baik)	5	4, 1	0.8, 0.2	0.5	0.5, 0.5	1.0, 1.0	1	2
34	Nilai K(9) => Keputusan(Baik) OR Keputusan(Sangat Baik)	2	1, 1	0.5, 0.5	0.2	0.5, 0.125	1.0, 1.0	1	2

Figure 3. Result of new rules or knowledge

Based on the results of the generated rules in Figure 3, it shows 34 (Thirty-four) rules or new knowledge that are composed of the constituent attributes. Based on the analysis that the researchers conducted from the rules obtained, the number of appearances of the employee name attribute was 10 (ten) times, the attribute value of E was 4 (four) times, the attribute value of KK was 7 (seven) times, the attribute values of KW and E were the same as 4 (Four) times, the attribute value of K is 3 (three) times and the attribute value is 6 (six) times. So it can be seen that the most influential attribute in decision attainment is the KK attribute (timeliness) because it has the highest number of appearances. The next influential attribute after KK is KW and E. The next influential attribute is K Independence which has the smallest number of occurrences.

CONCLUSION

Based on the number of 10 samples of Dapoer Enha Sago employees who have

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been tested using the Rought set application, it can be seen that the results are that the performance appraisal of 10 Dapoer Enha Sago employees shows good results 3 employees and 7 employees who have excellent performance. And for the manager of the cafe dapoer enha, it should be more improving employee performance by paying attention to employee timeliness, employee work effectiveness, work commitment and employee independence in completing work.

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