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Application of Apriori to Determine Correlations between Source Competencies Human Resources with Education and Working Period

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Abstract

Human resource competence (HR) is a key factor in supporting organizational performance. Referring to several problems in the Binjai City BKD, such as there is a difference between the competencies possessed by employees and the competencies needed to carry out their duties and responsibilities effectively, the placement of employees that are not in accordance with the competencies, the absence of a system to map and monitor employee competencies can cause difficulties in identifying development needs, as well as in the placement of appropriate employees. Employee competency mapping is relevant in the implementation of human resource management, both in planning, development and employee placement activities. Therefore, it is necessary to carry out competency mapping that can be used for various human resource management needs and this is in accordance with the priority program that will be carried out in the 2025 RKPD, namely improving the quality of innovative human resources. This study uses a priori algorithm with the Rapidminer application to be able to provide correlation results of human resource competencies. From the results of the research, a correlation was formed between human resource competence and education and work period, namely 8 *association rules* and the *highest best rule was obtained with support of 32% and confidence value* of 99.4%.

Keywords: *A priori, Competence, Working Period, Education*

1. Introduction

Employees are very valuable assets for the company that must be managed properly by the company in order to make an optimal contribution. The company can develop and progress if the performance of employees is in maximum condition. Good performance is one of the factors that is considered important in an effort to improve performance. So employee performance is the result of quality and quantity of work achieved by an employee in carrying out his duties in accordance with the responsibilities given. One of the things that must be the main concern of a company is seen from its working period [1]. Factors that affect employee performance as stated by Sutermeister "Employee performance is influenced by education, work experience, and ability. "This research also refers to the scientific journal Media Sisfo Vol.15, No.1, April 2021 by Anas with the conclusion that the 10 best rules were obtained using Weka data mining software. The company can develop and progress if the performance of employees is in maximum condition. Good performance is one of the factors that is considered important in an effort to improve performance. Therefore, the Human Resource Management (HRM) department is required to manage human resources properly in order to maximize employee performance.

2. Literature Review

2.1. A priori application in Data Mining

Data mining is the process of extracting useful information from large data sets. According to, data mining is part of the Knowledge Discovery in Database (KDD) process which consists of several stages such as data cleaning, data integration, data selection, data transformation, data mining, pattern evaluation, and knowledge presentation. Data mining is the process of extracting useful information from big data. This process involves statistical, mathematical, and computational techniques to identify patterns or relationships in data. Data mining is often used to aid decision-making in a variety of fields, including business, healthcare, education, and others [2].

2.2. A priori algorithm

Algoritma Apriori termasuk jenis aturan Asosiasi pada data mining. Aturan yang menyatakan asosiasi antara beberapa atribut sering disebut Affinity analysis or market basket analysis. Association rule data mining is a data mining technique to find the rules of a combination of

items. One of the stages of association analysis that has attracted the attention of many researchers to produce efficient algorithms is high-frequency pattern analysis (frequent pattern mining). The importance of an association can be known by two benchmarks, namely: support and confidence, support is the percentage of the combination of items in the database, while confidence is the strength of the relationship between items in the association rules [1].
The function of Association Rules is often referred to as "market basket analysis", which is used to find relationships or correlations between sets of items. This function is most widely used to analyze data for marketing strategies, catalog design, and business decision-making processes. The type of association rule can be stated as: "70% of people who buy noodles, juices and sauces will also buy white bread". (e.g.Risdawati, D., & Merlina, N.)
Association rules capture items or events in large data that contain transaction data. With the advancement of technology, sales data can be stored in large quantities called "data baskets." The association rules defined in the data basket, are used for promotional purposes, catalog design, customer segmentation and marketing targets. The formation of association rules that meet the minimum requirements for confidence is calculated by calculating the confidence of associative rules A→B, where support is supporting data and confidence is confidence. (e.g.Anas, A).

The confidence value of the A→B rule is obtained from the following formula:

$$Support\ (A) = \frac{\sum Transaction\ contains\ A\ And\ B}{\sum Total\ transaction\ amount} \text{ x } 100\%$$

$$Confidance\ (A) = \frac{\sum Transaction\ contains\ A\ And\ B}{\sum Transaction\ contains\ A} \text{ x } 100\%$$

Searches for the minimum qualifying combination of items from the support value in the database. The support value of an item is obtained by using the following formula:

$$Support\ (A) - \frac{The\ number\ of\ transactions\ contains\ A}{Total\ transaction}$$

The support *values* of the 2 items are obtained by using the formula:

$$Support\ (A,B) = p\ (A \cap B)$$

$$Support\ (A,B) - \frac{\sum The\ transaction\ amount\ contains\ A\ and\ B}{\sum Transaction}$$

After all the high-frequency patterns are found, then the association rules that meet the minimum requirements for confidence are searched by calculating the confidence of the associative rule A B. The ∪confidence value of rule A B is obtained by the following formula:∪

$$Confidence - P\ (B|A) - \frac{\sum J\ Transaction\ contains\ A\ And\ B}{\sum Transaction}$$

2.3. Human Resources

Humans are an important component in an organization that will move and carry out activities to achieve goals. The success of an organization is determined by the quality of the people in it. Human resources is management that consists of the policies and practices necessary to carry out the "people" aspect of a management position, including recruitment, training, evaluation, rewards, and a safe and fair work environment. He emphasized that HR includes all managerial decisions and actions that affect the relationship between the organization and its employees Human resources can be defined as all human beings involved in an organization in striving to realize the organization's goals.
divides the meaning of human resources into two, namely macro and micro definitions. The definition of human resources in macro terms is all human beings as residents or citizens of a country or within the boundaries of a certain region who have entered the age of the labor force, both those who have and have not obtained a job (employment). The definition of human resources in the micro sense in simple terms is a human being or a person who works or becomes a member of an organization called personnel, employees, employees, workers, laborers and others
HR is an important asset that needs to be managed properly so that companies can develop and compete in an increasingly competitive market. The importance of human resources lies in their role in creating added value for the organization. A competent and motivated workforce can increase productivity, innovation, and the quality of the services or products offered. Therefore, effective HR management is essential to maximize this potential.
Overall, HR is a vital element in an organization's success. Effective HR management should not only focus on operational aspects, such as recruitment and training, but also pay attention to long-term strategies that can improve the quality and productivity of the workforce. Thus, investment in human resource development is a crucial investment for the sustainability and future growth of the organization.

2.4. Human Resource Competencies

Human resources are one of the most important factors in the success or failure of an organization in achieving its goals, both public and private [3]. Human resource management is a strategic approach to skills, motivation, development and management of workforce organization [4] In this environment, management is required to develop new ways to maintain organizational members at high productivity and develop their potential to make maximum contributions to the organization. Human resource problems, which seem to be only internal problems of an organization, actually have a close relationship with the wider community as a public service measured by performance [5].

2.5. Education and Employment Period

The meaning of education can simply be interpreted as a human effort to foster his personality in accordance with the values in society and culture. Formal education provides the foundation of knowledge and skills needed to enter the workforce. Higher education also often equips individuals with analytical, problem-solving, and critical thinking skills that are highly valued in the workplace. Thus, however simple the civilization of a society, in which an educational process occurs or takes place. Education is an experiential process. Because life is growth, education means helping human inner growth without being limited by age. The growth process is a process of adjustment at each phase and adding skills in a person's development through education [6]

The working period can be seen from how long the employee devotes himself to the company, and how the relationship between the company and its workforce is. According to Hasibuan, the working period is the length of work in the company [7].The length of service is one of the indicators of how strong the employee's engagement with the place where he or she works, because the longer an employee works in a company, the smaller the chance of the employee resigning so that the stronger the emotional bond is obtained, which can ultimately trigger positive efforts in contributing [8].The working period that a person undergoes must provide a work experience, which then affects the level of professionalism of a person.The length of time an employee contributes his or her energy to a particular company and results in absorption from various human activities. The more experienced an employee is, the more it will help the company to produce more performance or output [9]. According to Foster,work time is directly proportional to work experience. Work experience is one of the most important factors in a company. Employees who have a lot of work experience will very easily adapt to the existing job [10], [11], [12], [13], [14], [15].

3. Analysis and Design

3.1. Research Supporting Data

The following is the human resource data that will be used in the research

Table 1: Human Resources Research Data

No	Competence	Education	Working period (yrs)
1	Good	D-III COMPUTER	16
2	Good	S-1/A-IV PHYSICAL EDUCATION, HEALTH AND RECREATION	13
3	Excellent	D-III NUTRIENT	22
4	Good	S-2 HEALTH SCIENCES	16
5	Good	SMK BANGUNAN	11
6	Enough	D-II/A-II PGSD	3
7	Good	S-1 SOCIAL SCIENCES	18
8	Excellent	S-2/POSTGRADUATE	24
9	Excellent	S-1 GOVERNMENT SCIENCE	25
10	Enough	S-1 MANAGEMENT	0
11	Enough	D-III MACHINE	3
12	Excellent	S-2 MASTER OF MANAGEMENT	20
13	Excellent	SEKOLAH MENENGAH ATAS	22
14	Good	SMP	19
15	Enough	SMP	15
16	Good	S-2 MAGISTEHIGH SCHOOLR SAINS	8
17	Enough	D-IV GOVERNMENT POLITICS	0
18	Good	D-I MIDWIFERY	15
19	Good	PRIMARY SCHOOL	16
20	Good	SEKOLAH DASAR	17

3.2. Method Application

The steps to implement manual calculations using a priori algorithm are as follows:

1. Data Preparation:
   Convert the data into a transaction format where each row represents a set of items (e.g., Competency, Education, Service Life).
2. Frequently Appearing Itemsets:
   Identify itemsets that frequently appear in the dataset.
3. Rules of Association:
   Generate rules in the form of IF X THEN Y\text{IF X THEN Y}IF X THEN Y and calculate support, confidence, and lift

From the research conducted to apply the rule association method to correlate between human resource competence with education and employment period using a sample of employee data that will be used as research support, it can be seen in Table 2.

Table 2: Competency Data

No.	Competence	Code	Interval
1	Excellent	K1	80-100
2	Good	K2	60-79
3	Enough	K3	40-59

Table 3: Education Data

No.	Education	Code
1	SD	P1
2	SLTP/SMP	P2

No.	Education	Code
3	SMA/SMU/Parcel C	P3
4	D1	P4
5	D2	P5
6	D3	P6
7	S1/D4	P7
8	S2	P8

Table 4: Working Period

No.	Working Period	Code
1	0-5	MK1
2	6-10	MK2
3	11-15	MK3
4	16-20	MK4
5	21-25	MK5

And the data that has been formed in the form of tabular dapar is aimed at

Table 5: Formation of tabular data

No	Competence			Education								Working Period				
	K1	K2	K3	P1	P2	P3	P4	P5	P6	P7	P8	MK1	MK2	MK3	MK4	MK5
1	0	1	0	0	0	0	0	0	1	0	0	0	0	0	1	0
2	0	1	0	0	0	0	0	0	0	1	0	0	0	1	0	0
3	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
4	0	1	0	0	0	0	0	0	0	0	1	0	0	0	1	0
5	0	1	0	0	0	1	0	0	0	0	0	0	0	1	0	0
6	0	0	1	0	0	0	0	1	0	0	0	1	0	0	0	0
7	0	1	0	0	0	0	0	0	0	1	0	0	0	0	1	0
8	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
9	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
10	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0
11	0	0	1	0	0	0	0	0	1	0	0	1	0	0	0	0
12	1	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0
13	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
14	0	1	0	0	1	0	0	0	0	0	0	0	0	0	1	0
15	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0
16	0	1	0	0	0	0	0	0	0	0	1	0	1	0	0	0
17	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0
18	0	1	0	0	0	0	1	0	0	0	0	0	0	1	0	0
19	0	1	0	1	0	0	0	0	0	0	0	0	0	0	1	0
20	0	1	0	1	0	0	0	0	0	0	0	0	0	0	1	0
∑	**5**	**10**	**5**	**2**	**2**	**2**	**1**	**1**	**3**	**5**	**4**	**4**	**1**	**4**	**7**	**4**

Then the process of forming *a* support of 1 *itemset* will be carried out with *a minimum amount of support* = 10%.
With the following formula:

$$\boldsymbol{Support}\ (\mathbf{A}) = \frac{\Sigma \text{ Transactions contain A}}{\Sigma \text{ Transactions}} * 100\%$$

Table. 6: Support 1 itemset

ID	*Count*	*Support*
K1	5/20	25%
K2	10/20	50%
K3	5/20	25%
P1	2/20	10%
P2	2/20	10%
P3	2/20	10%
P4	1/20	5%
P5	1/20	5%
P6	3/20	15%
P7	5/20	25%
P8	4/20	20%
MK1	4/20	20%
MK2	1/20	5%
MK3	4/20	20%
MK4	7/20	35%
MK5	4/20	20%

After obtaining 1 itemset, select some data that meets the predetermined value, the value itself is the limit of the number used to obtain the selected number, the support value is 10%, as seen in Table 7 below:

Table 7: Support 1 itemset

ID	*Count*	*Support*
K1	5/20	25%
K2	10/20	50%
K3	5/20	25%

ID	*Count*	*Support*
P6	3/20	15%
P7	5/20	25%
P8	4/20	20%
MK1	4/20	20%
MK3	4/20	20%
MK4	7/20	35%
MK5	4/20	20%

The process of forming C2 or called 2 itemsets with a minimum amount of support = 10%. Table III.8 shows the combination of 2 itemsets with the following formula:

$$\textbf{Support}\ (\mathbf{A}, \mathbf{B}) = \frac{\Sigma\ \text{Transactions contain A dan B}}{\Sigma\ \text{Transaction}} * 100\%$$

Combinations of 2 itemsets that do not meet the minimum support requirements will be removed.

Table 8: Support 2 Item Set

ID	Count	Support
K1 & K2	0/20	0%
K1 & K3	0/20	0%
K1 & P6	1/20	5%
K1 & P7	1/20	5%
K1 & P8	2/20	10%
K1 & MK1	0/20	0%
K1 & MK3	0/20	0%
K1 & MK4	1/20	5%
K1 & MK5	4/20	20%
K2 & K3	0/20	0%
K2 & P6	1/20	5%
K2 & P7	2/20	10%
K2 & P8	2/20	10%
K2 & MK1	0/20	0%
K2 & MK3	3/20	15%
K2 & MK4	6/20	30%
K2 & MK5	0/20	0%
K3 & P6	1/20	5%
K3 & P7	2/20	10%
K3 & P8	0/20	0%
K3 & MK1	4/20	20%
K3 & MK3	1/20	5%
K3 & MK4	0/20	0%
K3 & MK5	0/20	0%
P6 & MK1	1/20	5%
P6 & MK3	0/20	0%
P6 & MK4	1/20	5%
P6 & MK5	1/20	5%
P7 & MK1	2/20	10%
P7 & MK3	1/20	5%
P7 & MK4	1/20	5%
P7 & MK5	1/20	5%
P8 & MK1	0/20	0%
P8 & MK3	0/20	0%
P8 & MK4	2/20	10%
P8 & MK5	1/20	5%

Setelah memperoleh 2 itemset dipilih beberapa data yang memenuhi nilai yang telah ditentukan, nilai itu sendiri adalah batasan angka yang digunakan untuk memperoleh angka yang dipilih, nilai support 10%, seperti terlihat di Tabel III.9

Table 9: Support 2 Itemset

ID	Count	Support
K1 & MK5	4/20	20%
K2 & MK3	3/20	15%
K2 & MK4	6/20	30%
K3 & MK1	4/20	20%

The process of forming C3 or called the minimum amount of *support* = 10%, the calculation results can be seen in Table III.10 with the following formula:

$$\textbf{Support}\ (\mathbf{A}, \mathbf{B}) = \frac{\Sigma\ \text{Transactions contain A, B \& C}}{\Sigma\ \text{Transaction}} * 100\%$$

Table 10: Support 3 Item Set

ID	Count	Support
K1, MK5 & MK3	0/20	0%
K1, MK5 & MK4	0/20	0%

ID	Count	Support
K1, MK5 & MK1	0/20	0%
K2, MK3 & MK5	0/20	0%
K2, MK3 & MK4	0/20	0%
K2, MK3 & MK1	0/20	0%
K2, MK4 & MK5	0/20	0%
K2, MK4 & MK1	0/20	0%
K3, MK1 & MK5	0/20	0%
K3, MK1 & MK3	0/20	0%
K3, MK1 & MK4	0/20	0%

After all the high-frequency patterns are found, the association rules with the results of the frequency patterns shown in Table III are searched. 11 as follows:

Table 11: Results of the Highest Frequency Pattern

ID	*Count*	*Support*
K2 & MK4	6/20	30%

After all the high-frequency patterns have been found, the association rules that meet the minimum requirements for confidence are searched by calculating the confidence or association A→B, with a minimum confidence of 10%.

Table 12: Final Results of the Association

If ancedent then consequent	*Support*	*Confidence*	*S*C*
If K2 → MK4	30%	100%	30%

From the results of the test conducted on a sample of 20 data obtained, it can be concluded that the results of the Final Association Rules were obtained as a result of rules that met the support value of 30% and 100% confidence in determining the competence of human resources, namely with the K2 (Good) category with a working period, namely MK4 (16-20 years).

4. Analysis and planning

4.1. Discussion

This research was conducted at the Regional Civil Service Agency (BKD) of Binjai City which is a Regional Civil Service Agency (BKD) is one of the local government work units tasked with managing various aspects of personnel in the local government environment. The main functions of BKD include personnel administration management, human resource development (HR), preparation and implementation of personnel policies, and supervision of the implementation of personnel regulations. BKD is also responsible for the process of recruitment, appointment, promotion, mutation, and retirement of civil servants (PNS) in their regions. In addition, BKD plays a role in improving employee competence through training and career development, as well as maintaining employee welfare by regulating personnel rights.

In this chapter, it will be explained about the application of the Apriori algorithm to determine the correlation between human resource competence (HR) and education level and working period. This research aims to identify patterns that emerge from HR data, which can then be used to understand the factors that contribute to the level of competence possessed by employees. By using the association method of the Apriori algorithm, this study is expected to provide insights that can be used as a basis for decision-making related to human resource development policies.

The steps taken in the application of a priori to determine the correlation between human resource competence and education and work period in this study used rapidminer which involved data preparation, data format (tabular) and data import. The data used in this study consists of HR data which includes information about education, working period, and competence. These datasets are imported into RapidMiner for further processing. Before the analysis is carried out, the data must be prepared and processed first. This includes data cleanup, such as removing incomplete or duplicate entries, as well as redefining variables if necessary (for example, grouping tenure or education into clearer categories).

4.1.1. Program Interface Discussion

In this interface discussion, it will be explained about the results of designing programs using the Rapidminer application, a correlation process will be designed by inputting data which is then imported from Microsoft Excel which will then be processed using the Rapidminer application whose output results have a display in the form of association rule results that will be displayed on the application used.

4.1.2. Discussion of Input Data

System input data is in the form of data obtained from the Binjai City BKD as of 2023. The system input data has been stored in Ms.Office Excel as a data container, then the data used in the system can be seen as follows:

Table 13: Tabular 500 SDM

No	K1	K2	K3	P1	P2	P3	P4	P5	P6	P7	P8	MK1	MK2	MK3	MK4	MK5
1	0	1	0	0	0	0	0	0	1	0	0	0	0	0	1	0
2	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
3	0	1	0	0	0	0	0	0	0	1	0	0	0	0	1	0

4	0	1	0	0	0	0	0	0	0	1	0	0	0	1	0	0
5	0	1	0	0	0	0	0	0	0	1	0	0	0	0	1	0
6	0	1	0	0	0	0	0	0	0	0	1	0	0	0	1	0
7	0	1	0	0	0	1	0	0	0	0	0	0	0	1	0	0
8	0	1	0	0	0	1	0	0	0	0	0	0	0	1	0	0
9	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0
10	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0
11	0	1	1	0	0	0	0	1	0	1	0	1	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
13	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
14	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
15	0	1	0	0	0	1	0	0	0	0	0	0	0	0	1	0
16	0	1	0	0	0	0	0	0	0	1	0	0	0	1	0	0
17	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
18	0	0	1	0	0	0	0	0	0	1	0	0	1	0	0	0
19	0	1	0	0	0	1	0	0	0	0	0	0	0	1	0	0
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
500	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0

4.2. Implementation of a priori algorithm using Rapid Miner

Implementation is the stage of implementation as well as testing for the new system and is the stage where the application will be run in real conditions. In this section, the Rapid Miner process in finding a correlation between human resource competence and education and employment period will be discussed. The data that will be used is 500 HR data in excel form. At this stage, what is done is to prepare the data to be processed, namely HR data.
Below are the working steps for implementing data mining using Rapid Miner, namely the first step in the implementation of the Apriori algorithm is data pre-processing. At this stage, the data that has been collected is prepared to be suitable for analysis.

4.2.1. Trial System Using Rapidminer

In the trial of this system, the Rapidminer process in determining the correlation between human resource competence and education and work period will be discussed. Below are the implementation work steps that are carried out including: regulating the role of attributes (set roles), namely Education, Work Period, and Competency Attributes, Discretize Data (if needed) in the sense that if the attributes of work or education are numerical, then the data is discretized or grouped into certain categories to facilitate analysis.

Human Resource Competency Correlation Process Trial. The following are the stages of the data correlation testing process with the Rapidminer application. The formation of the Apriori Algorithm process on Rapid Miner can be seen in the following figure:

a. Open the Rapidminer app and select Blank Process to start a new process.

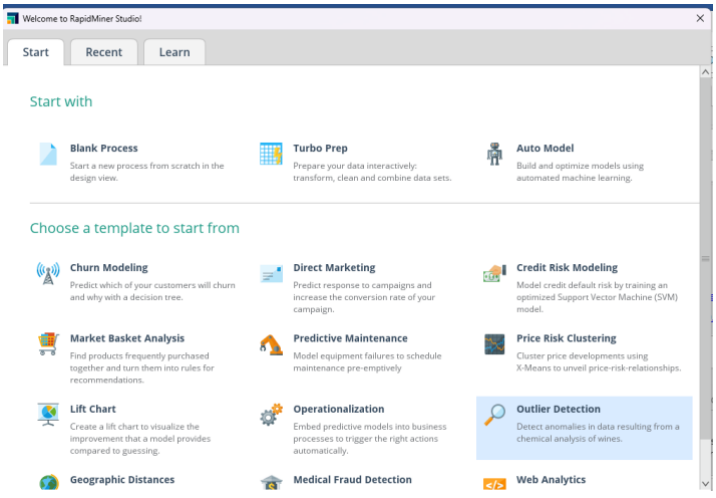

Fig. 1: Proses Baru untuk Korelasi Data SDM

b. Process operator arrangement in Rapidminer; At this stage, drag and drop the excel data table into the process of operators. The following is a display of the correlation process arrangement in Rapidminer.

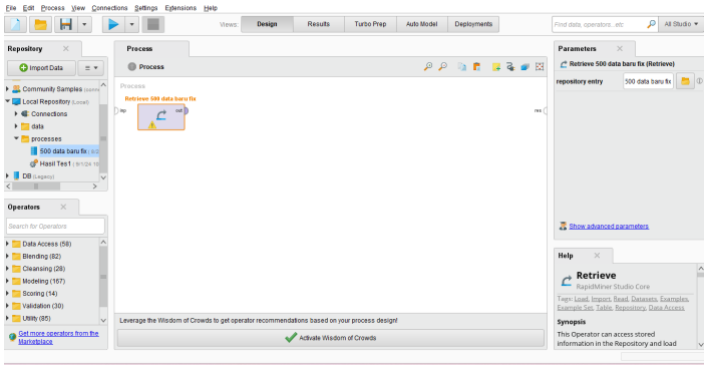

Fig. 2: Data Input in Read Excel

c. Then select the data to be processed is the data with the file name 500 data fix baru.xlsx in the documents folder.

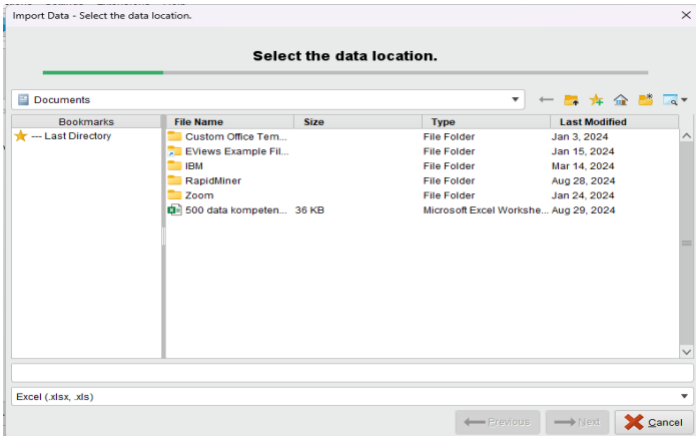

Fig. 3: Input Data File Retrieval Process

d. Next, select the sheet to be processed on the system, here is the display in the data retrieval process on Rapidminer then click Finish.

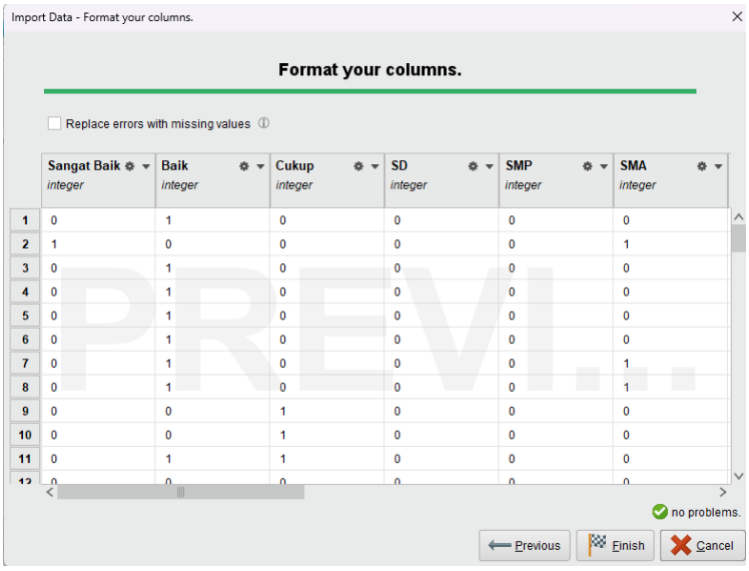

Fig. 4: Data to be processed

e. Design process on Rapidminer; At this stage, it is continued with the association with tools create association rules. The following is a view of the entire design arrangement of the HR competency data correlation process.

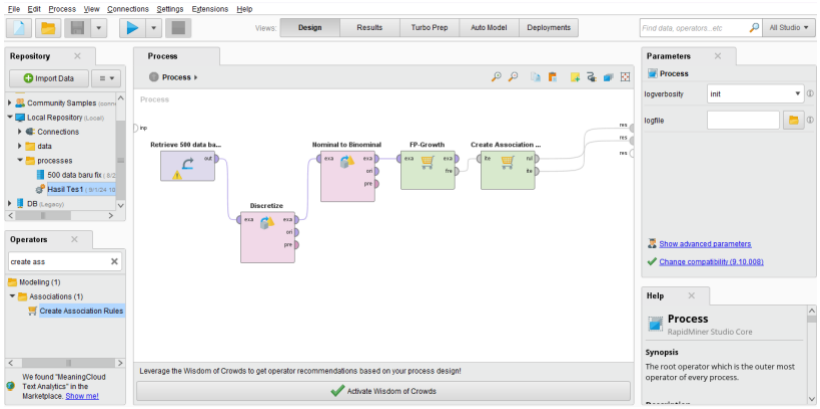

Fig. 5: Process Design on Rapid miner

f. After the system is run, the results of the HR competency correlation process are obtained. This is the last stage of the rapidminer data mining process, and a new A priori tab will appear, which contains a description of the entire itemset as shown below:

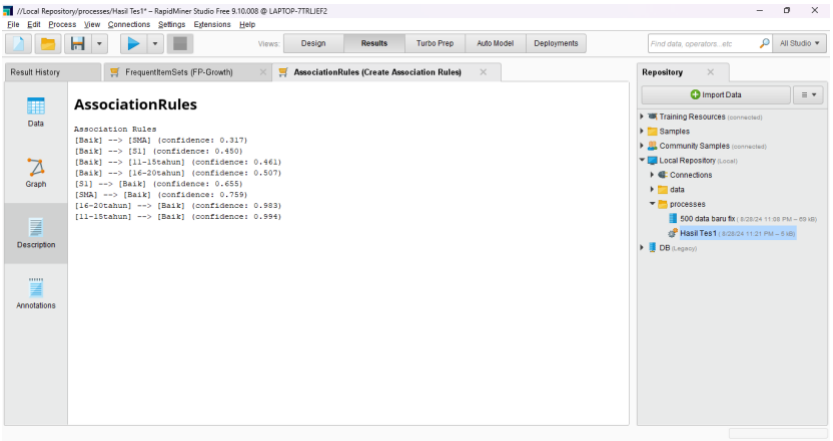

Fig. 6: Results Association Rule 1

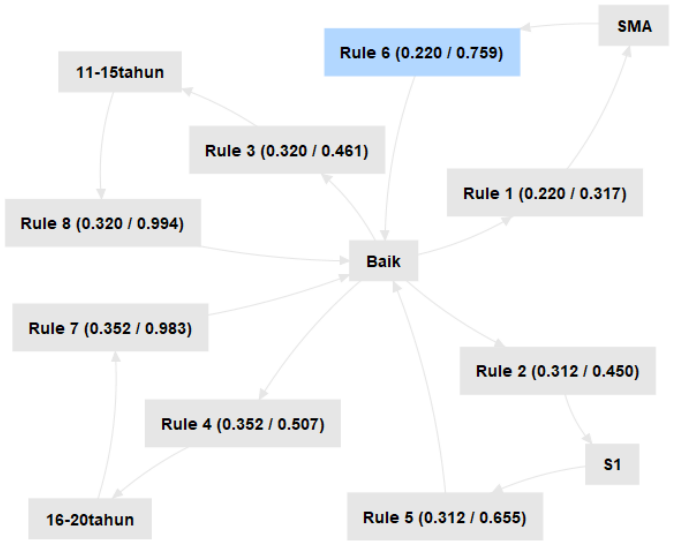

Fig. 7: Results Association Rule 2

4.2.2. Test Result Description

Based on the table of 500 HR competency data that has been processed using Rapidminer, the results are obtained in the form of 8 *association rules* with the following details:

1. Rule 1: Good Competence with high school education has support of 0.220 and confidence of 0.317. This means that only 31.7% of the data has Good competence which is also associated with high school education. This suggests that this relationship is weak and may not be very significant

2. Rule 2: Good Competence with S1 education has a support of 0.312 and confidence of 0.450. This means that 45% of the data that has Good competence is also associated with S1 education. This relationship is stronger than Rule 1, but it is still relatively weak.
3. Rule 3: Good Competence with a working period of 11-15 years has a support of 0.320 and confidence of 0.461. This means that 46.1% of the data that have Good competence are also associated with a working period of 11-15 years. This relationship is similar to Rule 2 in terms of strength.
4. Rule 4: Good Competence with a working period of 16-20 years has a support of 0.352 and confidence of 0.507. This means that 50.7% of the data that has good competence is also associated with a 16-20 year working period. This relationship is starting to approach a limit that can be considered significant.
5. Rule 5: S1 education with good competence has support of 0.312 and confidence of 0.655. This means that 65.6% of the data that have S1 Education is associated with Good competence.
6. Rule 6: High school education with good competence has support of 0.220 and confidence of 0.759. This means that there is a fairly strong relationship between high school education and Good competencies even though the support is relatively low.
7. Rule 7: Working period of 16-20 years with Good Competence has support of 0.352 and confidence of 0.983. This rule is very strong with 98.3% confidence. This shows if a person has a working period of 16-20 years, it is very likely to have Good competence.
8. Rule 8: Working period 11-15 years with Good competence has support 0.320 and confidence 0.994. This is the strongest rule with almost 100% confidence which shows that almost everyone with a working period of 11-15 years has Good competence.

From the results of the association rule above, several conclusions can be drawn that:

1. The relationship between tenure and competence is good
   This shows a very strong relationship between the working period of 11-15 years and 16-20 years (rules 7 and 8) with Good competence. This means that service life can be a very strong indicator of this correlation.
2. The relationship between education and competence is good
   The relationship between education and good competence is quite significant. This can be seen in rules 5 and 6. However, this relationship is not as strong as the relationship with the working period.
3. When competence becomes a premise, the results show a weak relationship with education, but slightly stronger with tenure.

4. Conclusion

This study aims to apply a priori algorithm to determine the correlation between human resource competence (HR) and education level and working period. Through the use of RapidMiner Studio, data covering variables of HR competencies, education, and tenure were processed to find significant association patterns. Based on the results of the research and discussion that has been carried out, conclusions can be drawn as follows:

From testing using the RapidMiner application using the Apriori Algorithm into the data mining system, the results of correlation data between human resource competence and education and work period were obtained, namely 8 association rules. From testing using the RapidMiner application using the Apriori Algorithm into the data mining system, the results of the correlation data between human resource competence and education and work period were found, the highest best rule was found with support of 32% and a confidence value of 99.4%.

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