THE ROUGH SET METHOD IN MEASURING EMPLOYEE PERFORMANCE

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Abstract

Performance has a very important role because performance is a form of the end result of an employee's process in completing his duties. Employees who can complete their duties properly and correctly will have high performance. Therefore Punctuality, Technical Knowledge Regarding Work, Communication between Employees, and the Ability to Manage Work are believed to be able to influence the performance of an employee. To further accelerate the measurement of performance, a method is needed to measure it. The thought set method is a solution for measuring an employee's performance in several steps, namely: Decision System, Equivalence Class, Discernibilty Matric, Reduction, and Rules. This study measures the performance of employees using the Rough Set method on employees of the Qiana Padang Wholesale Store with a sample of 10 employees, so the results of this study are based on 10 samples of employees of the Qiana Padang Store which were carried out by testing using the Rough Set application. The employees of Toko Qiana Padang showed good results as many as 4 employees and there were as many as 6 employees who had excellent performance

Keywords: Employee Performance, Rough set

INTRODUCTION

Every company in carrying out its activities must have a goal to be achieved, to achieve or realize these goals every company must be good at choosing strategies, especially HR planning (Human Resources) which in essence is focused on certain steps taken by management. For the availability of permanent workers to occupy positions and at the right time in order to achieve the stated goals and objectives. Human resource management is the science and art of managing the relationships and roles of the workforce to be effective and efficient in helping the realization of the goals of the company, employees and society, Hasibuan in [1]. [2] Human resources are an important asset for an organization. They need attention from various parties so that their performance can be maximized so that

organizational goals are achieved. Based on this, human resource management is needed to increase the effectiveness of human resources in an organization.

The definition of performance or performance is a description of the level of achievement of the implementation of an activity program or policy in realizing the goals, objectives, vision and mission of the organization as outlined in the strategic planning of an organization. Performance can be known and measured if an individual or group of employees has criteria or benchmarks of success that have been established by the organization. Therefore, if there are no goals and targets set in the measurement, it is impossible for a person's performance or organizational performance to be known if there is no measure of success [3]. Mangkunegara 2009 in [4] states that: "performance is the

result of work in quality and quantity achieved by an employee in carrying out his duties in accordance with the responsibilities assigned to him". Meanwhile, Hasibuan 2005 in [5]. states that: "performance is a result of work achieved by a person in carrying out tasks assigned to those based on skills, experience, and seriousness and time". According to the above definition, performance is equated with the work results of an employee. To achieve good performance, the most dominant element is human resources, even though the planning has been well and neatly arranged, but if the person or personnel implementing it is not qualified and does not have high morale, then the planning that has been prepared will be in vain.

Data mining is a field that is growing rapidly in line with the development of information technology which involves the use of large and small scale databases. Information stored in databases becomes useless over time. Data mining can increase the added value of a database. We can dig up information stored in databases that have accumulated over a long period of time to obtain additional information [6]. Data mining is a form of implementation that is applied to look for a model and pattern that is able to predict data based on previous data in a certain time period [7]. Data mining, in simple terms is finding useful patterns in data and there are many different definitions and criteria for data mining. Data mining is also referred to as knowledge discovery, machine learning, and predictive analytics according to [8].

One algorithm that is simple and quite easy to implement data mining is the Rough Set algorithm. Rough Set is a mathematical technique developed by Pawlack in 1980. Rough Set is an efficient technique for Knowledge Discovery in Database (KDD) in the process and data mining stages [9].. Rough set theory is a mathematical tool to deal with insecurity and uncertainty which is introduced to process uncertainty and imprecise information [10]. Rough sets have been widely applied in many real problems in medicine, pharmacology, engineering, banking, finance, market analysis, environmental management and others [11]. The Rough Set algorithm can be used to analyze employee performance. Through the Rough Set method, outputs or rules can be generated so that knowledge is obtained in the form of decisions about assessments for employee performance whether very good, good or not good. Rough set theory divides the data into upper approximation, lower approximation and boundary classes. The rough area (boundary) in the rough set classification can be approximated by calculating the quantitative measure. Rough set theory will be implemented and developed on the basis of SQL queries. With Rough sets, it is possible to find hidden relationships and attribute reducts from a series of attribute data classifications. From these reducts, the rules can be generated, and quantitative measures are calculated to strengthen the rule. Rule reinforced by quantitative measure is used to classify [12]. Rough Set is a mathematical tool for dealing with uncertainty and uncertainty that is

introduced to process uncertainty and imprecise information [13].

METHOD

Employee performance in general is a manifestation of work performed by employees which is usually used as a basis or reference for assessing employees within an organization (Uguy, 2018). Good performance is a step towards achieving organizational goals. Therefore, performance is also a determining tool in achieving organizational goals so that efforts need to be made to improve employee performance.

This study aims to measure the performance of employees using the Rough Set method, because the Rough Set can represent a data set as a table, where rows in the table represent objects and columns and represent the attributes of these objects. The Rough Set method 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 (Jamaris, 2017). From these rules, you can make the right decision in solving a study related to employee performance at the Qiana Padang Store.

In order to facilitate data analysis, data processing stages were made using the Rough Set Alagorithm method as in the following process:
1. Decision System.
2. Equivalance Class.
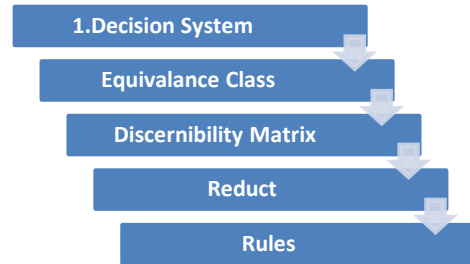3. Disceribility Matrix.
4. Reduct.
5. Rules

Figure 1. Knowledge Discovery Process with Rough Sets

The data used is the employee data of the Qiana Shop along with the attributes: Timeliness, Technical Knowledge Regarding Work, Communication between Employees, Ability to Manage Work. In order to assess and measure employee performance.

NO	NAMA
1.	Lian
2.	Putri
3.	Irma
4.	Riska
5.	Icha
6.	Nisha
7.	Windi
8.	Miko
9.	Dedi
10.	Mira

Table 1. Sample of employees at the Qiana Padang shop

The data used is the data of the Qiana Padang shop along with the attributes: Timeliness, Technical Knowledge Regarding Work, Communication between Employees, the Ability to Manage Work. In order to assess and measure the performance of the employees of the Qiana Padang Shop, it is based on a number of assessment components such as, Timing (Max. 40%), Technical

Knowledge Around the Work (Max. 30%), Communication Between Employees (Max. 15%) and Ability to Manage Jobs (Max. 15%).

[4] in the research methodology, there is a sequence of frameworks that must be followed, the order of this framework is the steps taken in writing. The following are the steps for the work taken:

Identify the Problem.
There will be a review of the system that will be studied to observe and carry out deeper exploration and explore the problems that exist in the current system. This stage is the first step in determining the problem formulation of the research.

Setting Goals
Based on the understanding of the problems 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.

Studying 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. This literature literature will serve as a guide for conducting research in order to facilitate the research process.

Collecting Data.
The method of data collection was done by direct observation of the Qiana Padang Shop. Apart from making observations, data base sampling was also carried out to support this research.

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.

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.

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.

Analyzing Test Results.
At this stage, observations and analysis will be carried out on the results of the implementation of the Rough Set method in determining the performance of the employees of the Qiana Padang Shop

RESULT
The data used in this research are: Data Decision System (DS) in the form of a list of the names of the employees of Toko

Qiana Padang at this time. There are several types of components that are used as a reference for measuring employee performance at the Qiana Padang Store, among others, as in the table below:

Kriteria yang dinilai	Bobot
a. Mengerjakan tugas dengan tuntas sesuai dengan waktu	10 %
b. Masuk dan pulang kerja sesuai dengan peraturan jam kerja	10 %
c. Bersungguh-sungguh dan teliti dalam menyelesaikan tugas	10 %
d. Mampu mempercepat menyelesaikan pekerjaan sebelum batas waktu yang ditentukan	10 %

Table 2. Punctuality

Kriteria yang dinilai	Bobot
a. Kemampuan memenuhi jumlah barang sesuai permintaan	15 %
b. Kecepatan menyelesaikan pekerjaan	15 %

Table 3. Technical Knowledge Around the Work

Kriteria yang dinilai	Bobot
a. Mampu berkomunikasi baik dengan atasan maupun rekan kerja	10 %
b. Berkomunikasi dengan Pihak-Pihak Eksternal (Mitra Bisnis, Klien dan Pelanggan).	5 %

Table 4. Communication Between Employees

Kriteria yang dinilai	Bobot
a. Mampu merencakan dan mengatur sebuah pekerjaan.	5 %
b. Mampu memecahkan masalah dalam waktu singkat dan dalam situasi dibawah tekanan.	5 %
c. mampuan bekerja sama dalam sebuah tim kerja	5 %

Table 5. Ability to Organize Work

Data Transformation

The total results of the assessment are then made into categories with the following conditions:

<50 is said to be less = 1

$62 \leq X \leq 74$ is categorized as Enough = 2

$75 \leq X \leq 84$ categorized as Good = 3

$85 \leq X \leq 100$ is categorized as Very Good = 4

The existing Qiana Store employee Decision System can be seen in the table with the data to be used as many as 10 (ten) data.

Nama Karyawan	Nilai KW	Nilai PTSP	Nilai KAK	Nilai KMP	Jumlah Nilai	Keputusan
Lian	40	29	15	15	99	Sangat Baik
Putri	36	20	14	14	84	Baik
Ima	32	22	14	15	83	Baik
Riska	40	29	15	15	99	Sangat Baik
Icha	40	30	15	14	99	Sangat Baik
Nisha	34	24	14	14	86	Baik
Windi	32	22	15	14	83	Baik
Miko	40	30	14	14	98	Sangat Baik
Dedi	38	30	15	15	98	Sangat Baik
Mira	40	14	15	15	99	Sangat Baik

Table 6. Decision Systems

The first step before we make the equivalent class determination is to transform back to attribute A (Punctuality), attribute B (Technical Knowledge about Work), Attribute C (Communication Between Employees), and Attribute D (Ability to Manage Work).

For attribute A, it is grouped into 4 groups, namely:
$0 \leq X \leq 15 = 1$
$16 \leq X \leq 30 = 2$

31≤X≤35 = 3
36≤X≤40 = 4

For attribute B, it is grouped into 4 groups, namely:
0≤X≤15 = 1
16≤X≤20 = 2
21≤X≤25 = 3
26≤X≤30 = 4

For attribute C, it is grouped into 4 groups, namely:
0≤X≤4 = 1
5≤X≤8 = 2
9≤X≤12 = 3
13≤X≤15 = 4

For attribute D is grouped into 4 groups, namely:
0≤X≤4 = 1
5≤X≤8 = 2
9≤X≤12 = 3
13≤X≤15 = 4

So that the results of the decision system can be seen in table 7.

Nama Karyawan	Nilai KW	Nilai PTSP	Nilai KAK	Nilai KMP	Jumlah Nilai	Keputusan
Lian	4	4	4	4	99	Sangat Baik
Putri	4	2	4	4	84	Baik
Ima	3	3	4	4	83	Baik
Riska	4	3	4	4	99	Sangat Baik
Icha	4	4	4	4	99	Sangat Baik
Nisha	3	3	4	4	86	Baik
Windi	3	3	4	4	83	Baik
Miko	4	4	4	4	98	Sangat Baik
Dedi	4	4	4	4	98	Sangat Baik
Mira	4	1	4	4	99	Sangat Baik

Table 7. Decision System

The formation of the Equivalence Class is done by eliminating data that has similarities, so that in the Equivalence Class the data remains 1 (one) Record. The results of the formation of the Equivalence Class can be seen in Figure 1.

Figure 1. Equivalence Class

Information:

It is known that attribute A (Punctuality), attribute B (Technical Knowledge Regarding Work), attribute C (Communication Between Employees), attribute D (Ability to Manage Work).

Generating Decision Systems using the Rough Set Method

The Decission System from Rosetta that has been imported into the system through the data input procedure is shown in the following figure.

Figure 2. Decission System Rosetta

Furthermore, the steps 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. Instead, they directly display the next process in the Rough Set method, namely the reduct results. The results of the reduct in this study are shown in Figure 3.

Figure 3. Reduct Rosetta Result

Figure 3 above shows the results of the reduct from the process that has been carried out. Later, these attribute-attributes will become a reference in carrying out the General Rule. The results of the general rule in this study will be displayed through the Rosetta process in Figure 4.

Figure 4. General Rule Rosetta

Based on the results of the generated rules above, it shows 32 (thirty two) rules or new knowledge that are composed of the constituent attributes. Based on the analysis carried out from the rules obtained, the number of appearances of the attributes of the employee's name of Qiana Shop was 10 (ten) times, the attribute value of KW was 5 (five) times, the attribute value of PTSP was 6 (six) times, the attribute value of KAK was 6 (six) times and the attribute number of values is 5 (five) times. So it can be seen that the attributes that are most influential in decision achievement are the attributes of Technical Knowledge Regarding Work (PTSP) and Communication between Employees (KAK) because they have the highest number of appearances of 6 (six) times. Attributes that have the next effect after are the value of Timeliness (KW) and the attribute value which has the same number of appearances as the second highest number of occurrences of 5 (five) times.

The population in this study were all employees of Toko Qiana which consisted of 10 employees who would be tested using the rought set method. The sample in this research took data from 10 employees of Toko Qiana to examine employee performance. So it can be seen that the performance appraisal of 10 employees of Toko Qiana shows good results there are 4 (four) employees and there are 6 (six) employees who have very good performance.

CONCLUTION

From the results of research and data processing, as well as the results obtained based on the number of samples of employees of the Qiana Padang shop as many as 10 employees who have been tested using the Rought Set application, it can be seen that the results are that the performance appraisal of 10 employees shows good results as many as 4 employees and as many as 6 employees who have excellent performance. And the owner of the Qiana Shop should further improve employee performance by paying more attention to Punctuality, Technical Knowledge About Work, Communication between Employees, Ability to Manage Work in completing a job.

By applying the Rough Sets method, it is hoped that owners can find out in detail the level of performance of their employees from all attributes such as Punctuality, Technical Knowledge About Work, Communication between Employees, Ability to Manage Work. So that the increase in employee performance at Qiana Stores can be improved again.

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