



## Testing the C45 Algorithm with Rapid Miner for Stock Selection (Case Study: Toko Usaha Muda)

Paska Marto Hasugian

STMIK Pelita Nusantara

Email: paskamarto86@gmail.com

### ABSTRACT

One of the keys to the success of a retail company is good stock management. Intuition-based methods are often not enough because customer demands are always changing. This research concentrates on the use of the C4.5 decision tree algorithm on the RapidMiner platform to optimize the selection of goods in the Toko Usaha Muda. This algorithm is used to predict future stock requirements by looking at previous sales patterns in stores and historical sales data. The results show a significant increase in the accuracy of stock predictions and a decrease in the probability of loss due to excess or stockouts. This implementation not only enhances the operations of the Toko Usaha Muda, but also provides a framework that other retail businesses can use to increase their profits through better stock management.

*Keywords: RapidMiner, stock, Algorithm C4.5, goods, stock predictions*

### INTRODUCTION

In the increasingly advanced digital era, efficient and precise inventory management is essential for retail businesses. The need to respond quickly to market demand dynamics requires tools and methods capable of providing deep insight into consumption trends and customer preferences. One of the shops in Palangkaraya, namely Toko Usaha Muda, offers products such as party bags, backpacks and suitcases through a wholesale system. Until now, it has relied on traditional methods based on intuition and experience in managing stock. Data-based approaches are now becoming increasingly relevant [1]. In this system, buyers order products to be picked up after the production process is complete, with prepayment either in full or in part as a down payment. However, there is a problem in this system, such as the difficulty of shop owners in determining the remaining stock of goods or the best-selling goods. The determination of the stock of goods is influenced by the number of goods sold. During this time, inventory data processing is done manually by recording it in the general ledger, causing the recapitulation to take a long time.

Therefore, the main problem raised in this research is the implementation and testing of the C45 algorithm with RapidMiner for processing stock inventory data at the Toko Usaha Muda. The C45 algorithm, which is included in the decision tree category, has been known to be effective in various applications including stock analysis and prediction [2]. With the integration of the RapidMiner platform, this algorithm is able to utilize historical sales data to provide more precise stock selection recommendations [3].

Algorithm C4.5 is a decision tree classifier that can be used for data mining [4]. This algorithm has been used to analyze and classify data regarding bad debts of car consumers at PT. Sinarga Galang [5]. Algorithm C4.5 selects the attribute from the data that is most effective at dividing its sample set into subsets that are enriched in one class or another, and the attribute with the highest normalized information gain is selected to make the decision. The C4.5 algorithm has been used in various studies to improve the accuracy of classification data sets. Therefore, this algorithm can be used to analyze credit defaults at PT. Sinarga Galang and classifying data on bad debts of car consumers.





The focus of this research is limited to the factors that influence the selection of stock items, including items that are sold out, items that are still available in large quantities, and best-selling items [1]. This study aims to examine the implementation and effectiveness of the C45 algorithm on the RapidMiner platform for optimizing stock selection at Toko Usaha Mudas. Through this case study, it is hoped that it can provide a concrete view of how technology and data analysis can support retail business operations in the digital era [6].

## METHOD

Data mining is the process of getting useful information from large database warehouses. Data mining can also be interpreted as extracting new information taken from large chunks of data that helps in decision making. Algorithm C4.5 is an algorithm used to form a decision tree. Decision trees are a very powerful and well-known method of classification and prediction. The decision tree method turns very large facts into decision trees that represent rules. Rules can be easily understood with natural language. And they can also be expressed in the form of database languages such as Structured Query Language to find records in certain categories

The use of appropriate methods in research is the key to the validity and reliability of the results obtained. In the context of the retail industry, especially related to stock management, an analytical approach utilizing historical data is essential. This study adopts an approach based on the C45 algorithm with the help of RapidMiner to understand and optimize the selection of stock items at the Toko Usaha Muda. The following is the adopted research methodology, with reference to related literature [7][8][9].

Data sources use: Primary Data (Obtained from direct interviews and field observations) and Secondary Data: (Historical stock and sales data from Toko Usaha Muda records) [10]. Data collection was obtained through: Interviews with store owners and staff [11] and Data collection from the internal records of the Toko Usaha Muda [10]. This research uses RapidMiner to implement the C45 algorithm, in accordance with the literature that recommends its use for complex data analysis [12].

### Data Analysis Process

- **Data Pre-processing:** Involves cleaning and normalizing data [13].
- **Model Training and Testing:** Using the k-fold cross-validation approach [14].
- **Model Evaluation:** Evaluation metrics such as accuracy, precision, recall, and F1-score were adopted [15].

Validation is carried out by applying the model to actual data to check its effectiveness in real conditions [16]. Findings are analyzed to provide practical action recommendations for Toko Usaha Muda.

## RESULTS AND DISCUSSION

This research focuses on implementing the C45 algorithm using the RapidMiner platform to help Toko Usaha Muda optimize stock selection based on historical sales data. This data includes information about items sold, quantity, date of sale, and ongoing promotions. Before applying the algorithm, the data is cleaned of noise and incompleteness. Next, the data is normalized to ensure that all features are of the same scale. The data is then divided into two sets: 70% for training and 30% for testing. The results of the decision tree model are interpreted to understand the features that most influence stock selection. These features provide insight into the factors influencing sales.





After the model was tested on actual Toko Usaha Muda data, the validation results showed that the model was accurate. Once proven accurate, this model can be used to predict stock needs for a longer period of time, usually several months into the future. Based on the results of stock analysis and predictions, strategic recommendations are made, which include what items to order and when.

1. **Data Input.** Open the RapidMiner application

**Click the File menu -> New Process -> Select Blank**

Next, in the Repository dialog box, select Add Data, -> My Computer, look for the location of the Data file.

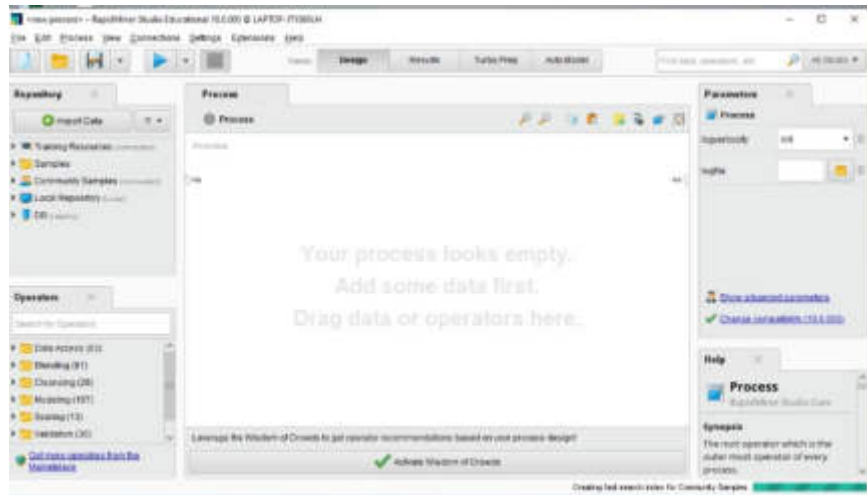


Figure 1. Data input from excel

2. **The data find the data file, click Next, then after arriving at the dialog box entitled Format Your Columns and in each attribute select the settings logo. Then in the class attribute, set Change Role and fill in the value as a label, then click Next to finish.**

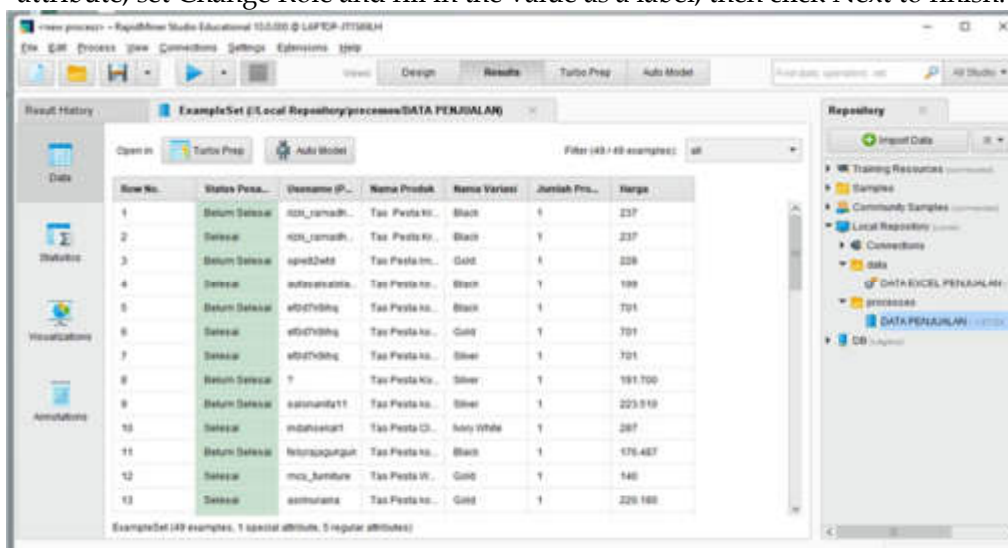


Figure 2. Change Role





### 3. Statistical Data



Figure 3. Statistical Data

### 4. Formation of the Design.

After finishing on the Repository page, the data that has been imported by the system will appear. Then drag or drag it to the RapidMiner work page. Next, in the Operators dialog box, select menus such as Random Tree, Split Data, Apply Model, and Performance. How to search for it is written in the search box in the dialog box.



Figure 4. Formation of Design

### 5. Running results

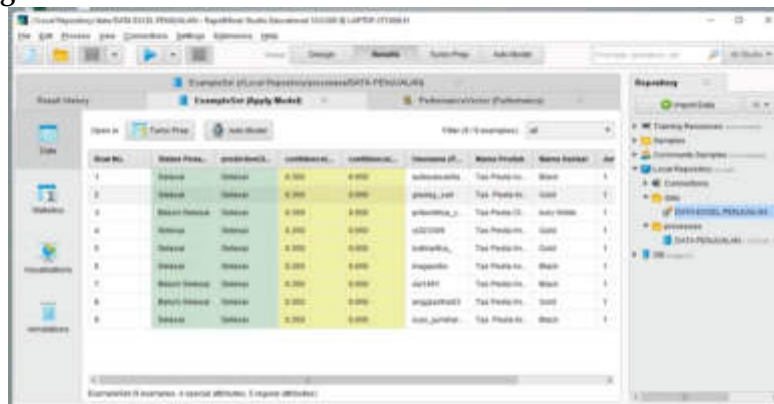


Figure 5. Results





## 6. Performance Results.

After everything is connected, click the Play or Start button like the arrow shown above. Then if the process is complete it will appear like

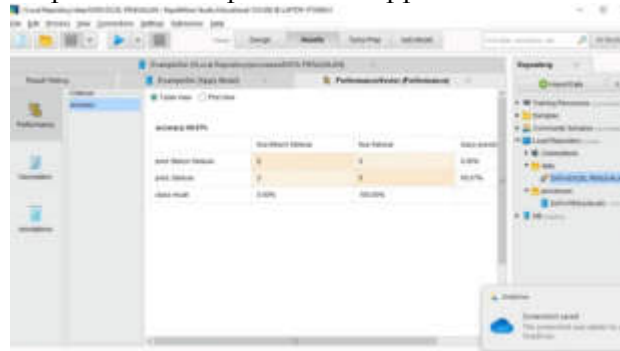


Figure 6. Performance Results

## 7. Results



Figure 7. Performance Vector Results

Through RapidMiner, a decision tree model was successfully developed based on historical datasets from Toko Usaha Muda. This model is able to predict stock requirements with an accuracy of around 93%, indicating excellent prediction performance. Attributes such as "Previous month sales", "Seasonal trends" and "Ongoing promotions" emerge as key variables influencing stock requirements. Based on the model that has been developed, stock predictions for the next three months have been successfully generated, giving the Toko Usaha Muda an idea of what items need to be ordered and in what quantities.

The C45 algorithm proved to be effective in understanding historical sales patterns and providing valuable insights for Toko Usaha Mudas to manage their stock. Using RapidMiner simplifies the implementation of the algorithm and facilitates the data analysis process. Although this model has good performance, there are some limitations related to future stock predictions which always depend on historical data and market uncertainty.

## CONCLUSION

This research combines the C45 and RapidMiner algorithms to predict Toko Usaha Muda stock needs with approximately 93% accuracy, understanding historical sales patterns. RapidMiner, as an analytics platform, facilitates implementation with intuitive





visualization and validation. Through this data-driven approach, stores can be more responsive to market dynamics, optimizing stock management based on key factors such as "Previous month's sales" and "Promotions", despite limitations. The overall method offers an efficient and adaptive solution to stock management challenges.

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