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Research Article

Classification of Neighborhood Unit Cadres' Satisfaction Levels with the Carik App Using the Naïve Bayes Method in Semper Barat Subdistrict

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Abstract: This study aims to classify the level of satisfaction of Dasawisma cadres with the Carik application in West Semper Village by utilizing the Naive Bayes method. Data was obtained through questionnaires, which were compiled based on three main aspects: ease of use, speed of access, and the usefulness of applications in supporting cadre tasks. After the data is collected, a pre-processing and labeling process is carried out, where the level of satisfaction of respondents is categorized into two classes, namely "satisfied" and "dissatisfied". The Naive Bayes algorithm is applied to predict satisfaction classes based on questionnaire answers. The results of the analysis show that the Naive Bayes method is able to perform classification with sufficient accuracy, so that it can be used as an evaluation tool and decision support in the development of the carik application. This method can also help the management understand user perceptions and improve the system based on objective and routine data in line with the needs of field cadres.

Keywords: Classification; Dasawisma; Naive Bayes; Satisfaction; Semper Barat Village.

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1. Introduction

In the era of public service digitalization, the utilization of information technology-based applications has become one of the government's primary strategies to improve efficiency, accountability, and community participation. This digital transformation not only occurs at the national level but has also expanded to the village and sub-district levels, where various applications have been developed to support local governance and community activities. One tangible example of this innovation is the Carik Application, a digital platform designed to support the administrative, reporting, and communication activities of Dasawisma cadres in various regions, including Semper Barat Subdistrict, North Jakarta.

The Carik Application has become one of the digital solutions supporting the activities of Dasawisma cadres in Semper Barat Subdistrict. However, the level of user satisfaction with this application has not yet been systematically measured. Previous studies have shown that user satisfaction with community-based applications is influenced by factors such as ease of use, features, and technical support (Smith, 2022). Nevertheless, there remains a research gap

regarding the classification of user satisfaction using computational approaches such as the Naive Bayes method.

Dasawisma cadres play a strategic role in the community empowerment structure. They serve as the frontline in disseminating information, implementing family health programs, collecting social data, and conducting outreach activities related to women's empowerment. The effectiveness of their role depends heavily on access to accurate information, effective work tools, and efficient reporting systems. Therefore, applications such as Carik have been introduced as solutions to address these needs, with the expectation of improving the performance and convenience of cadres in carrying out their responsibilities.

However, in practice, the effectiveness of an application is not measured solely by its technical functionality but also by the level of satisfaction experienced by its end users, in this case, the Dasawisma cadres. User satisfaction reflects the extent to which the application meets users' expectations in terms of usability, access speed, data accuracy, and the relevance of features to fieldwork activities. If an application is not designed according to user needs, its presence may become an additional administrative burden rather than a solution that facilitates and accelerates work processes.

This phenomenon highlights the need for a systematic evaluation of Dasawisma cadres' satisfaction as direct users of the Carik Application. However, measuring user satisfaction cannot be separated from the diversity of user characteristics. Each cadre has a different educational background, level of experience, and degree of technology adoption. In this context, the Naive Bayes method, as a probabilistic classification algorithm, can be used to classify the satisfaction levels of cadres based on specific attributes in a more objective and structured manner. This method is well known for its simplicity, computational efficiency, and classification accuracy in various studies related to social behavior and user analysis.

The specific problem addressed in this study is how to classify the satisfaction levels of Dasawisma cadres regarding the use of the Carik Application and to identify the factors that most significantly influence their satisfaction. Through this approach, it is expected that satisfaction categories (such as satisfied, neutral, and dissatisfied) can be identified and used as a basis for further evaluation and development of the application.

This research is important and timely because the success of community-based programs largely depends on the participation and comfort of field-level implementers. Without an accurate understanding of their perceptions and satisfaction, existing digital innovations may face challenges in achieving long-term sustainability. Therefore, this study not only contributes by mapping user satisfaction but also provides a scientific foundation for policymakers to develop systems that are genuinely responsive to the needs of grassroots communities.

2. Literature Review

Dasawisma Cadres

Dasawisma cadres are community members who actively participate in the Family Welfare Empowerment (PKK) program at the neighborhood or RT/RW level, particularly within Dasawisma Groups. The term "Dasawisma" is derived from the words "dasa" (ten) and "wisma" (household), referring to a group consisting of approximately 10–20 households within a particular area. The primary responsibility of Dasawisma cadres is to encourage community participation in empowerment activities, such as health, education, productive economic activities, and environmental conservation. They serve as facilitators, motivators, and intermediaries between the village administration and the community, including in the dissemination of programs such as the CARIK application. Dasawisma cadres are also responsible for population data collection, monitoring child nutrition, providing family planning education, and promoting community cooperation. Their presence is essential in improving the quality of family life through a community-based approach.

In addition, Dasawisma cadres often act as the frontline in implementing government policies at the grassroots level, such as stunting prevention programs, sanitation initiatives, and service digitalization. Although their role is voluntary, it is supported through regular training provided by PKK and the local government in Semper Barat Subdistrict. Therefore, Dasawisma cadres are not only agents of social change but also a bridge between technology, such as the CARIK application, and communities that may still have limited digital skills.

CARIK Application

The CARIK Application (Cadre Service and Information Application) is a digital platform developed to support the performance of Dasawisma and PKK cadres in delivering community-based services at the subdistrict level. The application functions as an integrated system that facilitates resident data collection, activity reporting, and the dissemination of important information from the government to the community. With features such as population data entry, health program monitoring, environmental issue reporting, and social activity coordination, CARIK is designed to accelerate administrative processes while improving the transparency of public services.

The main advantage of this application lies in its ability to replace manual methods with real-time data digitalization, allowing cadres to access and update information at any time. In addition, CARIK is equipped with notification features, regional statistics, and integration with local government systems, enabling more accurate analysis of community needs. The application provides solutions to longstanding challenges such as slow reporting processes, data duplication, and insufficient coordination among cadres. Consequently, CARIK not only improves the work efficiency of Dasawisma cadres but also strengthens communication networks among residents, cadres, and related institutions. However, its success depends greatly on the level of user adoption. Therefore, evaluating cadre satisfaction, as conducted in this study, is crucial for its future development.

Semper Barat Subdistrict

Semper Barat Subdistrict is one of the subdistricts located in Cilincing District, North Jakarta, directly bordering Jakarta Bay to the north. As a coastal area, the subdistrict has a diverse population whose primary livelihoods are in the fisheries, trade, and small-scale industrial sectors. Semper Barat is a densely populated area with continuously developing infrastructure, although it still faces challenges such as tidal flooding due to its lowland geographical location.

The local government actively promotes community empowerment programs, including those conducted through Dasawisma Groups and PKK, which play an important role in increasing community participation in development activities. One of the latest innovations implemented in this subdistrict is the adoption of the CARIK Application to facilitate cadres in administrative services and resident data collection. The area is also known for its strong culture of mutual cooperation, reflected in regular activities such as community service programs, integrated health service posts (Posyandu), and skills training. Supported by public facilities such as community health centers, schools, and places of worship, Semper Barat Subdistrict continuously strives to improve the quality of life of its residents while adapting to the dynamics of urbanization and environmental challenges characteristic of Jakarta's coastal regions.

Naïve Bayes

Naïve Bayes is a probabilistic machine learning algorithm used for classification tasks by applying Bayes' Theorem. The algorithm is referred to as "naïve" because it assumes that all features or predictor variables, such as questionnaire responses, are independent of one another, although in reality there may be relationships among them.

Naïve Bayes calculates the probability that a data instance belongs to a particular class, for example "satisfied" or "dissatisfied" in the context of the CARIK Application study, based on the frequency of feature occurrences in historical data. The main advantages of this algorithm are its ability to process large amounts of data quickly, high computational efficiency, and strong performance even when dealing with incomplete datasets. Naïve Bayes is widely applied in sentiment analysis, document classification, and predictive studies such as this research, which classifies the satisfaction levels of Dasawisma cadres.

Although its assumption of feature independence is not always realistic, the algorithm has proven effective in many real-world applications, especially when features are relatively uncorrelated. Additional advantages include ease of implementation and interpretation of results, making it a popular choice for data mining and predictive analytics projects.

RapidMiner

RapidMiner is a GUI (Graphical User Interface)-based data science platform that enables users to perform data analysis, machine learning, and predictive analytics without the need for manual coding. Designed for users with varying levels of expertise, RapidMiner provides visual tools for processes such as data preprocessing, statistical modeling, model validation, and result visualization.

The platform supports a wide range of algorithms, including Naïve Bayes, decision trees, clustering techniques, and deep learning models, and is compatible with various data sources such as Excel files, SQL databases, and big data frameworks. In the context of this study on classifying Dasawisma cadres' satisfaction with the CARIK Application, RapidMiner can be used to import questionnaire data, clean datasets, apply the Naïve Bayes algorithm, and evaluate model accuracy through metrics such as precision, recall, and confusion matrices.

RapidMiner's strengths lie in its intuitive drag-and-drop interface, integration with programming languages such as Python and R, and workflow automation capabilities. Supported by templates and an active user community, RapidMiner is suitable for both academic research and industrial applications, helping transform raw data into actionable insights efficiently.

CRISP-DM (Cross-Industry Standard Process for Data Mining)

CRISP-DM (Cross-Industry Standard Process for Data Mining) is a structured methodology used to guide the data mining process systematically and effectively. It consists of six main phases: Business Understanding, Data Understanding, Data Preparation, Modeling, Evaluation, and Deployment. This methodology is flexible and iterative, allowing adjustments according to project requirements.

CRISP-DM is widely used across various industries because of its ability to integrate both technical and business aspects, ensuring that data mining results are relevant and actionable. For example, in a study involving the classification of Dasawisma cadres' satisfaction, CRISP-DM helps guide the process from problem identification to the implementation of data-driven solutions.

CRISP-DM was developed in 1996 by analysts from several industries, including DaimlerChrysler, SPSS, and NCR. It provides a standard framework for data mining as a general problem-solving strategy in business and research environments. CRISP-DM is a methodology that can be applied to general problem-solving strategies while offering a standardized approach to data mining.

The objective of CRISP-DM is to align technical and business processes within a data mining project, thereby enabling more relevant and effective outcomes for business decision-making and scientific research. As a standard methodology in data mining, CRISP-DM consists of six stages, of which the first three stages, based on practical experience, may be non-mutually exclusive.

3. Method

Research Data

The data were obtained by distributing questionnaires directly to Dasawisma cadres using Google Forms and through manual data collection conducted by the researcher during field observations. After the data were collected, a preprocessing stage was carried out, including checking data completeness, verifying the consistency of responses, cleaning invalid data, and transforming values into a numerical format that could be processed using the Naïve Bayes algorithm. The data were then exported in CSV format to facilitate the classification analysis process.

The data used in this study are qualitative data. Qualitative data are data that characterize or describe a phenomenon and can be observed and recorded. Qualitative data are divided into two categories:

Primary Data

Primary data were obtained directly from the original source, namely the Dasawisma cadres, through questionnaire distribution and direct observation. This approach enabled the researcher to obtain direct responses from participants according to the actual conditions in the field.

Secondary Data

Secondary data were obtained through: Literature Review, namely the collection of data from journals, articles, and previous research reports relevant to the topics of application user satisfaction and classification using Naïve Bayes. Textbooks, namely the collection of information from textbooks and standard references related to user satisfaction theory, Naïve Bayes, and classification methodologies to support the theoretical framework of the study.

Method Implementation

In this study, the Naïve Bayes method was used to classify the satisfaction level of Dasawisma cadres regarding the use of the Carik Application in Semper Barat Subdistrict. The data used were primary data obtained from questionnaires completed by Dasawisma cadres, covering aspects such as ease of use, access speed, and application usefulness.

In this study, the researcher adopted the CRISP-DM (Cross-Industry Standard Process for Data Mining) approach, which consists of six stages to systematically guide the research process.

Data Collection Process

The data collection process involved conducting a survey among Dasawisma cadres. The collected data were then analyzed using the Naïve Bayes method to classify the level of community satisfaction with the services provided.

Test Design

The test design process involves planning and documenting the strategies, approaches, resources, and schedules required to conduct testing on a system or software application.

Table 1. Test Design

No.	Action	Expected Outcome	Result
1	Collect data from respondents through questionnaires	Data are obtained from the community with valid and relevant information	Data were collected from 100 respondents, with most questionnaires completed properly
2	Perform preprocessing (cleaning, encoding, normalization)	Data are ready to be used in the classification process	Data were successfully processed, missing values were handled, and all features were properly encoded
3	Split the data into training data (80%) and testing data (20%)	The model can be trained with sufficient data and tested fairly	Data were divided according to the appropriate proportion, with no overlapping data
4	Build a classification model using the Naïve Bayes algorithm	The model is capable of classifying satisfaction levels with high accuracy	The model was successfully built and ran without errors
5	Test the model's performance using testing data and calculate accuracy	Classification accuracy reaches at least 70%	Accuracy reached 98%, indicating very good performance
6	Compare prediction results with the actual values from the testing data	Model predictions are consistent with actual results in most cases	Predictions matched the actual data for the majority of respondents
7	Present classification results in the form of graphs and tables	Visualizations facilitate readers' understanding and interpretation of the results	Graphs and tables were successfully created and clearly illustrated the distribution of satisfaction levels
8	Conduct final model evaluation using a confusion matrix and other metrics	Identify the model's strengths and weaknesses in detail (Precision, Recall, F1-score)	Evaluation showed that the model was most accurate in predicting the "Satisfied" and "Very Satisfied" classes
9	Develop recommendations based on the features that most influence satisfaction	Provide recommendations to the Department of Population and Civil Registration (Dukcapil) to improve service quality	Recommendations were developed based on the dominant features, namely "Service Speed" and "Staff Friendliness"

4. Results and Discussion

RapidMiner Testing Results

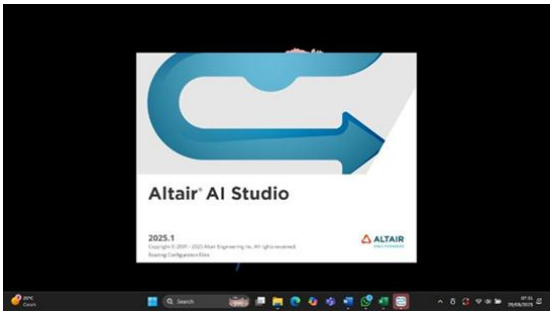

Figure 1. Altair AI Studio

Next, after the initial interface appears, the dataset to be processed can be imported. Insert the dataset into the workspace by searching for Read Excel in the Operators search column and then dragging it into the workspace.

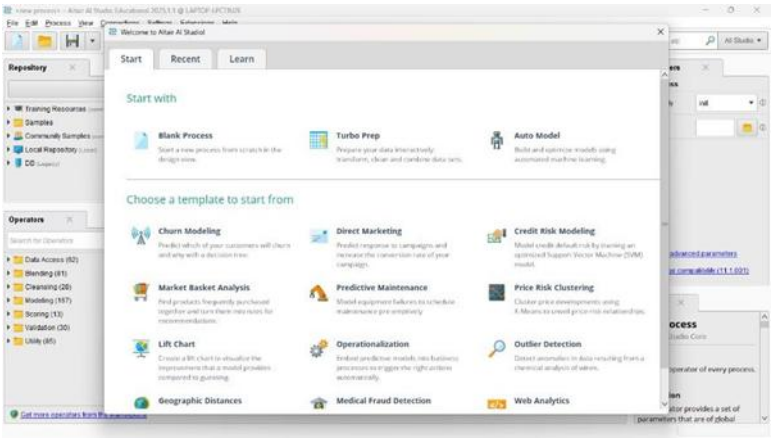

Figure 2. Initial RapidMiner Interface

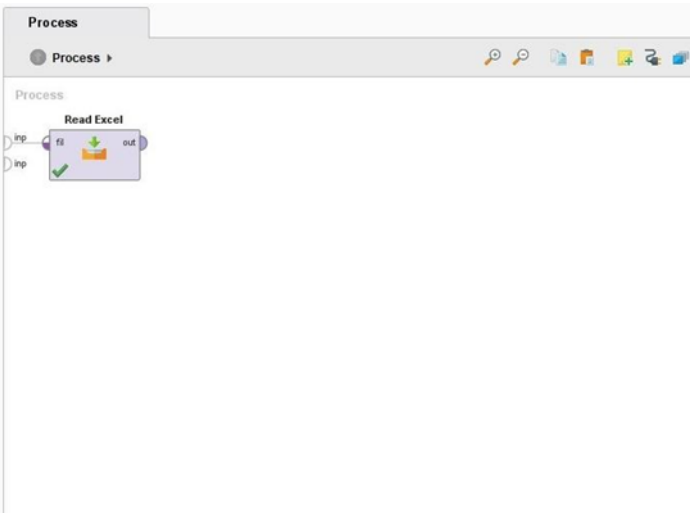

Figure 3. Interface for Displaying the Dataset

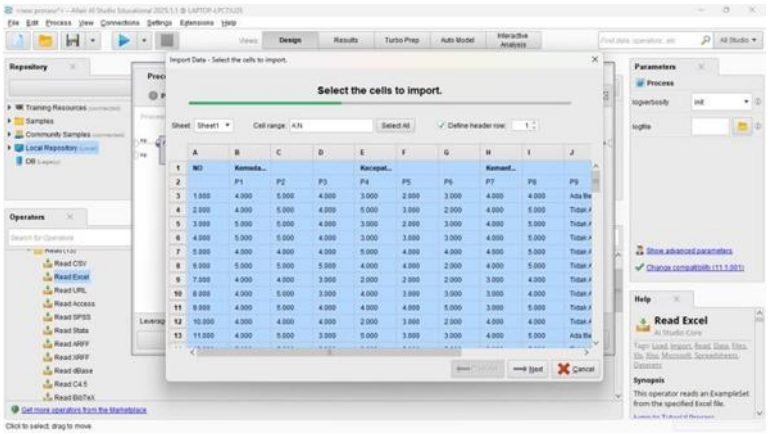

Figure 4. Dataset Display

The process of importing the grouped community satisfaction data into RapidMiner displays four assessment variables and a satisfaction label column with the categories Satisfied, Neutral, and Dissatisfied.

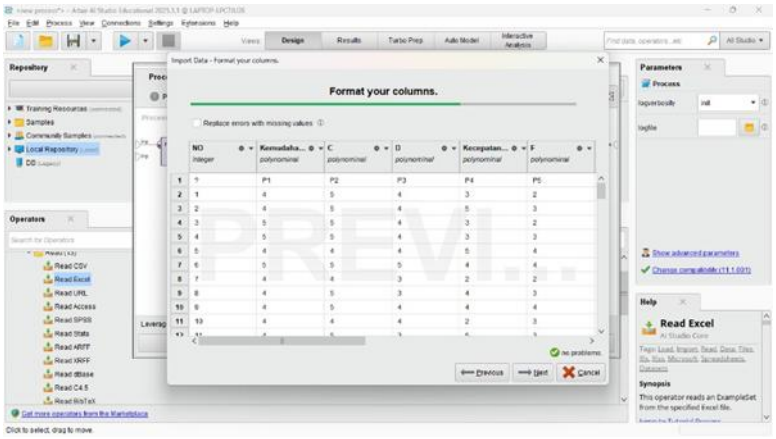

Figure 5. Format Your Columns Interface

The next stage is determining the data types to be used during the configuration process in RapidMiner. In the data above, the Integer data type is used for columns P1–P7.

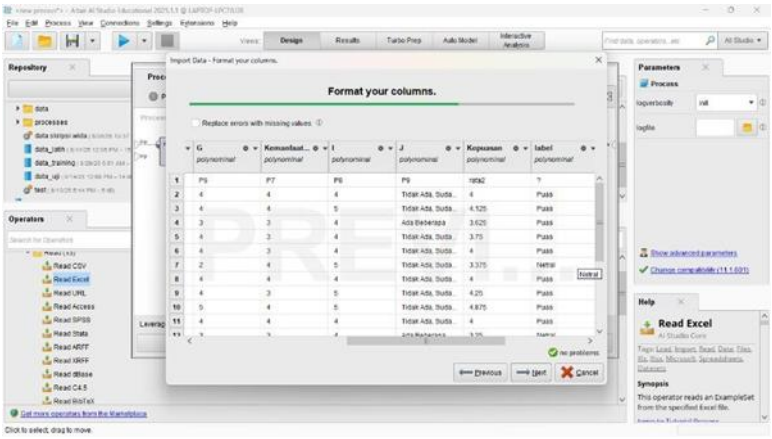

Figure 6. Change Role Interface

This interface displays the data import process in RapidMiner. The label variable is selected for use in the classification process.

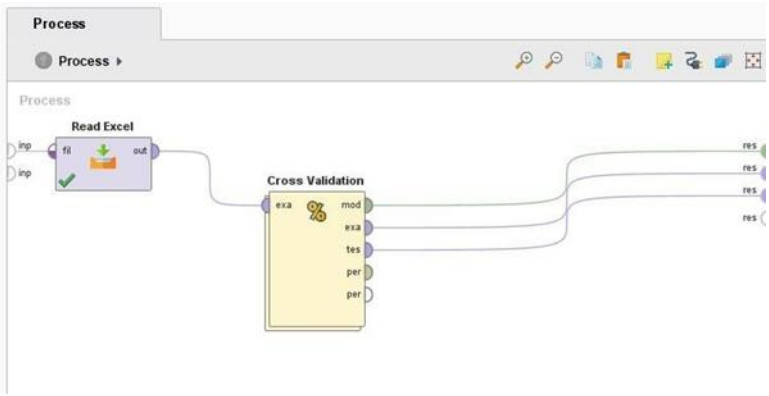

Figure 7. Dataset Connected to Cross Validation

After the dataset has been imported, it is connected to the Cross Validation operator to separate the training data used to train the algorithm in finding a model that best fits the data. The testing data are then used to evaluate and determine the performance of the model obtained during the testing stage.

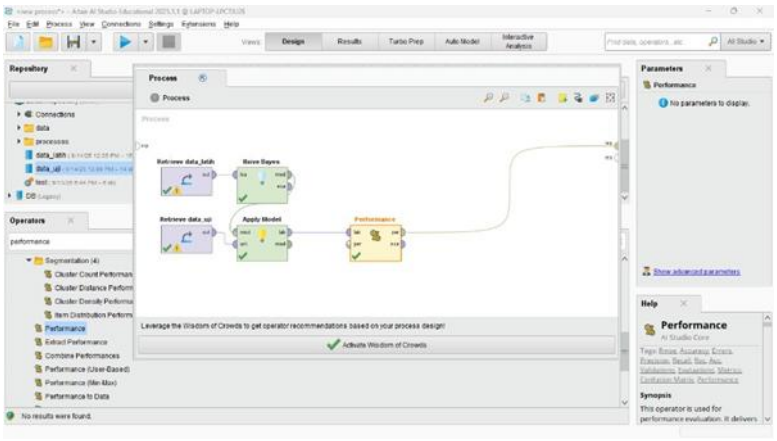

Figure 8. Testing Process Interface

The model testing process in RapidMiner uses the Naïve Bayes algorithm, beginning with data reading, model training, model application to the testing data, and performance evaluation using the Performance operator.

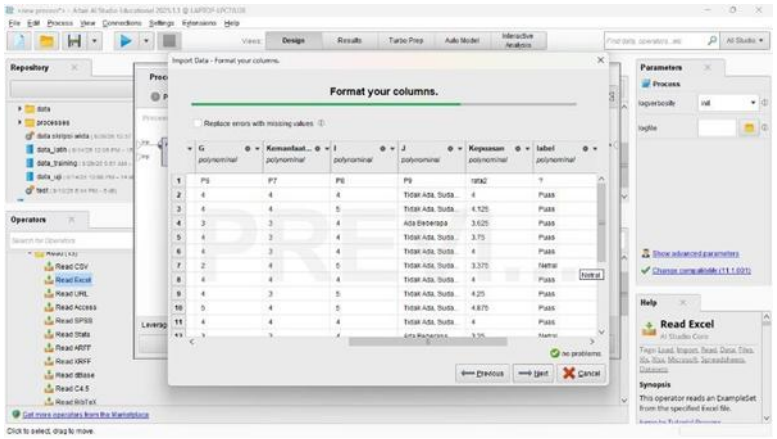

Figure 9. Prediction Attribute Interface

The descriptive statistical results displayed in RapidMiner for each assessment criterion show the values and average respondent scores as part of the testing data evaluation process.

Final Results

The following performance results were obtained from RapidMiner:

Accuracy: 93.00%

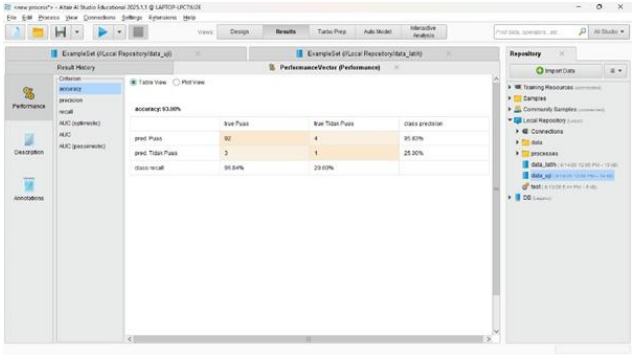

Figure 10. Accuracy Result Interface

Performance Description

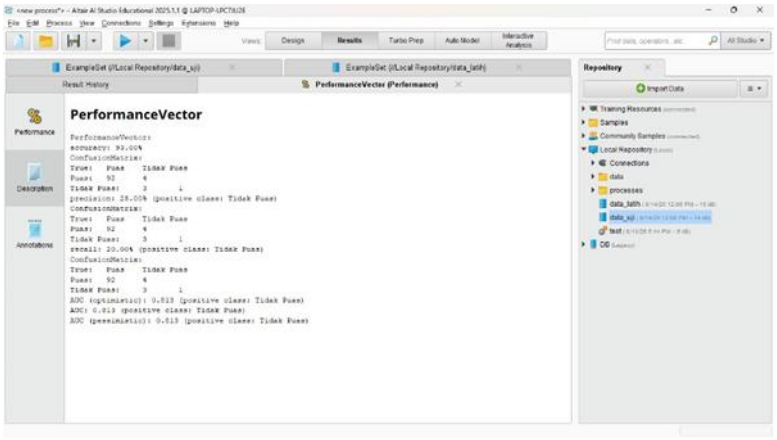

Figure 11. Performance Description Interface

Visualization

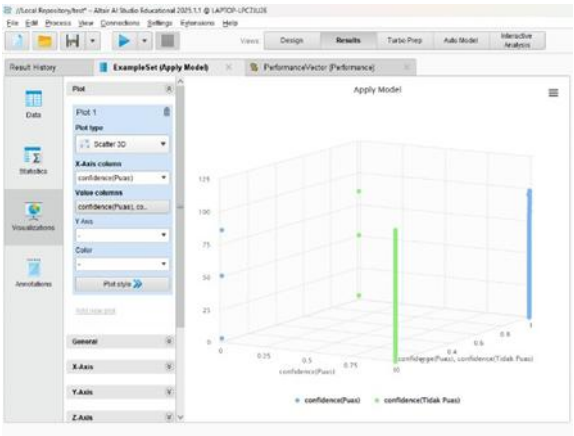

Figure 12. Comparison of Dasawisma Cadres' Satisfaction Levels

5. Conclusion

Based on the research entitled "Classification of Dasawisma Cadres' Satisfaction Levels Toward the CARIK Application Using the Naïve Bayes Method in Semper Barat Subdistrict", several conclusions can be drawn as follows:

Effectiveness of the Naïve Bayes Algorithm

The Naïve Bayes algorithm proved effective in classifying the satisfaction levels of Dasawisma cadres toward the CARIK Application, achieving an accuracy of 96.84%. This high level of accuracy indicates that the method is suitable for analyzing questionnaire data involving variables such as ease of use, access speed, and application usefulness. Although the assumption of feature independence is not always fully satisfied, Naïve Bayes was still able to produce accurate and efficient results within a short computational time.

Dominant Factors Influencing User Satisfaction

The classification results indicate that ease of use is the most influential factor affecting cadre satisfaction, followed by access speed and application usefulness. However, several cadres highlighted the need for improvements in the application's response speed, particularly when operating under limited network connectivity conditions.

Contribution to the Development of the CARIK Application

This study provides an empirical foundation for application developers and the local government to improve application features, including: Optimizing application performance, such as reducing loading time. Adding interactive features such as chat support and user guidance. Providing technical training for cadres to improve digital literacy.

Policy Implications

These findings highlight the importance of conducting periodic evaluations of community-based applications using a data-driven approach. User satisfaction classification can serve as a monitoring tool to ensure that digital innovations remain relevant to field conditions and user needs.

Recommendations

From a technical perspective, application performance optimization should be prioritized, focusing on improving loading speed and developing an offline mode to address network limitations in certain areas. Enhancing application features should also become a priority, including the integration of real-time assistance features such as chat support and the provision of easily accessible interactive tutorials. Furthermore, periodic compatibility testing across various mobile devices commonly used by cadres is necessary to ensure an optimal user experience.

Regarding user capacity development, it is recommended to organize regular training programs using a blended learning approach that combines online and offline methods to improve the digital literacy of cadres. The establishment of technical support teams at the RW level is also recommended to provide direct assistance to cadres experiencing difficulties in using the application.

From the perspective of future research, additional variables should be incorporated, including demographic factors such as age and users' technological experience. Comparative studies involving other classification algorithms, such as Support Vector Machine (SVM) and Random Forest, may provide a more comprehensive understanding of classification accuracy. In addition, a mixed-method approach combining questionnaires with in-depth interviews would help explore the context of user dissatisfaction more thoroughly.

At the policy level, developing a feedback mechanism integrated with the development team is essential to effectively collect and address user complaints. Periodic evaluations every six months using standardized methods should be scheduled to monitor changes in user satisfaction levels. Finally, establishing a regular collaborative forum involving cadres, developers, and local government officials would facilitate open discussions regarding feature requirements and future application development while strengthening synergy among stakeholders involved in this community-based digital initiative.

Closing Remarks

The findings of this study not only contribute to the academic literature regarding the application of text mining in public services but also offer a practical model for community-based digital transformation. The successful implementation of the CARIK Application through a user-centered approach can serve as a blueprint for the development of similar applications in other regions, with contextual adjustments based on local characteristics and community needs.

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