LEMBAR PENGESAHAN

Skripsi yang berjudul "**IMPLEMENTASI TEKNIK *RANDOM UNDER SAMPLING* DAN *SYNTHETIC MINORITY OVERSAMPLING TECHNIQUE* UNTUK MENGEVALUASI KINERJA METODE *CLASSIFICATION AND REGRESSION TREE***"

Oleh

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Hari, tanggal	**:**	**Rabu, 15 Januari 2025**
Waktu	**:**	**14.00-15.00 WITA**
Tempat	**:**	**Ruang Sidang Jurusan Matematika**

A.	**Pembimbing**		**Tanda Tangan**
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1.	**Djihad Wungguli, S.Pd., M.Si** NIP. 198906122019031018	Penguji Utama	(....................)
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ABSTRACT

Rifandi Pratama Putra K, 2 0 2 5. *IMPLEMENTATION OF RANDOM UNDER-SAMPLING AND SYNTHETIC MINORITY OVERSAMPLING TECHNIQUE TO EVALUATE THE PERFORMANCE OF THE CLASSIFICATION AND REGRESSION TREE METHOD.* **Undergraduate Thesis** Gorontalo. Study Program of Statistics. Department of Mathematics, Faculty of Mathematics and Natural Sciences. Universitas Negeri Gorontalo.
The Supervisors : **(1) Nurwan, S.Pd., M.Si (2) La Ode Nashar, S.Pd., M.Sc.**

The class imbalance in a dataset is a significant challenge in applying classification models, including the Classification and Regression Tree (CART) method. This study aimed to evaluate the performance of CART combined with two data balancing techniques: Random Under Sampling (RUS) and Synthetic Minority Oversampling Technique (SMOTE). The dataset used came from the Heart Failure Clinical Records on Kaggle.com, showing an imbalance between deceased patients (1,568 data points as the minority class) and survivors (3,432 data points as the majority class), with a total of 5,000 data points. The Random Under Sampling (RUS) technique reduced the total data to 2,526, with each class having 1,263 data points. In contrast, after applying the Synthetic Minority Oversampling Technique (SMOTE), the total data increased to 5,474, with each class having 2,737 data points. The model's performance was assessed using precision, recall, and F1-score metrics, both before and after applying the data balancing techniques. The results indicate that the combination of Classification and Regression Tree (CART) with Synthetic Minority Oversampling Technique (SMOTE) provides better performance in recognizing the minority class compared to Random Under Sampling (RUS), achieving an accuracy and F1-score of 88.203% and 88.195%, respectively. On the other hand, Random Under Sampling (RUS) reached an accuracy of 86.345% and an F1-score of 86.332%. This research contributes significantly to improving prediction accuracy in imbalanced datasets and enriches the scientific references related to the application of the Classification and Regression Tree (CART) method and data balancing techniques.

Keywords: *Random Under Sampling (RUS), Synthetic Minority Oversampling Technique (SMOTE), Classification and Regression Tree (CART), data imbalance.*