Department of Digital Business
Journal of Artificial Intelligence and Digital Business (RIGGS)
Homepage: https://journal.ilmudata.co.id/index.php/RIGGS
Vol. 5 No. 2 (2026) pp: 26689-26696
P-ISSN: 2963-9298, e-ISSN: 2963-914X

Implementation Of the C4.5 Algorithm for Web-Based Skincare Sales Classification at Sintia Distributor SR12

Wahyuni[1], Elfi Fauziah[2]
[12]Program Studi Teknik Informatika, Fakultas Ilmu Komputer, Universitas Pamulang
[1]yunipsm35@gmail.com, [2]dosen00475@unpam.ac.id

Abstract
Sintia Distributor SR12 is a business that distributes various skincare products. Sales records available at the store had not been optimally utilized to objectively identify products with high and low sales. This condition could affect inventory planning and sales evaluation because product performance was still assessed through manual observation. This study aimed to implement the C4.5 algorithm in a web-based system for classifying skincare product sales. Data were collected through observation, interviews, and literature review. The system was developed using Python Flask, MySQL, HTML, CSS, Bootstrap, JavaScript, and Chart.js. The classification process consisted of selecting a sales period, combining product and sales data, calculating the average quantity sold, forming class labels, calculating entropy, gain, split information, and gain ratio, and generating classification rules. Testing was conducted using Black Box Testing, White Box Testing with the Basis Path technique, and a user response questionnaire. The implementation processed 31 product records, consisting of 13 Best-Selling products and 18 Non-Best-Selling products. The initial entropy value was 0.981, while the quantity-sold attribute obtained a gain ratio of 1.000. All main system functions and internal classification paths operated according to the designed scenarios. User response testing involving five respondents and ten questions produced a score of 95.60%, categorized as Very Good. The developed system can assist the store in managing sales data and presenting period-based product classification information for inventory and sales strategy evaluation.

Keywords: *C4.5 Algorithm; Classification; Data Mining; Skincare Sales; Web-Based System*

1. Introduction

The development of information technology has changed the way business owners manage operational data. Data that were previously used only as transaction records can now be processed into useful information to support evaluation and decision-making activities. In sales activities, structured data processing can help business owners monitor changes in customer demand, identify products with high sales levels, and evaluate products that receive relatively low customer interest.

The skincare industry is one of the business sectors characterized by a wide variety of products and dynamic levels of consumer demand. The growth of the Indonesian skincare market is influenced by changes in self-care trends, the increasing use of social media, promotional activities, and greater public awareness of skin care products [1]. This condition provides promising business opportunities while requiring business owners to manage sales data more effectively. Decisions concerning product inventory and sales strategies should therefore be supported by data rather than solely based on estimates.

Sintia Distributor SR12 is a business engaged in selling and distributing various skincare and personal care products. In its daily operations, the store manages a variety of products with different sales volumes in each period. However, the available sales data have primarily been used as transaction records and have not been optimally processed to generate information concerning products categorized as Best-Selling or Non-Best-Selling.

The manual assessment of product sales performance has several limitations. As the number of products and transactions increases, examining sales records requires more time and may produce inconsistent judgments. Products with high demand may experience stock shortages when their sales patterns are not promptly identified. In contrast, products with low sales may remain in inventory for an extended period. These circumstances can affect the efficiency of inventory procurement and the preparation of appropriate sales strategies.

One approach that can be used to process sales data is data mining. Data mining enables historical datasets to be examined to discover patterns that are not directly visible from ordinary transaction records. Classification is one of the techniques used in data mining to group data into predefined classes based on their attributes. In this study, classification is used to categorize skincare products into two classes, namely Best-Selling and Non-Best-Selling.

The C4.5 algorithm is a classification method that produces a model in the form of a decision tree. Attribute selection in this algorithm is performed by calculating entropy, information gain, split information, and gain ratio. The attribute with the highest gain ratio is selected as the basis for constructing a decision branch. The resulting decision tree can then be converted into classification rules, allowing users to understand the conditions underlying each classification result.

The application of the C4.5 algorithm to sales data has been investigated in several previous studies. A study conducted at Dutalia Supermarket used product type, price, sales quantity, sales period, sales occasion, and sales status as classification attributes. The C4.5 algorithm was implemented to identify sales patterns that could support the determination of minimum product inventory [2]. The study demonstrated that transaction records could be developed into more meaningful information for business management.

Another study applied the C4.5 Decision Tree algorithm to classify best-selling products using the Cross-Industry Standard Process for Data Mining approach. The developed model achieved an accuracy of 95.68% using RapidMiner and 95.09% using a Python-based model after parameter adjustment [3]. Meanwhile, the application of the C4.5 algorithm to classify best-selling Honda motorcycles achieved an accuracy of 99%, indicating that the method was capable of identifying products with high sales potential [4]

The C4.5 algorithm has also been applied to inventory prediction. A study conducted at PT Aerofood Indonesia used the C4.5 algorithm to classify and predict whether inventory items would be available or unavailable. The classification process was supported by RapidMiner and produced a decision-tree model with an accuracy of 100% [5]. A similar application to hijab sales data showed that sales attributes could be processed into a decision-tree structure and classification rules [6]. These studies indicate that the C4.5 algorithm can be applied to sales datasets with different product characteristics.

In addition to classification algorithms, a web-based system can help business owners manage sales information in a more organized manner. A study concerning a web-based skincare sales information system at Kumara Store in Sukoharjo showed that a web application could assist users in managing orders and preparing sales reports. Black Box Testing conducted in that study indicated that the developed functions operated according to user requirements [7]. However, the system primarily focused on transaction management and did not implement a data-mining algorithm to classify sales performance.

Based on the previous studies, the C4.5 algorithm has been widely applied to classify sales performance across various product categories. Nevertheless, there is still an opportunity to apply the C4.5 algorithm specifically to skincare sales data and integrate the classification process into a web-based application. This study not only generates classification rules but also combines product management, sales-data management, period selection, algorithm calculations, classification-result storage, and report presentation within one system.

The system developed in this study uses Python with the Flask framework, while MySQL is used as the database management system. The user interface is developed using HTML, CSS, Bootstrap, JavaScript, and Chart.js. The system has two types of users, namely Admin and Owner. The Admin is authorized to manage product data, manage sales data, execute the C4.5 process, review classification results, access reports, and manage user accounts. The Owner is authorized to access the dashboard, classification results, and reports.

The classification process begins when the Admin selects the starting and ending dates of the sales period to be analyzed. The system retrieves sales records within the selected period and combines them with the corresponding product data. When a product appears in more than one transaction, the system accumulates its quantity sold and total sales value. The system then calculates the average quantity sold, forms the class labels, groups numerical attributes, calculates entropy, information gain, split information, and gain ratio, and generates the classification rules.

The classification results are stored in the database and presented on the Classification Results page. The displayed information includes the analysis period, product code, product name, category, quantity sold, total sales, average sales value, classification result, and description. The system also provides a reporting page that allows users to filter data according to the selected period or classification category. Reports can subsequently be printed or downloaded in Microsoft Excel format.

This study aims to implement the C4.5 algorithm in a web-based system to classify skincare product sales at Sintia Distributor SR12. The developed system is expected to assist the store in identifying products categorized as Best-Selling and Non-Best-Selling according to a selected sales period. The resulting information can be used as supporting material for sales evaluation, inventory planning, and the preparation of data-driven sales strategies.

This manuscript presents the original results of research conducted through data collection, analysis, system design, implementation, and testing. The article was prepared based on the authors' ideas and research findings and does not directly reproduce the contents of previous publications.

2. Research Methodology

DOI: https://doi.org/10.31004/riggs.v5i2.12628

This section describes the research stages conducted from data collection to system testing. The study employed a quantitative approach because the classification process involved processing numerical and categorical sales data. The collected data were analyzed using the C4.5 algorithm to classify skincare products into Best-Selling and Non-Best-Selling categories. The classification procedure was subsequently implemented in a web-based application.

The research was conducted through several stages, including problem identification, data collection, system requirement analysis, data preparation, C4.5 algorithm implementation, system design and development, and system testing. These stages were arranged to ensure that the developed system addressed the operational requirements of Sintia Distributor SR12.

Figure 1. Research framework

2.1 Data Collection

The research data were obtained from Sintia Distributor SR12 through observation, interviews, and a literature review. Observation was conducted to examine the existing product-management and sales-recording processes. Interviews with the store representatives were used to identify user requirements, required information, and access restrictions within the system.

The literature review focused on data mining, classification, the C4.5 algorithm, web-based applications, and software testing. Previous studies showed that the C4.5 algorithm could be applied to identify sales patterns and classify products based on historical transaction data [2], [3].

The main data used in this study consisted of product data and sales data. Product data included product codes, product names, categories, prices, stock quantities, and units. Sales data contained sales dates, products, quantities sold, and total sales values. The classification status was not manually entered because the Best-Selling and Non-Best-Selling labels were generated automatically by the system.

2.2 Data Preparation and Class-Label Formation

Before the classification process was conducted, the Admin selected the starting and ending dates of the sales period. The system then retrieved sales records within the selected period and combined them with the corresponding product data.

When one product appeared in several transactions, its quantity sold and total sales value were accumulated. Consequently, each product was represented by one summarized sales record for the selected period.

The class label was formed based on the average quantity sold. The average value was calculated using Equation (1).

Average Quantity Sold = Total Quantity Sold / Number of Products (1)

The classification rules are presented in Table 1.

Tabel 1. Class-label formation rules

No	Condition	Classification
1	Quantity Sold ≥ Average Quantity Sold	Best-Selling
2	Quantity Sold < Average Quantity Sold	Non-Best-Selling

A product whose quantity sold was greater than or equal to the average value was categorized as Best-Selling.

DOI: https://doi.org/10.31004/riggs.v5i2.12628

In contrast, a product whose quantity sold was lower than the average value was categorized as Non-Best-Selling.

2.3 C4.5 Algorithm Implementation

The C4.5 algorithm was used to determine the attribute that most effectively separated the data into Best-Selling and Non-Best-Selling classes. The calculation process included entropy, information gain, split information, and gain ratio.

Entropy was used to measure the level of class diversity within the dataset. It was calculated using Equation (2).

$$\text{Entropy}(S) = -\Sigma \, pi \log_2 pi \quad (2)$$

Information gain was used to measure the reduction in uncertainty after the data were divided according to an attribute. The calculation is presented in Equation (3).

$$\text{Gain}(S,A) = \text{Entropy}(S) - \Sigma \left((|Sv| / |S|) \times \text{Entropy}(Sv) \right) \quad (3)$$

The C4.5 algorithm also calculated split information to evaluate the distribution of data across the generated branches. The gain-ratio value was subsequently calculated using Equation (4).

$$\text{GainRatio}(S,A) = \text{Gain}(S,A) / \text{SplitInfo}(S,A) \quad (4)$$

The attribute with the highest gain-ratio value was selected as the best attribute. The system then generated classification rules based on that attribute.

In the developed website, the classification process began when the Admin selected the sales period. The system retrieved and summarized the sales data, calculated the average quantity sold, formed the class labels, calculated the C4.5 values, determined the best attribute, and stored the classification results in the database.

2.4 System Implementation

The system was developed as a web-based application using Python and the Flask framework. MySQL was used to store user, product, sales, and classification-result data. The interface was developed using HTML, CSS, Bootstrap, JavaScript, and Chart.js.

The website supported two user roles, namely Admin and Owner. The Admin could manage product and sales data, execute the C4.5 process, review classification results, access reports, and manage user accounts. The Owner could access the dashboard, classification results, and reports.

The main features of the application included login, dashboard, product data, sales data, C4.5 processing, classification results, reports, and user management. Classification results could be filtered according to the selected period or classification category and downloaded in Microsoft Excel format.

2.5 System Testing

The developed system was evaluated using Black Box Testing, White Box Testing, and User Response testing. Black Box Testing was used to verify whether the main system functions produced the expected outputs based on the provided inputs. This method examined login, access restrictions, data management, the C4.5 process, classification results, reports, and user management [8].

White Box Testing was conducted to examine the internal logic of the C4.5 program. The Basis Path technique was used by constructing a flow graph, calculating cyclomatic complexity, identifying independent paths, and preparing test cases [9]. The main C4.5 process was tested under several conditions, including incomplete periods, invalid periods, unavailable data, and successful classification processing.

User Response testing was conducted using a questionnaire to measure user perceptions of the system interface, navigation, classification process, clarity of information, and usefulness of reports. Questionnaire-based user acceptance testing can be used to determine whether a developed application meets the requirements of its intended users [10].

The questionnaire consisted of ten statements and was completed by five respondents. Each response was measured using a five-point Likert scale. The percentage of user responses was calculated using Equation (5).

$$\text{Percentage} = \text{Obtained Score} / \text{Maximum Score} \times 100\% \quad (5)$$

A higher percentage indicated a better level of user acceptance of the developed skincare-sales classification system.

3. Result and Discussion

3.1 System Implementation and Classification Results

The web-based skincare sales classification system was successfully implemented using Python with the Flask framework and MySQL as the database management system. The system includes login, dashboard, product data, sales data, C4.5 processing, classification results, reports, and user management features. The application supports two user roles, namely Admin and Owner.

The Admin can manage product and sales data, execute the classification process, review the results, generate reports, and manage user accounts. Meanwhile, the Owner can access the dashboard, classification results, and reports

DOI: https://doi.org/10.31004/riggs.v5i2.12628

without modifying the operational data.

The classification process begins when the Admin selects the starting and ending dates on the C4.5 Process page. The system then retrieves the sales data within the selected period, combines the records with the corresponding product data, calculates the average quantity sold, forms the class labels, performs the C4.5 calculation, and stores the results in the database.

The implementation of C4.5 in a Flask-based web application is consistent with previous research showing that Python Flask can be used to process classification data and present decision-tree results through a web interface [11]. Integrating analytical functions into a web-based system also enables users to access information and reports more conveniently [13].

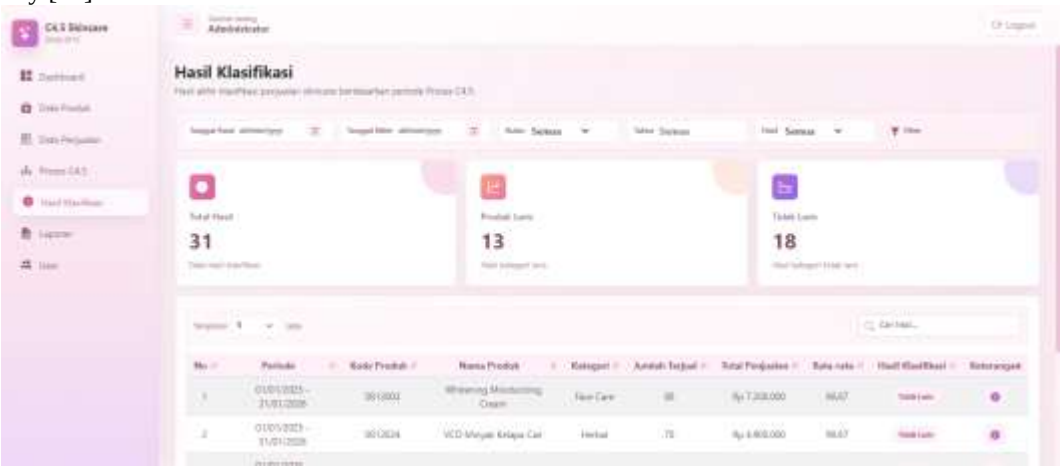

Figure 2. Classification results page

The classification process was conducted using sales records from January 1, 2025, to January 31, 2026. A total of 31 product records were processed, with a total quantity sold of 2,811 units. The average quantity sold was calculated as follows:

Average Quantity Sold = 2,811 / 31 = 90.67

The average value of 90.67 was used as the classification threshold. Products with a quantity sold greater than or equal to 90.67 were classified as Best-Selling, whereas products with a quantity sold below 90.67 were classified as Non-Best-Selling.

The classification results are presented in Table 2.

Tabel 2. Summary of classification results

No	Description	Result
1	Analysis period	January 1, 2025–January 31, 2026
2	Number of product records	31
3	Total quantity sold	2,811
4	Average quantity sold	90.67
5	Best-Selling products	13
6	Non-Best-Selling products	18

The results show that 13 products, or 41.94% of the data, were categorized as Best-Selling. Meanwhile, 18 products, or 58.06%, were categorized as Non-Best-Selling. Therefore, the number of Non-Best-Selling products was greater than the number of Best-Selling products during the selected period.

Previous research has shown that sales classification results can be used to identify product performance and support decisions related to stock availability, product display, and promotional strategies [14]. In this study, the classification results can provide initial information for Sintia Distributor SR12 when evaluating stock levels and determining which products require further promotional attention.

3.2 C4.5 Calculation Results

The initial entropy was calculated from 13 Best-Selling products and 18 Non-Best-Selling products. The calculation produced an entropy value of 0.981.

Entropy(S) = $-(13/31 \log_2 13/31) -(18/31 \log_2 18/31)$

DOI: https://doi.org/10.31004/riggs.v5i2.12628

Entropy(S) = 0.981

The entropy value indicates that the initial dataset still contained two different classes. The system subsequently evaluated the quantity-sold attribute by dividing the data according to the average sales threshold of 90.67.

A total of 18 products had quantities sold below 90.67, and all of them were classified as Non-Best-Selling. Meanwhile, 13 products had quantities sold greater than or equal to 90.67, and all were classified as Best-Selling. Because each group contained only one class, the entropy of each resulting group was zero.

The results of the C4.5 calculation are presented in Table 3.

Tabel 3. C4.5 calculation results

Attribute	Initial Entropy	Information Gain	Split Information	Gain Ratio
Quantity Sold	0.981	0.981	0.981	1000

The quantity-sold attribute obtained an information-gain value of 0.981 and a gain-ratio value of 1.000. Therefore, quantity sold was selected as the best attribute for forming the classification rules.

The rules generated by the system were as follows:

1.3 If the quantity sold is greater than or equal to 90.67, the product is classified as Best-Selling.

2.3 If the quantity sold is lower than 90.67, the product is classified as Non-Best-Selling.

The use of information gain in the C4.5 algorithm is intended to identify the attribute that provides the most effective separation between classes [12]. In this study, the quantity-sold attribute produced homogeneous branches because all records below the average belonged to the Non-Best-Selling class, while all records at or above the average belonged to the Best-Selling class.

The gain-ratio value of 1.000 indicates complete consistency between the quantity-sold threshold and the class labels generated by the system. However, this value should not be interpreted as independent prediction accuracy because the class labels were formed using the same quantity-sold attribute. An independent target label and separate testing data would be required to evaluate the predictive performance of the model using accuracy, precision, recall, and F1-score.

Nevertheless, the generated rules remain useful for period-based sales evaluation. The system allows the store to process sales data consistently without manually determining the sales category of each product.

3.3 System Testing Results

The system was evaluated using Black Box Testing, White Box Testing, and User Response testing. Black Box Testing was used to verify the functions that interact directly with users. The tested features included login and logout, access restrictions, dashboard, product data, sales data, the C4.5 process, classification results, reports, and user management.

The Black Box Testing results showed that all positive and negative scenarios produced the expected outputs. The system was able to validate incorrect login information, incomplete data, invalid periods, unavailable sales data, and access restrictions between the Admin and Owner roles.

White Box Testing was performed to examine the internal logic of the C4.5 process. The tested functions included entropy calculation, class-label formation, numerical categorization, dataset preparation, gain-ratio calculation, rule formation, and the main classification process. The Basis Path technique was applied to examine the independent execution paths. All tested paths produced outputs that were consistent with the program design.

User Response testing involved five respondents and ten questionnaire statements. The total score obtained was 239 out of a maximum score of 250.

User Response Percentage = 239 / 250 × 100% = 95.60%

The overall testing results are summarized in Table 4.

Tabel 4. Summary of system testing results

Testing Method	Tested Aspect	Result	Interpretation
Black Box Testing	Main system functions	All scenarios passed	The functions operated as expected
White Box Testing	Internal C4.5 program paths	All tested paths passed	The program logic followed the designed process
User Response	Interface, navigation, classification, and reports	95.60%	Very Good

DOI: https://doi.org/10.31004/riggs.v5i2.12628

The combination of Black Box and White Box Testing showed that the system operated correctly from both the functional and internal-program perspectives [8], [9]. The User Response score of 95.60% indicates that the respondents positively accepted the developed application.

A previous study that applied User Acceptance Testing to a web-based information system also evaluated ease of use, satisfaction, functionality, and system performance. The study obtained ratings within the Very Good category, indicating that questionnaire-based testing can be used to assess the suitability of a system for its intended users [15].

The results of this study indicate that the application is understandable, accessible, and capable of presenting classification information according to user needs. The developed system can therefore assist Sintia Distributor SR12 in processing period-based sales data and presenting Best-Selling and Non-Best-Selling product information in a structured manner.

4. Conclusion

This study successfully developed a web-based skincare sales classification system for Sintia Distributor SR12 by implementing the C4.5 algorithm. The application was built using Python with the Flask framework and MySQL as the database management system. The system provides integrated features for managing product data, sales data, classification processes, classification results, reports, and user accounts. The separation of access rights between Admin and Owner also supports more controlled data management and information monitoring. The classification process was carried out based on the sales period selected by the Admin. The system combined product and sales data, accumulated sales records for each product, calculated the average quantity sold, formed the class labels, and processed the data using entropy, information gain, split information, and gain ratio. From 31 product records, 13 products were classified as Best-Selling and 18 products were classified as Non-Best-Selling. The quantity-sold attribute produced the highest gain-ratio value and became the basis for generating the classification rules. The developed system was also evaluated through Black Box Testing, White Box Testing, and User Response testing. The functional and internal-program tests showed that the main features and classification paths operated according to the designed scenarios. The User Response test achieved a score of 95.60%, indicating that the system was considered easy to use, understandable, and useful by the respondents. The main contribution of this study is the integration of the C4.5 classification process with product management, period-based sales analysis, result storage, and report generation within a single web-based application. The system can assist Sintia Distributor SR12 in evaluating product sales performance more consistently and provide supporting information for inventory planning and sales-strategy development. Nevertheless, the classification results should be interpreted as period-based sales evaluation because the class labels were formed using the average quantity sold rather than independently verified actual labels. **Future Work,** Future research may improve the classification process by adding other relevant attributes, such as initial stock, final stock, discount value, promotional activity, product category, and sales channel. The class labels should also be determined using independently validated sales criteria so that the predictive performance of the model can be measured using a confusion matrix, accuracy, precision, recall, and F1-score. Further development may compare the C4.5 algorithm with other classification methods, such as Naïve Bayes, K-Nearest Neighbor, or Random Forest. The application can also be enhanced by adding PDF and CSV reports, sales-trend visualizations, automatic periodic classification, stronger password protection, user-activity records, and a larger amount of sales data from multiple periods.

References

[1] N. Nawiyah, R. C. Kaemong, M. A. Ilham, and F. Muhammad, "Penyebab pengaruhnya pertumbuhan pasar Indonesia terhadap produk skin care lokal pada tahun 2022," ARMADA: Jurnal Penelitian Multidisiplin, vol. 1, no. 12, pp. 1390–1396, Dec. 2023, doi: 10.55681/armada.v1i12.1060.

[2] A. K. Lalo, P. Batarius, and Y. C. H. Siki, "Implementasi algoritma C4.5 untuk klasifikasi penjualan barang di Swalayan Dutalia," Jurnal Teknik Informatika UNIKA Santo Thomas, vol. 6, no. 1, pp. 1–12, Jun. 2021, doi: 10.54367/jtiust.v6i1.1089.

[3] N. W. Wardani, P. G. S. C. Nugraha, E. Hartono, I. W. D. Suryawan, A. M. Dirgayusari, I. W. Darmadi, and G. S. Mahendra, "Penerapan data mining untuk klasifikasi penjualan barang terlaris menggunakan metode Decision Tree C4.5," Jurnal Teknologi Informasi dan Komputer, vol. 8, no. 3, pp. 268–279, Oct. 2022, doi: 10.36002/jutik.v8i3.2081.

[4] T. Salsabilla and S. Sulastri, "Implementasi algoritma C4.5 untuk klasifikasi produk laris sepeda motor Honda pada CV Cendana Motor Cepiring," RABIT: Jurnal Teknologi dan Sistem Informasi Univrab, vol. 7, no. 2, pp. 164–171, Jul. 2022, doi: 10.36341/rabit.v7i2.2489.

[5] Suwandi, E. Gustami, K. P. Astuti, and Yunita, "Klasifikasi barang menggunakan algoritma C4.5 dalam penentuan prediksi stok barang pada PT Aerofood Indonesia," Reputasi: Jurnal Rekayasa Perangkat Lunak, vol. 3, no. 2, pp. 12–18, Nov. 2022, doi: 10.31294/reputasi.v3i2.1398.

[6] F. Husna, H. Rahman, and J. Juhari, "Implementasi data mining menggunakan algoritma C4.5 pada klasifikasi penjualan hijab," Jurnal Riset Mahasiswa Matematika, vol. 2, no. 2, pp. 40–46, Dec. 2022, doi: 10.18860/jrmm.v2i2.14891.

[7] D. Septieni, E. Purwanto, and H. Permatasari, "Sistem informasi penjualan skincare berbasis website: Studi kasus Toko Kumara Sukoharjo," in Prosiding Seminar Nasional Teknologi Informasi dan Bisnis (SENATIB), Surakarta, Indonesia, 2023, pp. 294–299.

[8] A. C. Praniffa, A. Syahri, F. Sandes, U. Fariha, and Q. A. Giansyah, "Pengujian sistem informasi parkir berbasis web pada UIN SUSKA Riau menggunakan White Box dan Black Box Testing," Jurnal Testing dan Implementasi Sistem Informasi, vol. 1, no. 1, pp. 1–16, 2023, doi: 10.55583/jtisi.v1i1.321.

[9] J. B. L. Sie, I. A. Musdar, and S. Bahri, "White Box Testing on the website Room using the Basis Path technique," KHARISMA Tech, vol. 17, no. 2, pp. 45–57, Sep. 2022, doi: 10.55645/kharismatech.v17i2.235.

DOI: https://doi.org/10.31004/riggs.v5i2.12628

[10] Aliyah, N. Hartono, and A. A. Muin, "Penggunaan User Acceptance Testing (UAT) pada pengujian sistem informasi pengelolaan keuangan dan inventaris barang," Switch: Jurnal Sains dan Teknologi Informasi, vol. 3, no. 2, pp. 42–58, Mar. 2025, doi: 10.62951/switch.v3i1.330.
[11] A. C. Darmawan and L. Iswari, "Pengembangan aplikasi berbasis web dengan Python Flask untuk klasifikasi data menggunakan metode Decision Tree C4.5," Jurnal Pendidikan dan Konseling, vol. 4, no. 5, pp. 5351–5362, Oct. 2022, doi: 10.31004/jpdk.v4i5.7492.
[12] T. Y. Pratama and Armansyah, "Decision Tree C4.5 dengan teknik information gain untuk klasifikasi pemilihan program studi tingkat lanjut," Journal of Information System Research, vol. 5, no. 4, pp. 1042–1052, Jul. 2024, doi: 10.47065/josh.v5i4.5643.
[13] R. Yap and R. Arijanto, "Analysis and design of online based plastic sales information system with User Acceptance Testing method," bit-Tech, vol. 6, no. 1, pp. 8–15, Aug. 2023, doi: 10.32877/bt.v6i1.739.
[14] D. I. Suranda and A. Nugroho, "Klasifikasi data penjualan untuk memprediksi tingkat penjualan produk menggunakan metode Decision Tree," Jurnal Teknik Informasi dan Komputer (Tekinkom), vol. 7, no. 1, pp. 370–376, Jun. 2024, doi: 10.37600/tekinkom.v7i1.1269.
[15] D. Putri, R. Afriansyah, and P. A. Prayesy, "Implementation of User Acceptance Testing (UAT) in testing the academic and financial information system for Islamic boarding school students," TeIKa, vol. 15, no. 2, pp. 1–15, Jan. 2026, doi: 10.36342/ztavmp10.

DOI: https://doi.org/10.31004/riggs.v5i2.12628