

**IMPLEMENTATION OF PNN, ANN, AND K-NN ALGORITHMS  
ON INDONESIAN MARKETPLACE REVIEWS ON GOOGLE  
PLAY STORE**

**TUGAS AKHIR**

Diajukan Sebagai Salah Satu Syarat  
untuk Memperoleh Gelar Sarjana Komputer pada  
Program Studi Sistem Informasi

Oleh:



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**FAKULTAS SAINS DAN TEKNOLOGI  
UNIVERSITAS ISLAM NEGERI SULTAN SYARIF KASIM RIAU  
PEKANBARU**

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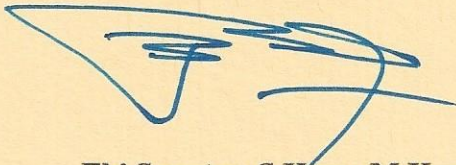
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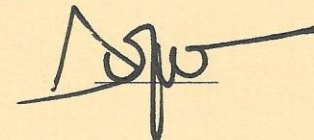
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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

*Dengan menyebut nama Allah yang maha pengasih lagi maha penyayang*

*Assalamualaikum Warahmatullahi Wabarakatuh*

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*Wassalamu 'alaikum Warahmatullahi Wabarakaatuh.*

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banyak memberikan ilmunya kepada peneliti. Semoga ilmu yang diberikan dapat peneliti amalkan dan menjadi amal jariyah.

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# Implementation of PNN, ANN And K-NN Algorithms on Indonesian Marketplace Reviews on Google Play Store

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**Abstract**— The Google Play Store is an official application owned by Google that provides digital content such as games, applications, movies, music, and books with various categories. One of the applications available on the Play Store is a buying and selling or marketplace service application, namely Shopee, Tokopedia, Lazada, Blibli, and Bukalapak. These marketplace applications have many reviews or responses from users regarding the issues they experience while shopping, such as fraud, delayed delivery, mismatched items received, expensive shipping costs, damaged items received by customers, or other problems. These reviews can be analyzed using text mining techniques. In this research, three classification techniques, namely Artificial Neural Network (ANN), Probabilistic Neural Network (PNN), and K-Nearest Neighbor (KNN). The training and test data are divided using the 10-fold Cross Validation technique, with 1000 data points used for each marketplace. The review classes considered are positive, negative, and neutral. In the experiments with the data, the highest accuracy is achieved by the ANN algorithm. ANN outperforms PNN and K-NN, with an accuracy of 81.54%, while PNN has an accuracy of 69.32%, and K-NN has an accuracy of 68.4%. Despite having the highest accuracy, ANN requires a relatively long training time compared to PNN and K-NN. However, in terms of performance, ANN is better than PNN and K-NN in modeling the five datasets.

**Keywords**— Artificial Neural Network, Google Play Store, K-Fold Cross Validation, K-Nearest Neighbor, Marketplace, Probabilistic Neural Network

## I. INTRODUCTION

In the 4.0 era, technological advancements have changed the way humans engage in their activities [1]. The abundance of available applications today proves that there has been rapid development in technology and the internet. Google provides a service known as the Play Store. Google Play Store is the official application owned by Google for devices using the Android operating system, providing digital content such as games, applications, movies, music, and books with various categories [2].

According to data from Statista, the Google Play Store has total of 2,673,292 applications in the year 2023. One of the features found on the Play Store is the rating score and reviews, where users of the Play Store can provide ratings and opinions on the applications they have used [3].

The reviews on Google Play Store consist of star ratings ranging from one to five, accompanied by text reviews. User reviews typically highlight the strengths and weaknesses of

using the application. One of the applications available on the Google Play Store is a marketplace app. A marketplace is a platform for buying and selling goods or services in the form of an electronic or online market [4]. According to data from www.similarweb.com, the top 5 marketplace websites in Indonesia in 2023 are recorded as Shopee, Tokopedia, Lazada, Blibli, and Bukalapak.

According to data from databoks.katadata.com in October 2023, the most visited marketplace websites in Indonesia were Shopee with 216.8 million visits, Tokopedia with 97.1 million visits, Lazada with 52.2 million visits, Blibli with 28.4 million visits, and lastly, Bukalapak with 12.4 million visits.

The marketplace applications available on the Google Play Store have reviews or feedback from users regarding issues they face while shopping. These issues include fraud, delayed delivery, mismatched items, high shipping costs, damaged items received by customers, improper marketplace service, as well as problems arising from slow responses to user complaints or questions, frequent application errors, and so on [5]. Therefore, these sentiments or comments can be processed using text mining. Text mining can generate useful information [6]. The result of data processing from text mining is to classify sentiment.

In this study, three algorithms were applied in the classification technique, namely the Probabilistic Neural Network (PNN), Artificial Neural Network (ANN), and K-Nearest Neighbor (KNN). The PNN algorithm is a method known to perform quite well in sentiment analysis, as demonstrated in previous research on sentiment analysis of the Sinovac vaccine, showing an accuracy result of 91% [7]. Furthermore, a study conducted by Alam and Yao (2018) utilized the Probabilistic Neural Network (PNN) and word embedding for sentiment analysis. The research compared the accuracy results among the PNN, SVM, NB, and MaxE algorithms, where PNN had the highest accuracy at 98.0% [8].

The ANN algorithm is a method that is frequently applied and produces very good accuracy for text data due to its detailed and human-like working mechanism [9]. Based on the research conducted by Kalarani and Selva on sentiment analysis using SVM and ANN algorithms, the results show that the ANN algorithm is superior compared to SVM [10]. Subsequently, the research conducted by Borele & Borikar



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on the implementation of algorithms that provide the best results in sentiment analysis. The study compared the Naïve Bayes, SVM, KNN, Maximum Entropy, and ANN algorithms, indicating that the implementation of the ANN algorithm is the best in sentiment analysis [11].

The K-NN algorithm is considered one of the simplest machine learning algorithms [12]. The K-NN algorithm can achieve good accuracy results and is suitable for calculations applied in an application [13]. Based on previous research on sentiment analysis in the Shopee marketplace using the K-NN algorithm, an accuracy result of 90% was obtained [14]. Furthermore, research on sentiment analysis comparing Naïve Bayes, K-NN, and NBC algorithms found that the K-NN algorithm produced the best results with an accuracy of 93.3% [15].

This research will be conducted by scraping review data from the Google Play Store and processing it using the Python programming language to obtain text and labels automatically through various processes. Subsequently, Probabilistic Neural Network, Artificial Neural Network, and K-Nearest Neighbor will be modeled to classify the processed data. The distinctive aspect of this research compared to others is the comparison of three classification algorithms, Naïve Bayes, ANN, and K-NN, resulting in a model capable of classifying marketplace sentiments. Additionally, the research employs the most recent data to generate more relevant sentiment analysis. The aim of this study is to understand public opinions and provide information to the public in determining the best marketplace delivery service by applying the Probabilistic Neural Network (PNN), Artificial Neural Network (ANN), and K-Nearest Neighbor (K-NN) algorithms to achieve the highest accuracy from all three algorithms.

II. RESEARCH METHODOLOGY

In this research, the process will be explained through a flowchart, starting from data collection to the prediction stage. The aim is to provide a clear structure and guidance for the study to align with the intended objectives. The stages in this research can be seen in Fig. 1.

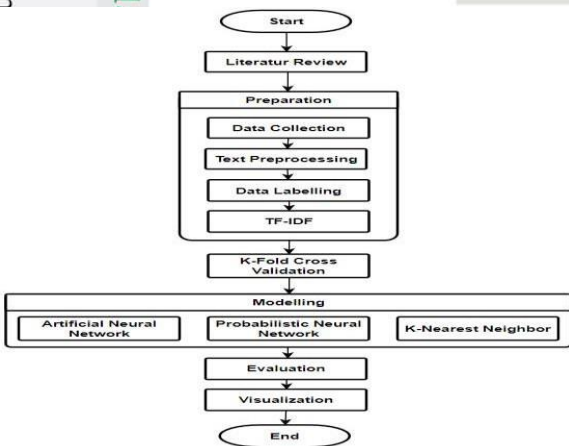


Fig. 1. Research Methodology

A. Data Collection

Data collection can be conducted by implementing scraping techniques on the Google Play Store. The plugin used for data scraping is the google-play-scraper. Review data is

extracted from the most recent comments related to reviews that refer to marketplace delivery services in Indonesia, within the timeframe from August to November 2023. The data is obtained through web scraping using the Python programming language, which is then simplified for ease of processing. The data used consists of reviews and ratings from users of Indonesian marketplace applications, namely Shopee, Tokopedia, Lazada, Blibli, and Bukalapak, with a total of 5000 data preprocessing, each containing 1000 review data. In this study, the classes used are positive, negative, and neutral reviews.

B. TF-IDF

The TF-IDF method is a comprehensive assessment of the importance of a word in a text. TF represents the frequency of a word's occurrence in a specific document, and the document frequency intuitively indicates the importance of the word for that article or document class. IDF is the document frequency containing the word and indicates how common the word is [16].

C. K-Fold Cross Validation

The data division is performed using the K-Fold Cross Validation technique. K-Fold Cross Validation is a testing system for machine learning algorithms to estimate the error rate. In this technique, data is divided into 'k' parts. The operation of k-fold cross-validation involves grouping training and testing data [17]. K-fold cross-validation divides the data into several folds (parts) as much as 'k' to determine training and testing data, with k=10 used to estimate the error rate [18].

D. Probabilistic Neural Network

Probabilistic Neural Network (PNN) is an algorithm in artificial neural networks based on statistical algorithms and is one of the widely used and developed classification algorithms for human purposes. The advantages of implementing the PNN algorithm include process speed, simplicity, and immediacy [19]. PNN demonstrates the ability to efficiently map patterns with optimal results or achieve high levels of accuracy. However, the PNN faces challenges when it comes to determining smoothing parameters, a process often reliant on trial and error or user-defined specifications. The architecture of PNN consists of 4 layers, namely:

- 1) *Input Layer*: The input layer consists of a set of input vector variables designated to serve as the network's input. These variables hold the feature extraction outcomes derived from each test data.
- 2) *Pattern Layer*: Within the Pattern Layer, the proximity distance between the weight vector and input vector is computed. The weight vector represents the training data values for each class, while the input vector encompasses the feature extraction values from the data under examination. The process in this layer uses Equation 1.

$$W_{i,j}(x) = \frac{1}{2\pi^{d/2} \sigma^d} \exp[-\|x - x_{ij}\|^2 / (2\sigma^2)] \quad (1)$$

- 3) *Summation Layer*: The Summation Layer involves the calculation of the maximum potential sum for each i-neuron sharing the same class in the pattern layer. This sum is subsequently averaged over the number of test data for each class, utilizing Equation 2.

$$g_i(x) = \frac{1}{2\pi^{d/2} N_i} \sum_{j=1}^N \exp[-\|x - w_{ij}\|^2 / (2\sigma^2)] \quad (2)$$

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4) **Output layer:** In the final layer, the values corresponding to the outcomes of the two classes are compared. The class with the highest probability value is assigned to that specific class. The process in this layer is carried out using the following Equation 3.

$$G_i(x) = \operatorname{argmax}\{g_i(x)\}, \quad i = 1, 2, \dots, m \quad (3)$$

**Artificial Neural Network**

Artificial Neural Network (ANN) is a biologically inspired computational system where the connection system is formed based on the human neural network. A neuron consists of a summation function, an activation function, and an output [20]. ANN is a mathematical or computational model inspired by the operation of biological neural networks [21]. ANN is also a tool for non-linear statistical data modeling and can be used to model complex relationships between input and output to discover data patterns [22]. The constituent layers of ANN can be divided into 3, namely:

**Input Layer:** The Input layer is a layer consisting of input units (neurons) that directly receive input signals from the outside and send the received input information to each neuron in the hidden layer through weights connecting the input layer and the hidden layer.

**Hidden Layer:** The Hidden layer is a layer consisting of hidden units (neurons) located between the input layer and the output layer, where its output is not directly observed. The addition of this hidden layer can enhance the network's ability in pattern recognition.

**Output Layer:** The Output layer is a layer consisting of output units where the output from the output layer is the solution of the ANN for a problem.

**K-Nearest Neighbor**

K-Nearest Neighbor (KNN) is an algorithm commonly used for the classification of data. KNN is a stage that employs a supervised algorithm, where the result of a new query instance is classified based on the majority of existing categories. This algorithm is used to classify objects based on training data that is closest in distance to the object. The proximity or distance is usually calculated based on the Euclidean Distance [23], as represented in the equation 4.

$$d(x, y) = \sqrt{\sum_{i=1}^n (x_i - y_i)^2} \quad (4)$$

**Evaluation**

After the sentiment analysis classification process is completed, the next step is to evaluate by measuring the accuracy and quality of the results. The evaluation is done by testing performance and accuracy, resulting in values for accuracy, precision, and recall. To calculate the accuracy value, equation (5) can be used, precision with equation (6), and recall with equation (7) [24].

$$\text{Accuracy} = \frac{TP+TN}{TP+TN+FP+FN} \quad (5)$$

$$\text{Precision} = \frac{TP}{TP+FP} \quad (6)$$

$$\text{Recall} = \frac{TP}{TP+FN} \quad (7)$$

**H. Visualization**

The final stage in this research is visualization. The purpose of data visualization is to facilitate analysis and identify words that frequently appear in each review related to marketplace delivery services in Indonesia

**III. RESULTS AND DISCUSSION**

In the data collection process, the data used is obtained from web scraping using the Google Play Scraper tool. The collected data consists of 1000 reviews of the latest data on each marketplace related to delivery services on the Google Play Store. The marketplaces used in this research are the top 5 (Five) marketplace websites in Indonesia in 2023, namely Shopee, Tokopedia, Lazada, Blibli, and Bukalapak. After being scraped using the Python programming language, the text data obtained contains several attributes, but the attribute used is the content column from the output of the scraping results.

Once the data is obtained, the next step is preprocessing. The initial step is to convert the text to lowercase, remove symbols, links, URLs, and usernames. Then, the filtering stage removes text unrelated to sentiment analysis. The next process is tokenizing by cleaning words in a paragraph and then removing prefixes and suffixes in the stemming process.

The automatically processed data is then labeled by Indonesian language experts with positive, negative, and neutral labels. The following is the labeling result by the expert for the reviews of Indonesian marketplace delivery services.

TABLE I. DATASET LABELING RESULT

Dataset	Sentiment		
	Positive	Negative	Neutral
Shopee	300	599	101
Tokopedia	221	623	156
Lazada	285	610	105
Blibli	189	707	102
Bukalapak	267	638	95

Then, the TF-IDF implementation is applied to obtain scores or weights for specific words. The TF-IDF calculation is done using Python with the support of the Scikit-Learn library. The results of the TF-IDF implementation can be found in the Table. II.

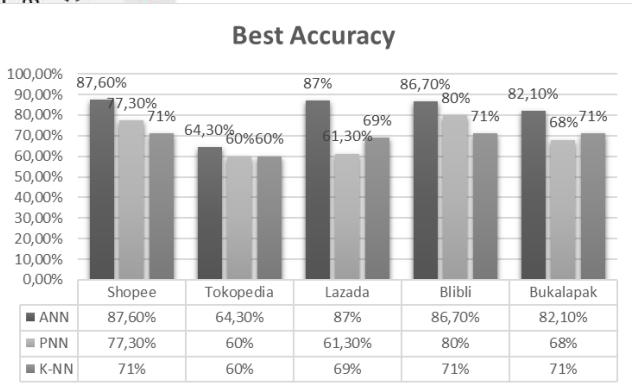
TABLE II. TF-IDF IMPLEMENTATION RESULTS

aja	aplikasi	bagus	baik	...	banget
0.000	0.580	0.000	0.000	...	0.211
0.000	0.466	0.000	0.000	...	0.000
0.196	0.000	0.189	0.000	...	0.000
...	...	...	...	...	...
0.000	0.184	0.000	0.236	...	0.000

Performing sentiment modeling on delivery services in the Indonesian marketplace using three algorithms, namely PNN, ANN, and K-NN. In the PNN algorithm, the smoothing parameter (Spread) is utilized. For the implementation of the ANN algorithm, the optimizer used is Adam with a Learning Rate of 0.001. The training process is conducted with 100 epochs. As for the K-NN algorithm, K is set to 25. Subsequently, validation is carried out by applying the K-Fold Cross-Validation technique using 10-Fold. The following are the results of the modeling analysis of sentiment on delivery



service in the Indonesian marketplace based on the average accuracy for each marketplace.



Comparison of ANN, PNN, and K-NN Accuracy

The graph above represents the results of modeling using the PNN, ANN, and K-NN algorithms, indicating that ANN performs with a higher accuracy compared to PNN and K-NN. The average accuracy for ANN is 81.54%, for PNN is 69.30%, and for K-NN is 68.4%. Despite its high accuracy, ANN has a slight drawback in that it requires longer training time compared to PNN and K-NN in modeling the five datasets mentioned.

The data visualization stage is conducted to identify the most frequently appearing words in user reviews on the Google Play Store for the five Indonesian marketplace applications. Based on the image, it can be seen that the most frequently mentioned words by users for Shopee are "Kirim", "Cepat", "Komplain", "Barang", "Ribet", "Kecewa", "Tipu", "Susah", "Bagus". Hence, it can be concluded that there are many users who provide both positive and negative comments regarding the delivery services on Indonesian marketplaces.



The data visualization

After obtaining the visualization of the most frequent words on each marketplace, several negative words related to the delivery service were identified. In this research, these negative words can be used as a reference for the marketplace to improve their delivery service, so that users' expressions of "Kecewa", "Komplain", "Ribet", "Tipu" and "Susah" can be addressed by the marketplace.

#### IV. CONCLUSION

In this research experiment, a dataset capturing public sentiment towards the delivery services of Indonesian

marketplaces, namely Shopee, Tokopedia, Lazada, Blibli, and Bukalapak, was used. The data was split using the 10-fold Cross Validation technique. The comparison of the best accuracy among PNN, ANN, and K-NN for the five datasets yielded results. The ANN algorithm produced the highest accuracy compared to PNN and K-NN, with ANN's accuracy at 81.54%, PNN at 69.32%, and K-NN at 68.4%. The obtained accuracy indicates that the performance of ANN is superior to PNN and K-NN, although ANN requires a relatively long training time compared to PNN and KNN. Furthermore, the frequency of word occurrences in the five datasets is dominated by words such as "Ongkir", "Susah", "Kecewa", and "Barang", suggesting that there are still many users expressing negative opinions about these five marketplaces. These negative words can be used as a reference for the marketplaces to improve their delivery services.

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#### REFERENCES

- [1] M. Iqbal Ahmadi *et al.*, "SENTIMENT ANALYSIS ONLINE SHOP ON THE PLAY STORE USING METHOD SUPPORT VECTOR MACHINE (SVM)," *Seminar Nasional Informatika*, vol. 2020.
- [2] Ilmawan Lutfi Budi, "MEMBANGUN WEB CRAWLER BERBASIS WEB SERVICE UNTUK DATA CRAWLING PADA WEBSITE GOOGLE PLAY STORE," *ILKOM Jurnal Ilmiah*, 2018.
- [3] N. C. Agustina, D. Herlina Citra, W. Purnama, C. Nisa, and A. Rozi Kurnia, "MALCOM: Indonesian Journal of Machine Learning and Computer Science The Implementation of Naive Bayes Algorithm for Sentiment Analysis of Shopee Reviews on Google Play Store Implementasi Algoritma Naive Bayes untuk Analisis Sentimen Ulasan Shopee pada Google Play Store," vol. 2, pp. 47–54, 2022.
- [4] I. Alfiansya and N. Nurhadi, "Pengaruh Influencer Media Sosial dan Testimoni terhadap Minat Beli Produk Erigo di Marketplace Indonesia," *Al-Kharaj : Jurnal Ekonomi, Keuangan & Bisnis Syariah*, vol. 5, no. 2, pp. 843–856, Aug. 2022, doi: 10.47467/alkharaj.v5i2.1350.
- [5] I. Syarif, R. Asmara, and N. U. Rusmayani, "Klasifikasi Keluhan Masyarakat pada Sosial Media Twitter terhadap Pelayanan Toko Online di Indonesia menggunakan Metode Cosine TF-IDF," *BINA INSANI ICT JOURNAL*, vol. 7, no. 1, pp. 33–42, 2020.
- [6] S. N. Sayyed, M. A. Pundge, and Namrata. C. Mahender, "Text mining for proper identification of noun using Conceptual Dependency," *International Conference on Smart Systems and Inventive Technology (ICSSIT 2018)*, 2018.
- [7] A. Rahman, W. Rapsanjani, and E. Junianto, "IMPLEMENTASI PROBABILISTIC NEURAL NETWORK DAN WORD EMBEDDING UNTUK ANALISIS SENTIMEN VAKSIN SINOVAC," *JURNAL RESPONSIF*, vol. 3, no. 2, pp. 233–242, 2021, [Online]. Available: <http://ejurnal.ars.ac.id/index.php/jti>
- [8] S. Alam and N. Yao, "Probabilistic Neural Network and Word Embedding for Sentiment Analysis," 2018. [Online]. Available: [www.ijacsa.thesai.org](http://www.ijacsa.thesai.org)
- [9] I. Najiyah, "ANALISIS SENTIMEN TANGGAPAN MASYARAKAT INDONESIA TENTANG KENAIKAN BBM MENGGUNAKAN METODE ARTIFICIAL NEURAL NETWORK," *JURNAL RESPONSIF*, vol. 5, no. 1, pp. 92–100, 2023, [Online]. Available: <https://ejurnal.ars.ac.id/index.php/jti>
- [10] P. Kalarani and S. Selva Brunda, "Sentiment analysis by POS and joint sentiment topic features using SVM and ANN," *Soft comput.*

vol. 23, no. 16, pp. 7067–7079, Aug. 2019, doi: 10.1007/s00500-018-3349-9.

P. Borele and D. A. Borikar, “An Approach to Sentiment Analysis Using Artificial Neural Network with Comparative Analysis of Different Techniques,” vol. 18, no. 2, pp. 64–69, doi: 10.9790/49661-1802056469.

D. Zaky and P. H. Gunawan, “Computational Parallel of K-Nearest Neighbor on Page Blocks Classification Dataset,” *International Conference on Information and Communication Technology (ICoICT)*, 2020.

M. F. El Birdaus, N. Nurfaizah, and S. Sarmini, “Analisis Sentimen Tokopedia Pada Ulasan di Google Playstore Menggunakan Algoritma Naïve Bayes Classifier dan K-Nearest Neighbor,” *JURIKOM (Jurnal Riset Komputer)*, vol. 9, no. 5, p. 1329, Oct. 2022, doi: 10.30865/jurikom.v9i5.4774.

Z. Rais, R. N. Said, and R. Ruliana, “Text Classification on Sentiment Analysis of Marketplace SHOPEE Reviews On Twitter Using K-Nearest Neighbor (KNN) Method,” *JINAV: Journal of Information and Visualization*, vol. 3, no. 1, pp. 1–8, Jul. 2022, doi: 10.35877/454ri.jinav1389.

I. G. Hendrayana, D. G. H. Divayana, and M. W. A. Kesiman, “KOMPARASI METODE SVM, K-NN DAN NBC PADA ANALISIS SENTIMEN,” *Jurnal Indonesia : Manajemen Informatika dan Komunikasi*, vol. 4, no. 1, pp. 191–198, Jan. 2023, doi: 10.30870/jimik.v4i1.157.

M. Liang and T. Niu, “Research on Text Classification Techniques Based on Improved TFIDF Algorithm and LSTM Inputs,” *7th International Conference on Intelligent, Interactive Systems and Applications*, 2019.

O. Karal, “Performance comparison of different kernel functions in SVM for different k value in k-fold cross-validation,” in *Proceedings - 2020 Innovations in Intelligent Systems and Applications Conference, ASYU 2020*, Institute of Electrical and

Electronics Engineers Inc., Oct. 2020. doi: 10.1109/ASYU50717.2020.9259880.

[18] S. M. Ganie and M. B. Malik, “An ensemble Machine Learning approach for predicting Type-II diabetes mellitus based on lifestyle indicators,” *Healthcare Analytics*, vol. 2, Nov. 2022, doi: 10.1016/j.health.2022.100092.

[19] N. Utami and Mustakim, “Data Distribution Modelling in Supervised Learning Algorithm is for the classification of Prospective Recipient Candidate,” in *2021 4th International Seminar on Research of Information Technology and Intelligent Systems, ISRITI 2021*, Institute of Electrical and Electronics Engineers Inc., 2021, pp. 593–597. doi: 10.1109/ISRITI54043.2021.9702783.

[20] I. Ahmad and S. M. Asad, “Predictions of coronavirus COVID-19 distinct cases in Pakistan through artificial neural network,” *Epidemiol Infect.*, 2020, doi: 10.1017/S0950268820002174.

[21] M. A. Haq, M. F. Azam, and C. Vincent, “Efficiency of artificial neural networks for glacier ice-thickness estimation: A case study in western Himalaya, India,” *Journal of Glaciology*, vol. 67, no. 264, pp. 671–684, Aug. 2021, doi: 10.1017/jog.2021.19.

[22] S.-W. Huang, H.-M. Cheng, and S.-F. Lin, “Improved Imaging Resolution of Electrical Impedance Tomography Using Artificial Neural Networks for Image Reconstruction,” *IEEE*, 2019.

[23] A. Hidayat and M. Zakiy Fauzi, “Implementasi Algoritma K-Nearest Neighbor dan Probabilistic Neural Network untuk Analisis Opini Masyarakat Terhadap Toko Online di Indonesia,” 2019.

[24] S. Hikmawan, A. Pardamean, and S. Nur Khasanah, “Sentimen Analisis Publik Terhadap Joko Widodo Terhadap Wabah Covid19 Menggunakan Metode Machine Learning,” 2020. [Online]. Available: <http://ejurnal.uhbarajaya.ac.id/index.php/JKI>

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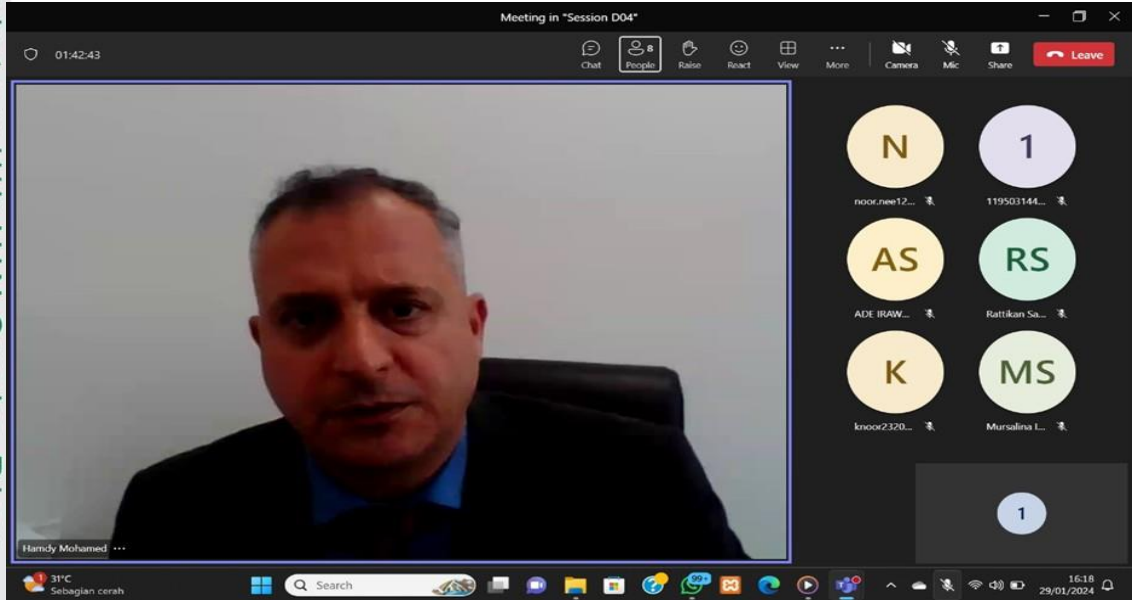
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Ms. Puji Dwi Rinanda and Mr. Mustakim Mustakim

2024 ASU International Conference in Emerging Technologies for Sustainability and Intelligent Systems (ICETISIS)

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Puji Dwi Rinanda

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## B.2 E-mail Accepted

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PUJI DWI RINANDA Sistem Informasi <12050321650@students.uin-suska.ac.id>

### Your paper #1570981116 ('Implementation of Probabilistic Neural Network And Artificial Neural Network Algorithms on Indonesian Marketplace Reviews on Google Play Store')

1 pesan

ICETSIS 2024 <icetsis2024-chairs@edas.info>

24 Desember 2023 pukul 13.58

Kepada: Puji Dwi Rinanda <12050321650@students.uin-suska.ac.id>, Mustakim Mustakim <mustakim@uin-suska.ac.id>, M Afdal <m.afdal@uin-suska.ac.id>, Angraini Angraini <angraini@uin-suska.ac.id>

Dear Ms. Puji Rinanda:

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> \*\*\* Strengths/Weakness: What are the major reasons to accept/reject the paper? [Be brief.]

Generally, the authors have provided a good presentation, particularly on the methodology and results.

> \*\*\* Contribution/s & Detailed comments: What are the major issues addressed in the paper? Do you consider them important? Comment on the degree of novelty, creativity and technical depth in the paper. Please provide detailed comments that will be helpful to the TPC for assessing the paper, as well as feedback to the authors.

The main contributions lie in using probabilistic neural networks and artificial neural network algorithms in the Indonesian marketplace.

> \*\*\* Originality: New or Novel contribution  
 Accept (8)



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> \*\*\* Significance of Topic: Relating to knowledge contribution  
Accept (8)

> \*\*\* Presentation: Clarity and Organisation of Content  
Accept (8)

===== Full Review 2 =====

> \*\*\* Strengths/Weakness: What are the major reasons to accept/reject the paper? [Be brief.]

The paper makes a relatively important contribution to the field of sentiment analysis and provides useful insights for improving marketplace delivery services in Indonesia. But there are some notes that could improve the quality of the paper.

> \*\*\* Contribution/s & Detailed comments: What are the major issues addressed in the paper? Do you consider them important? Comment on the degree of novelty, creativity and technical depth in the paper. Please provide detailed comments that will be helpful to the TPC for assessing the paper, as well as feedback to the authors.

In this paper, researchers used PNN and ANN algorithms to analyze public sentiment towards marketplace delivery services in Indonesia. The paper uses a recent dataset, compares two popular algorithms, and provides visualizations for deeper insights. The paper is rated as average in terms of novelty, technical depth, and creativity. However, the paper also has some weaknesses. First, the paper could be improved by including more marketplaces to provide a more comprehensive view of the landscape of marketplace delivery services in Indonesia. Second, the paper could analyze the reasons behind negative reviews to give insights into how to improve these services. Third, the paper could compare the performance of the algorithms with other algorithms to introduce a more complete picture of the state of the art in sentiment analysis.

> \*\*\* Originality: New or Novel contribution  
Neutral (5)

> \*\*\* Significance of Topic: Relating to knowledge contribution  
Weak Accept (6)

> \*\*\* Presentation: Clarity and Organisation of Content  
Weak Accept (6)

Best Regards,  
The conference chairs

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Nama : Elvina, M.Pd

Tempat Tanggal Lahir : Peranap, 02 Januari 1990

Pekerjaan : Dosen Bahasa Indonesia

Alamat : Perumahan Pranata Cluster Blok C4 Jl. Swakarya Tuah Karya,  
Tampan, Pekanbaru

Menyatakan dengan sesungguhnya bahwa benar memvalidasi untuk pelabelan sentimen yang bersifat positif, negatif dan netral dalam ulasan *Google Play Store* terhadap ulasan pengguna *Marketplace* Indonesia sebanyak 5000 data dalam Tugas Akhir dari:

Nama : Puji Dwi Rinanda

Nim : 12050321650

Jurusan : Sistem Informasi

Judul Tugas Akhir : *Implementation of PNN, ANN, And K-NN Algorithms On Indonesian Marketplace Reviews On Google Play Store*

Demikian surat ini saya buat dengan sesungguhnya tanpa paksaan dari pihak manapun. Atas perhatiannya saya ucapkan terima kasih.

Pekanbaru, 09 November 2023

Yang membuat pernyataan

Elvina, M.Pd

UIN SUSKA RIAU



## DAFTAR RIWAYAT HIDUP



Puji Dwi Rinanda lahir di Desa Buatan II, pada tanggal 22 Juli 2002. Peneliti merupakan anak dari Bapak Jasril dan Ibu Rina. Peneliti adalah anak kedua dari empat bersaudara. Pada tahun 2007 peneliti memulai pendidikan dengan masuk TK Nurul Amanatulhaq di Kota Batam dan lulus pada tahun 2008. Lalu melanjutkan pendidikan Sekolah Dasar di SD Negeri 003 Buatan II. Peneliti menyelesaikan pendidikan Sekolah Dasar pada tahun 2014. Setelah menyelesaikan pendidikan Sekolah

Dasar peneliti melanjutkan pendidikan tingkat SLTP di SMP Negeri 1 Koto Gasib yang selesai pada tahun 2017. Peneliti melanjutkan pelajaran ke tingkat SLTA di SMAN 1 Koto Gasib. Setelah menyelesaikan pendidikan di SMAN 1 Koto Gasib pada tahun 2020, peneliti pun melanjutkan pendidikan dengan menjadi mahasiswa Program Studi Sistem Informasi Fakultas Sains dan Teknologi Universitas Islam Negeri Sultan Syarif Kasim Riau. Pada tahun 2022, peneliti telah menyelesaikan kerja praktek yang bertempat di SD 03 Buatan II Kecamatan Koto Gasib, kemudian selanjutnya pada tahun 2023 peneliti juga telah menyelesaikan Kuliah Kerja Nyata (KKN) di Kelurahan Beringin Jaya, Kecamatan Sentajo Raya, Kabupaten Kuantan Singingi. Dan peneliti telah menyelesaikan kuliah Strata satu (S1) dengan mengambil judul tugas akhir *“Implementation Of PNN, ANN, And K-NN Algorithms On Indonesian Marketplace Reviews On Google Play Store”* pada tahun 2024.

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