Application of Business Intelligence to support decision making in determining competent laws in the culinary sector in Deli Serdang Regency using the decision tree algorithm.

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ABSTRACT

This study examines the application of Business Intelligence (BI) in identifying high-potential culinary Small and Medium Enterprises in Deli Serdang Regency. By using the Decision Tree algorithm, a prediction model is built based on historical sales data, business characteristics, and business environment factors. The results of the model evaluation show that Decision Tree is able to classify competent Small and Medium Enterprises. Key factors that influence the success of Small and Medium Enterprises, such as product quality, marketing strategy, and access to financing, were successfully identified through decision tree analysis. This study concludes that the application of BI with the Decision Tree algorithm can be an effective tool for stakeholders in supporting the development of Small and Medium Culinary Enterprises in Deli Serdang Regency

Keyword : *Business Intelligence*; *Data Mining*; *Decision Making*; *Small and Medium Culinary Enterprises*

1. INTRODUCTION

In the digital era like today, competition in the culinary sector is getting tighter. Small and Medium Culinary Enterprises are faced with the challenge of continuing to innovate and improve performance in order to survive and grow. To overcome this challenge, a system is needed that is able to analyze data comprehensively and provide appropriate recommendations.

Business Intelligence (BI) is an approach that utilizes technology to collect, manage, and analyze data with the aim of supporting decision making. With BI, we can gain valuable insights into business performance, market trends, and consumer behavior. BI is defined as follows: BI systems combine data collection, data storage, and knowledge management with analytical tools to present complex internal and competitive information to planners and decision makers (Afrizal Zein et al., 2023).

The Decision Tree algorithm is one of the techniques in data mining that is used to create predictive models based on historical data. This model will produce a "decision tree" that describes a series of rules for classifying data into certain categories. In the context of Small and Medium Culinary Enterprises, Decision Tree can be used to classify Small and Medium Enterprises based on their potential for success.

2. RESEARCH METHOD

In this study will use Decision Support System and one of the data mining methods, namely the classification method using the decision tree algorithm.

Decision Support System (DSS) as a computer based system consisting of tree interacting components, a language system (a mechanism to provide communication between users and other Decision Support System components), a knowledge system (a repository of problem domain knowledge that exist in the Decision Support System or as data or as a procedure), and a problem processing system the relationship between the other two components, consisting of one or more general problem manipulation capabilities needed for decision making (Sumarno et al., 20216).

Before Entering the Decision tree algorithm, the classification method in data mining is explained first. In Data Mining there are several methods, namely classification, Sequencing, Association, Oulier

Detection, Clustering, Regression and Forecasting. The Calssification Method Aims to estimate the class of an object whose label is unknown, in there are several algorithms that are often used in classification method, namely logistic regression, Naïve Bayes, Decision Tree, Random Forest, K Nearest Neighbour and Artificial Neuralk Network.

In This Study, the decision tree algorithm will be user. Decision tree is a supervised learning algorithm thah is non parametric. Has a Hierarchical tree structure, consisting of root nodes, branches, internal nodes and leaf nodes.

3. RESULTS AND DISCUSSION

In This research, several stages will be used, namely collecting raw data, cleaning raw data and analyzing processed data. The following are the stages of the research process,

A. Collecting Data Row

In This Data collection requires several attributes, namely the name of business actor, how long the business actor has ben running this business, and the income of the last 1 month in running the business. The following is the business actor data that has been collected

nomor	Nama UKM	Kualitas Makanan	Kebersihan	Harga	Pelayanan	Nilai	Hasil
1	MUSIAH	9	8	7	7	31	Berkompeten
2	EDI PRIANTO	1	1	3	4	9	Tidak Berkompeten
3	RIDHO AKBAR	4	3	6	2	15	Tidak Berkompeten
4	KIKI ANGGARINI	2	5	4	1	12	Tidak Berkompeten
5	JAUHARI	4	0	1	1	6	Tidak Berkompeten
6	DEDI YANTO	6	6	5	0	17	Berkompeten
7	KANAFILA	6	7	4	2	19	Berkompeten
8	M. DANI	0	6	4	4	14	Tidak Berkompeten
9	KUMAIDI	2	6	3	1	12	Tidak Berkompeten
10	RAMYANTO	4	0	2	9	15	Tidak Berkompeten
11	SUYONO	7	4	10	7	28	Berkompeten
12	DAHLAN	1	9	0	0	10	Tidak Berkompeten
13	NILA WATI	6	2	3	3	14	Tidak Berkompeten
14	USUP GINTING	2	10	9	1	22	Berkompeten
15	MISI	4	7	5	4	20	Berkompeten
16	IRWAN	9	5	9	7	30	Berkompeten
17	RADIMAN PURBA	6	7	10	2	25	Berkompeten
18	WARSINO JOKO	9	2	10	5	26	Berkompeten
19	HAMIDAH	6	2	2	1	11	Tidak Berkompeten
20	SUGIANI	7	7	1	3	18	Berkompeten
21	AZURA SUCI RAMADANI	3	4	8	0	15	Tidak Berkompeten
22	MARDIATI	5	3	2	2	12	Tidak Berkompeten
23	M. HERI	8	3	8	5	24	Berkompeten
24	SUMARNI	2	5	7	2	16	Berkompeten
25	YUSMAN	5	2	7	2	16	Berkompeten
26	SULIAH	0	5	9	4	18	Berkompeten
27	PIKI RIANTO	3	2	0	10	15	Tidak Berkompeten
28	SUYETNO	10	2	4	8	24	Berkompeten
29	ISKANDAR	2	1	9	8	20	Berkompeten
30	NAZARUDDIN HSB	0	9	9	1	19	Berkompeten
31	SUSANTI	9	5	4	8	26	Berkompeten

Fig 1. Data Collection

B. Data Processing

In This processing will directly use the rapid miner tool. In it use, we simply upload the data that we have prepared before into the rapid miner tool, after that it will enter into several poits, the first of which is to ensure that the data is correct
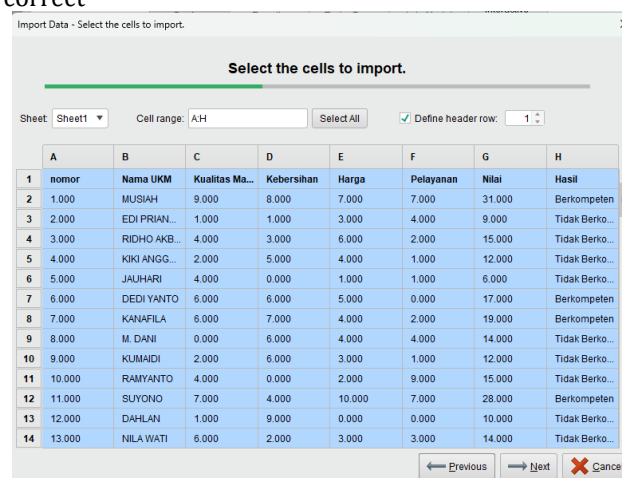

Fig 2. Data Collection

Next, after confirming the data, immediately determine the format of the data that has been imported
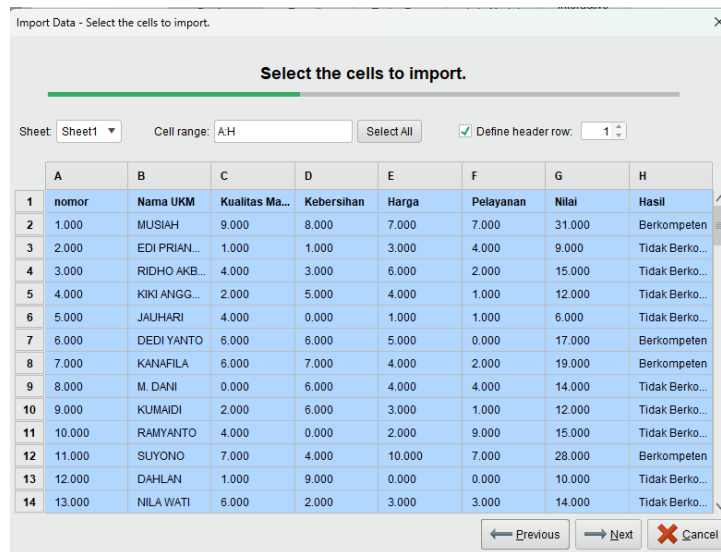

Fig 3. Format Data

After determining the table format, the next step is to place the data that will be processed later after the data is imported.
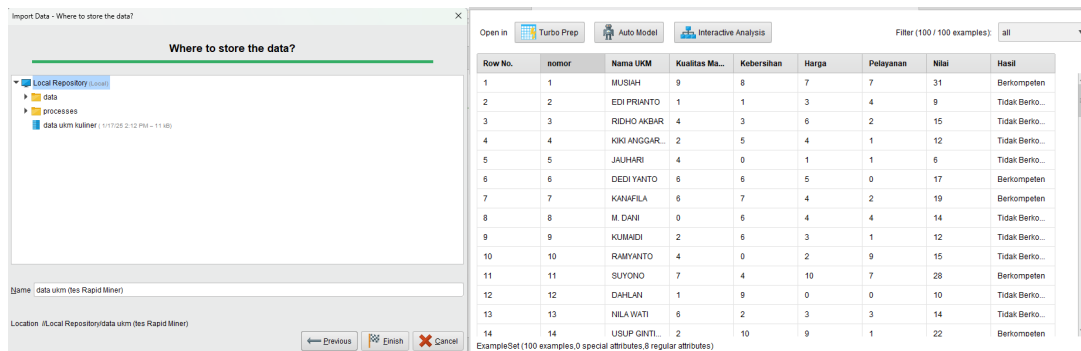

Fig 4 Data location placement

Next, go directly to the Design section of the Rapid miner application. In this design section, we will pull the data that has been uploaded earlier to be processed in rapid miner as shown in the image below
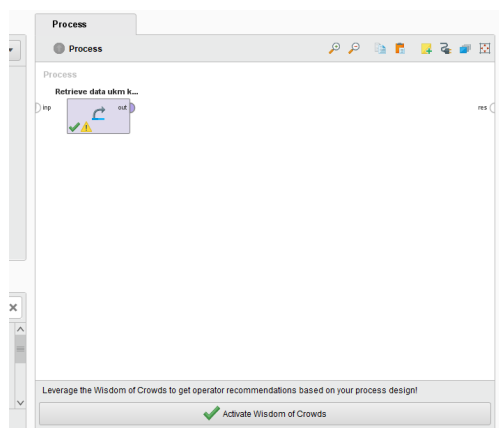

Fig 5 Design Rapid Miner

After it has been entered into the process section, then next please determine the role first in the operator section in rapid miner as shown in the image below.
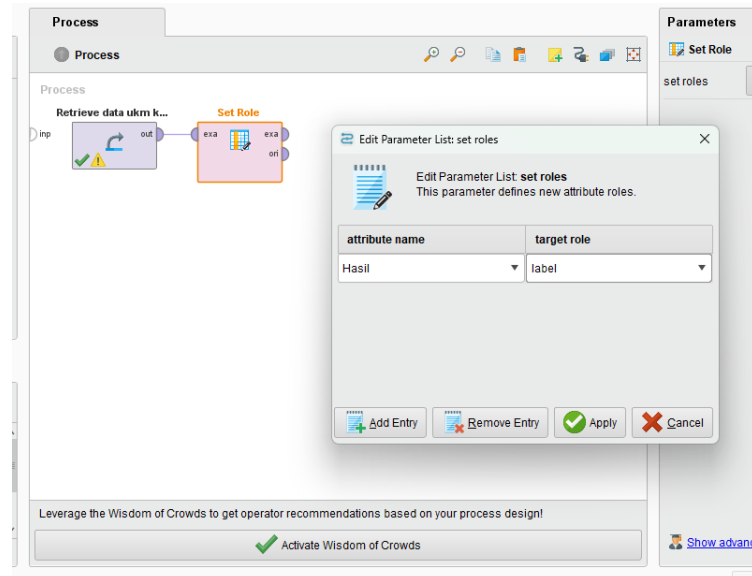

Fig 6 Design Rapid Miner Role

Next, after determining the role on the rapid miner, we immediately type in the operator section to use what algorithm to process the data. As explained earlier, the algorithm used is the Decision Tree algorithm.
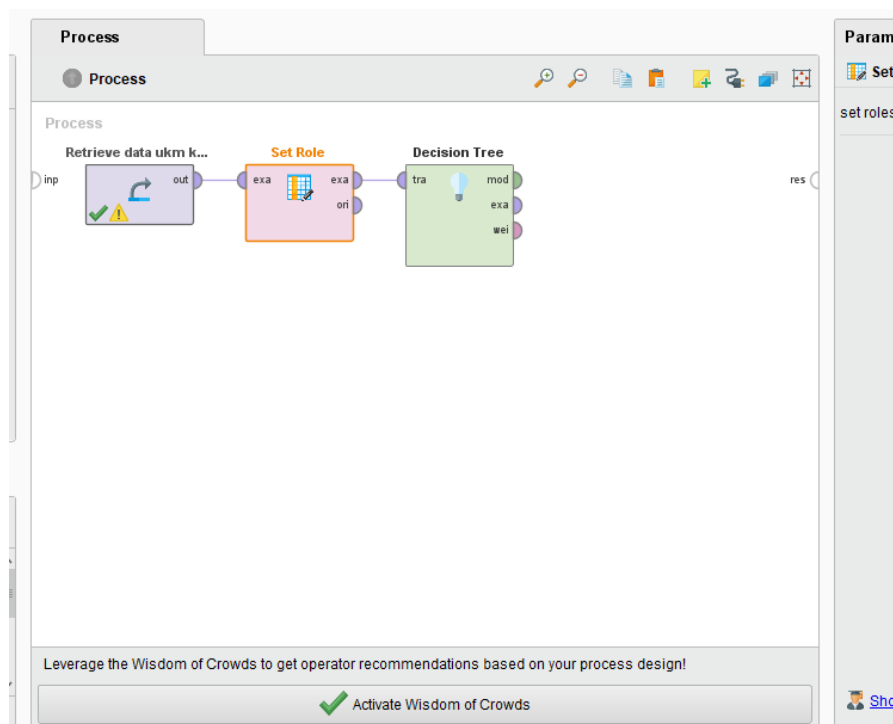

Fig 7 Algorithm Decision Tree

If the algorithm has been determined and the label has also been determined, then the next process is to simply drag the arrow on the algorithm to the res point in the right corner of the process panel. Then

immediately click process, then the data will be processed according to the algorithm used. After being successfully processed, the results will come out which give a decision as shown in the image below
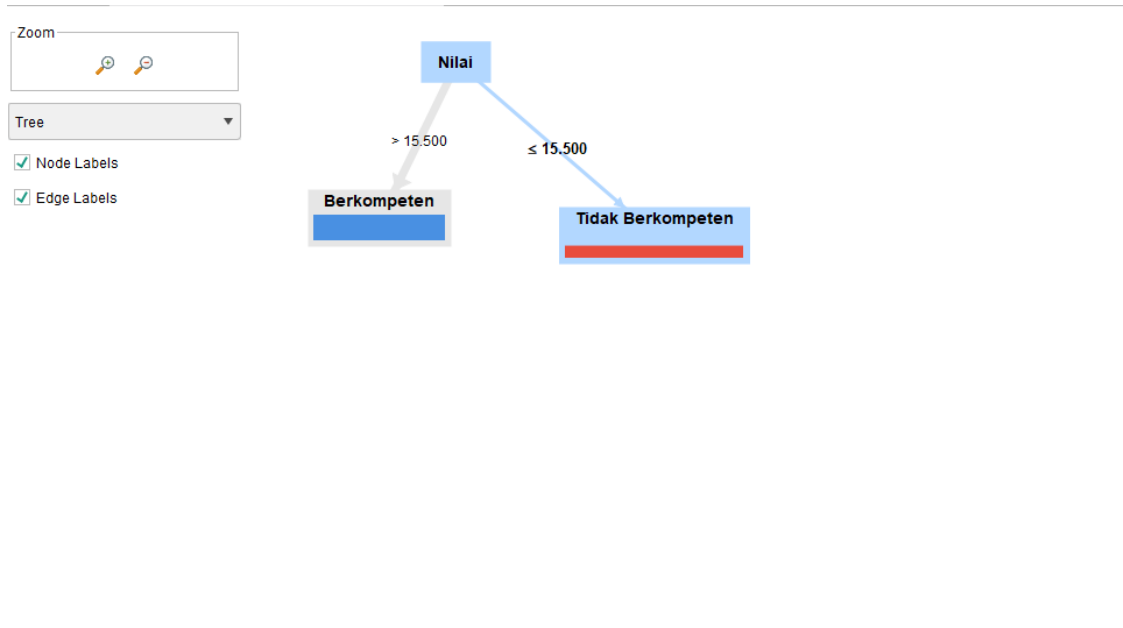

Fig 8 Report

Fig 9 Report

4. CONCLUSION

This study offers an innovative solution to support the development of culinary MSMEs in Deli Serdang Regency. By utilizing BI technology and the Decision Tree algorithm, it is expected to provide a significant contribution to regional economic growth, and of course using the Rapid Miner tool as a data processor and Power BI for tools as data visualization. By using these tools, it can make it easier to make decisions from a lot of data and with good and correct visualization, it becomes easier to analyze a lot of data. Thus, for decision making from a lot of data, it is highly recommended to use Rapid Miner as a data processor using the Decision Tree algorithm

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