



UNDERGRADUATE THESIS

**CLASSIFICATION OF LUMPY SKIN DISEASE
(LSD) IN CATTLE USING AN ENSEMBLE VISION
TRANSFORMER – DENSENET121 MODEL**

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SURABAYA
2026**

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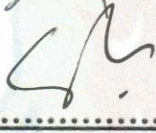


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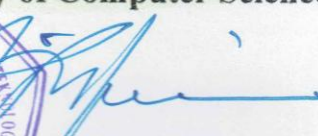


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ABSTRACT

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Thesis Title : Classification of Lumpy Skin Disease (LSD) in Cattle Using an Ensemble Vision Transformer–DenseNet121 Model
Supervisor : 1. Eka Prakarsa Mandyartha, S.T., M.Kom.
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Lumpy Skin Disease (LSD) is an infectious disease in cattle characterized by the appearance of bumps or nodules on the skin and can cause significant economic losses for farmers. LSD needs to be identified early so that treatment can be carried out promptly and its spread can be controlled. In the field, the identification process still largely relies on clinical examination and laboratory testing, which require time, cost, and expert personnel. The purpose of this study is to classify LSD in cattle based on digital images using an ensemble model of Vision Transformer (ViT) and DenseNet121. The dataset used was obtained from Kaggle, with a total of 1445 images consisting of 700 images of normal cattle and 745 images of cattle infected with LSD. The preprocessing stage included resizing the images to 224×224 pixels and normalizing pixel values, after which the model was evaluated using 5 – Fold Cross Validation. Hyperparameter tuning was conducted using Grid Search to obtain the best configuration for each model, while the ensemble weight was determined by testing α values in the range of 0.0 to 1.0. In the proposed approach, ViT was used to capture global information from the images, while DenseNet121 was used to capture more detailed local features. The results showed that the ensemble model achieved the best performance, with an accuracy of 91.35%, precision of 91.41%, recall of 91.30%, and f1 – score of 91.32%. These performance values were higher than those of the Vision Transformer model, which achieved an accuracy of 89.34%, and DenseNet121, which achieved an accuracy of 90.24%. These results indicate that combining ViT and DenseNet121 can improve classification performance by leveraging both global and local features simultaneously.

Keywords : Lumpy Skin Disease (LSD), Image Classification, Vision Transformer, DenseNet121, Ensemble

ACKNOWLEDGEMENTS

Praise be to Allah SWT for all His graces, guidance and gifts to the author so that the thesis with the title **“Classification of Lumpy Skin Disease (LSD) in Cattle Using an Ensemble Vision Transformer - DenseNet121 Model”** can be completed properly.

The author would like to thank Mr. Eka Prakarsa Mandyartha, S.T., M.Kom., as the main Supervisor who has taken his time to provide guidance, advice and motivation to the author. And the author also received a lot of help from various parties, be it in the form of moral, spiritual or material. For this the author would like to thank the:

1. Mrs. Prof. Dr. Ir. Novirina Hendrasarie, MT, as the Dean of the Faculty of Computer Science, Universitas Pembangunan Nasional “Veteran” Jawa Timur.
2. Mrs. Dr. Intan Yuniar Purbasari S.Kom., MSc., as the Head of the Informatics Study Program, Faculty of Computer Science, Universitas Pembangunan Nasional “Veteran” Jawa Timur.
3. Mr. Eka Prakarsa Mandyartha, S.T., M.Kom. as Supervisor I who has spent time, energy, and thoughts to provide guidance, advice, direction, and motivation so that this thesis can be completed well.
4. Mrs. Eva Yulia Puspaningrum, S.Kom., M.Kom., as Supervisor II who has provided assistance, corrections, suggestions, and meaningful direction in the improvement of this thesis.
5. Mr. Dr. Faisal Muttaqin, S.Kom., M.T. and Mr. Muhammad Muharrom Al Haromainy, S.Kom., M.Kom., as Examiner Lecturers who have provided evaluations, inputs, criticisms, and constructive suggestions in the thesis exam process. The contributions and directions given are valuable improvement materials for the author in perfecting the research and preparation of this thesis.
6. Parents and family who always provide prayers, affection, moral, spiritual, and material support, and unceasing enthusiasm to the author. Thanks to the prayers and support provided, the author was able to complete the study and preparation of this thesis well.
7. The author's friends, namely Frendiya Mei Sindy, Siti Afridayanti, Mulyani Setya Bhakti, Ahmad Diaz Nanda Ikrama, Hapsoro Wisnu Murti, M. Rifky Andrianto,

Ade Rizky Panjaitan, who have provided support, encouragement, assistance, and togetherness during the lecture period until the process of preparing this thesis. The presence and support provided is one of the sources of motivation for the author in completing this thesis.

8. All parties that the author cannot mention one by one who have provided assistance, support, prayers, and participation both directly and indirectly in the process of preparing this thesis. Hopefully all forms of assistance and kindness that have been given will get the best return.

The author realizes that this thesis still has shortcomings and limitations, both in terms of preparation and discussion. Therefore, the author expects constructive criticism and suggestions from various parties for the improvement of this thesis. Finally, the author hopes that this thesis can provide benefits for readers and for the author herself.

Surabaya, May 06, 2026

Author

TABLE OF CONTENTS

APPROVAL SHEET	iii
APPROVAL SHEET	v
STATEMENT OF ORIGINALTY	vii
ABSTRACT	ix
ACKNOWLEDGEMENTS	xi
TABLE OF CONTENTS.....	xiii
LIST OF FIGURES	xvii
LIST OF TABLES	xix
LIST OF PSEUDOCODE.....	xxi
CHAPTER I INTRODUCTION	1
1.1 Background	1
1.2 Problem Formulation.....	3
1.3 Research Objectives	4
1.4 Research Benefits	4
1.5 Problem Limitations	4
CHAPTER II LITERATURE REVIEW	5
2.1 Previous Research	5
2.2 Lumpy Skin Disease (LSD)	8
2.3 Digital Images	8
2.4 Deep Learning	9
2.5 Convolutional Neural Network	9
2.6 Vision Transformer (ViT) Architecture	13
2.6.1 Image Patch Embedding.....	14
2.6.2 Positional Encoding.....	14
2.6.3 Transformer Encoder.....	15
2.6.4 MLP Head	17
2.7 DenseNet121 Architecture	17
2.7.1 Initial Convolution and Pooling	18
2.7.2 Dense Block and Transition Layer.....	18
2.7.3 Global Average Pooling	19
2.7.4 Fully Connected layer.....	20
2.8 Weighted Ensemble.....	20

2.9 K-Fold Cross Validation.....	21
2.10 Grid Search CV	21
2.11 Model Performance Evaluation.....	22
CHAPTER III RESEARCH METHODOLOGY.....	25
3.1 Research Stages.....	25
3.2 Dataset.....	26
3.3 Data Preprocessing	26
3.3.1 Resize	26
3.3.2 Normalization	27
3.3.3 Data Augmentation.....	27
3.4 K-Fold Cross Validation.....	28
3.5 Proposed Methods	29
3.6 Implementation of Vision Transformer (ViT).....	30
3.6.1 Image Patch Embedding.....	31
3.6.2 Positional Encoding.....	33
3.6.3 Transformer Encoder.....	33
3.6.4 MLP Head	37
3.7 Implementation of DenseNet121.....	37
3.7.1 Initial Convolutional and Pooling	38
3.7.2 Dense Block and Transition Layer.....	39
3.7.3 Global Average Pooling	41
3.7.4 Fully Connected Layer	41
3.8 Implementation of Weighted Ensemble	41
3.9 Testing Scenario	42
3.10 Model Performance Evaluation.....	44
3.11 Implementation of the System Interface.....	45
CHAPTER IV RESULTS AND DISCUSSION.....	47
4.1 Data Collection.....	47
4.2 Data Preprocessing	48
4.3 K-Fold Cross Validation.....	51
4.4 Model Implementation	52
4.4.1 Implementation Model of Vision Transformer	53
4.4.2 Implementation Model of DenseNet121	57

4.4.3 Implementation of Ensemble Vision Transformer – DenseNet121 Model

62

4.5 Test Scenario Results	66
4.6 Model Evaluation	70
4.6.1 Best Model Evaluation (Raw Data).....	70
4.6.2 Best Model Evaluation (Balanced Data).....	78
4.6.3 Model Performance Comparison.....	87
4.7 Implementation of the System Interface.....	88
CHAPTER V CONCLUSION	93
5.1 Conclusion.....	93
5.2 Suggestions.....	94
BIBLIOGRAPHY	95
ATTACHMENT	101

LIST OF FIGURES

Figure 2. 1 Architecture Convolutional Neural Network.....	10
Figure 2. 2 Convolutional Layer	10
Figure 2. 3 Pooling Layer.....	12
Figure 2. 4 Fully Connected Layer.....	12
Figure 2. 5 Vision Transformer Architecture.....	13
Figure 2. 6 DenseNet121 Architecture.....	18
Figure 2. 7 K-Fold Cross Validation	21
Figure 2. 8 Confusion Matrix	22
Figure 3. 1 Research Stages	25
Figure 3. 2 Resize Results	27
Figure 3. 3 Hasil Augmentasi.....	28
Figure 3. 4 Flowchart of the Ensembled ViT-DenseNet121 Model	29
Figure 3. 5 Vision Transformer (ViT) Model Workflow	30
Figure 3. 6 DenseNet121 Model Workflow.....	37
Figure 3. 7 Initial Convolutional and Pooling Architecture.....	38
Figure 3. 8 Weighted Ensemble Workflow.....	41
Figure 3. 9 Interface of the LSD Disease Classification System	46
Figure 4. 1 Number of Data for Each Class	47
Figure 4. 2 Number of Images for Each Class (Balanced Data)	51
Figure 4. 3 Confusion Matrix Vision Transformer	70
Figure 4. 4 Vision Transformer Training and Validation Graphs.....	72
Figure 4. 5 Confusion Matrix DenseNet121	74
Figure 4. 6 DenseNet121 Training and Validation Graphs.....	75
Figure 4. 7 Confusion Matrix Ensemble Vision Transformer - DenseNet121.....	77
Figure 4. 8 Confusion Matrix Vision Transformer (Balanced Data).....	79
Figure 4. 9 Vision Transformer Training and Validation Graphs (Balanced Data)...	80
Figure 4. 10 Confusion Matrix DenseNet121 (Balanced Data).....	82
Figure 4. 11 DenseNet121 Training and Validation Graphs (Balanced Data).....	84
Figure 4. 12 Confusion Matrix Ensemble Vision Transformer - DenseNet121 (Balanced Data).....	85
Figure 4. 13 System Interface Display for LSD Detected Classification Results	91
Figure 4. 14 System Interface Display for Normal Classification Results.....	92

LIST OF TABLES

Table 3. 1 Dataset.....	26
Table 3. 2 Dataset After Augmentation.....	28
Table 3. 3 Implementation of K-Fold Cross Validation.....	29
Table 3. 4 Testing ViT and DenseNet121 Models.....	43
Table 3. 5 α Testing.....	43
Table 3. 6 Testing Scenario.....	44
Table 4. 1 Results of the Vision Transformer Grid Search Scenario.....	67
Table 4. 2 Results of the DenseNet121 Grid Search Scenario.....	68
Table 4. 3 Results of the Ensemble Weight (α) Scenario (Raw Data).....	68
Table 4. 4 Results of the Ensemble Weight (α) Scenario (Balanced Data).....	69
Table 4. 5 Performance Evaluation of the Vision Transformer Model.....	71
Table 4. 6 Performance Evaluation of the DenseNet121 Model.....	75
Table 4. 7 Performance Evaluation of Ensemble Vision Transformer - DenseNet121 Models.....	78
Table 4. 8 Performance Evaluation of the Vision Transformer Model (Balanced Data)	80
Table 4. 9 Performance Evaluation of the DenseNet121 Model (Balanced Data)	83
Table 4. 10 Performance Evaluation of Ensemble Vision Transformer - DenseNet121 Models (Balanced Data).....	86
Table 4. 11 Comparison of Model Performance Evaluations	87

LIST OF PSEUDOCODE

Pseudocode 4. 1 Data Preprocessing	48
Pseudocode 4. 2 Data Augmentation.....	49
Pseudocode 4. 3 K-Fold Cross Validation	52
Pseudocode 4. 4 Preparation of the input and parameters of the Vision Transformer model.....	53
Pseudocode 4. 5 Build the Vision Transformer Model	54
Pseudocode 4. 6 Initialization of Vision Transformer Hyperparameters	55
Pseudocode 4. 7 The Grid Search Process for Vision Transformer	55
Pseudocode 4. 8 ViT's Best Hyperparameter Selection	56
Pseudocode 4. 9 Evaluation of Vision Transformer Results.....	57
Pseudocode 4. 10 Preparation of the input and parameters of the DenseNet121 Model	57
Pseudocode 4. 11 Build the DenseNet121 Model.....	58
Pseudocode 4. 12 Initialization of DenseNet121 Hyperparameters	59
Pseudocode 4. 13 The Grid Search Process for DenseNet121	60
Pseudocode 4. 14 DenseNet121's Best Hyperparameter Selection	60
Pseudocode 4. 15 Evaluation of DenseNet121 Results.....	61
Pseudocode 4. 16 Model Ensemble Preparation	62
Pseudocode 4. 17 Build ViT and DenseNet121 Models	63
Pseudocode 4. 18 Out-Of-Fold Prediction Process	63
Pseudocode 4. 19 Weight Ensemble Testing	64
Pseudocode 4. 20 Selected Best Ensemble Weights	65
Pseudocode 4. 21 Evaluation of Ensemble Results.....	65
Pseudocode 4. 22 Initialize Configurations and Models	89
Pseudocode 4. 23 Preprocessing of Input Images	89
Pseudocode 4. 24 Ensemble Prediction.....	90
Pseudocode 4. 25 Classification Process in the System.....	90