UNDERGRADUATE THESIS

PERFORMANCE ANALYSIS OF THE KNN AND SVM ALGORITHMS IN STUNTING CLASSIFICATION BASED ON ANTHROPOMETRIC STANDARDS

SALMA FATHIYATUR RIZKY MUNIR
NPM 20081010025

THESIS ADVISORS
Yisti Vita Via, S.ST., M.Kom.
Eka Prakarsa Mandyartha, S.T., M.Kom

MINISTRY OF HIGHER EDUCATION, SCIENCE, AND TECHNOLOGY
UNIVERSITAS PEMBANGUNAN NASIONAL VETERAN JAWA TIMUR
FACULTY OF COMPUTER SCIENCE
INFORMATIC'S STUDY PROGRAM
SURABAYA
2026

APPROVAL SHEET

PERFORMANCE ANALYSIS OF THE KNN AND SVM ALGORITHMS IN STUNTING CLASSIFICATION BASED ON ANTHROPOMETRIC STANDARDS

By:
SALMA FATHIYATUR RIZKY MUNIR
NPM. 20081010025

Has been defended before, and accepted by, the Board of Assessors of the Thesis Examination of the Informatics Study Program, Faculty of Computer Science, Universitas Pembangunan Nasional Veteran Jawa Timur, on May 21, 2026:

Approved

Yisti Vita Via, S.ST., M.Kom. NIP. 19860425 202121 2 001	.....	**(Advisor I)**
Eka Prakarsa Mandyartha, S.T., M.Kom NIP. 19880525 201803 1 001	.....	**(Advisor II)**
Dr. Intan Yuniar Purbasari, S.Kom. MSc. NIP. 19800602 202521 2 029	.....	**(Head Assessor)**
Eva Yulia Puspaningrum, S.Kom., M.Kom NIP. 19890705 202121 2 002	.....	**(Assessor I)**

Acknowledge by,
Dean of the Faculty of Computer Science

Prof. Dr. Ir. Novirina Hendrasarie, MT.
NIP. 19681126 199403 2 001

APPROVAL SHEET

PERFORMANCE ANALYSIS OF THE KNN AND SVM ALGORITHMS IN STUNTING CLASSIFICATION BASED ON ANTHROPOMETRIC STANDARDS

By:
SALMA FATHIYATUR RIZKY MUNIR
NPM. 20081010025

Approved to proceed to the Thesis Examination

Approved by,

Coordinator of Informatics Study Program
Faculty of Computer Science

Dr. Intan Yuniar Purbasari, S.Kom. MSc.
NIP. 19800602 202521 2 029

STATEMENT OF ORIGINALITY

I am the undersigned:

Student Name	: Salma Fathiyatur Rizky Munir
NPM	: 20081010025
Degree Program	: Bachelor (S1)
Study Program	: Informatics
Faculty	: Faculty of Computer Science

Hereby declares that this undergraduate thesis contains no part of any other scientific work that has been submitted to obtain an academic degree at any higher education institution. Furthermore, it does not contain any work or opinions previously written or published by others, except for those which are explicitly cited in this thesis and listed completely in references.

And I declare that this scientific document is free from elements of plagiarism. If in the future indications of plagiarism are found in this Thesis, I am willing to accept sanctions in accordance with the applicable laws and regulations.

Thus, I made this statement without any coercion from anyone and to be used as it should.

Surabaya, May 21, 2026

Declarant,

SALMA FATHIYATUR RIZKY MUNIR

NPM. 20081010025

ABSTRACT

Student Name / NPM	:	Salma Fathiyatur Rizky Munir / 20081010025
Thesis Title	:	Performance Analysis of the KNN and SVM Algorithms in Stunting Classification Based on Anthropometric Standards
Supervisor	:	1. Yisti Vita Via, S.ST., M.Kom. 2. Eka Prakarsa Mandyartha, S.T., M.Kom

The purpose of this study is to evaluate how well the KNN and SVM algorithms in toddlers at the Patianrowo Community Health Center. Since stunting is a long-term nutritional issue that can impair children's growth and development, categorization techniques are essential for accurately identifying stunting cases. This study compares the two algorithms performance using evaluation metrics and examines how parameter changes affect classification performance. The Patianrowo Community Health Center provided primary data on newborns between the ages of 0 and 60 months. After preprocessing, 1,067 of the original 1,102 data points were recovered these were then split into 20% test data and 80% training data. Gender, age, height, weight, and Z-score values are among the features that are employed. While the SVM algorithm employed linear, polynomial, and radial basis function (RBF) kernels, the KNN algorithm testing was tested with several K values, specifically 3, 5, 7, 9, and 11. A confusion matrix comprising assessment metrics including accuracy, precision, recall, and F1-score was used to asse the model's performance.

According to the test findings, KNN with K = 5 generated an F1-score of 77.52%, recall of 67.73%, accuracy of 96.72%, and precision of 91.25. With an accuracy of 97.47%, precision of 90.82%, recall of 78.96%, and an F1-score of 82.55%, the polynomial kernel produced the best result for the SVM algorithm. These findings indicate that the SVM technique with a polynomial kernel outperforms the others in stunting classification.

Kata kunci : *stunting, klasifikasi, KNN, SVM*

ACKNOWLEDGEMENTS

All praise be to Allah SWT for His mercy, blessings, and the ease He has granted, enabling the author to successfully complete this thesis titled “Analysis of the Performance of the KNN and SVM Algorithms in Stunting Classification Based on Anthropometric Standards”.

During the process of writing this thesis, the author received a great deal of assistance, support, and prayers from various parties. Therefore, the author would like to take this opportunity to express his deepest gratitude to:

1. Mr. Prof. Dr. Ir. Akhmad Fauzi, MMT. as the rector of the National Development University “Veteran” East Java.
2. Mrs. Prof. Dr. Ir. Novirina Hendrasarie, MT. as the Dean of the Faculty of Computer Science, National Development University “Veteran” East Java.
3. Mrs. Dr. Intan Yuniar Purbasari, S.Kom., M.Sc. as the coordinator of the Informatics Study Program at the Faculty of Computer Science, National Development University “Veteran” East Java, for providing guidance and support throughout the academic program.
4. Mrs. Yisti Vita Via, S.ST., M.Kom., as the primary thesis advisor, who consistently provided guidance, motivation, and feedback to the author throughout the process of writing this thesis.
5. Mr. Eka Prakarsa Mandyartha, S.T., M.Kom., as the advisor who provided guidance, criticism, and suggestions for the refinement of this thesis.
6. All faculty members of the Computer Science Program, Faculty of Computer Science, National Development University “Veteran” East Java, who shared their knowledge and experience throughout the author’s academic journey.
7. My beloved parents, Father and Mother, who have always offered prayers, love, support, and unwavering encouragement to the author throughout every stage of life and education.
8. My younger siblings, who have consistently supported encouragement and support throughout the process of writing this thesis.

9. The author’s closest friends Sintya, Ais, Natalia, and Indy who have been by her side, offering encouragement, support, and companionship throughout her college years and while writing her thesis.
10. All those who cannot be named individually but who have helped and supported the author in completing this thesis.

The author acknowledges that this thesis still has shortcomings and is far from perfect. Therefore, constructive criticism and suggestions are greatly appreciated for future improvements. May this thesis be of benefit to readers and contribute to the advancement of knowledge.

Surabaya, May 21 2026

Author

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF NOTATIONS

D	:	Proximity distance between the test data and the training data (Euclidean distance)
x	:	Training data vector
y	:	Test data vector
n	:	Number of attributes in the data
i	:	Index of individual attributes
K	:	Number of nearest neighbors selected in the KNN method
x_i	:	i-th data point
y_i	:	Class label of the i-th data point
w	:	Weight vector
b	:	Bias (relative distance of the hyperplane to the coordinate point)
E_i	:	Error function for the i-th data point in SVM
$K(x_i, x_j)$	:	The value of the kernel function between the i-th and j-th data points
$f(x)$	:	The decision function in the SVM prediction process
TP	:	True Positive – Positive data correctly classified
TN	:	True Negative – Negative data correctly classified
FP	:	False Positive – Negative data classified as positive
FN	:	False Negative – Positive data classified as negative