



UNDERGRADUATE THESIS

Classification of Rice Leaf Diseases Using MobileNetV3-Large with a Grad-CAM-Based Explainable AI Approach on a Mobile Platform

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SURABAYA**

APPROVAL SHEET

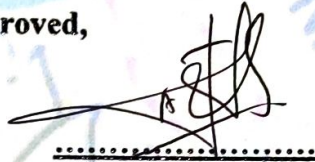
**CLASSIFICATION OF RICE LEAF DISEASES USING MOBILENETV3-
LARGE WITH A GRAD-CAM-BASED EXPLAINABLE AI APPROACH ON
A MOBILE PLATFORM**

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STATEMENT OF ORIGINALITY

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ABSTRACT

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Supervisor: 1. Fetty Tri Anggraeny, S.Kom, M.Kom
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Rice productivity in Indonesia is frequently threatened by leaf diseases, which can cause yield losses of up to 40%. While Deep Learning models like Convolutional Neural Networks (CNN) offer high accuracy for disease classification, their "black box" nature often lacks transparency, making it difficult for users to understand the basis of a prediction. This research addresses these challenges by developing an interpretable rice leaf disease classification system deployed on a mobile platform.

The study utilizes the MobileNetV3-Large architecture, specifically chosen for its computational efficiency and high performance on edge devices. To provide model explainability, the Gradient-weighted Class Activation Mapping (Grad-CAM) method is integrated, which generates visual heatmaps highlighting the specific areas of the leaf that influenced the model's decision. Due to the technical limitations of mobile machine learning libraries regarding gradient computation, a client-server architecture was adopted. Disease classification is performed locally on the Android device using a TensorFlow Lite model for offline functionality, while Grad-CAM heatmaps are generated via an external server.

The dataset used consists of rice leaf images from Kaggle, covering four classes: Bacterial Leaf Blight, Blast, Brown Spot, and Healthy. Experimental results demonstrate that the MobileNetV3-Large model achieved high performance across various data split scenarios. The final integrated mobile application allows farmers to capture leaf images, receive immediate disease classifications, and view Grad-CAM heatmaps for visual validation. This approach provides a balance between high-accuracy mobile inference and meaningful model interpretability, supporting more effective and reliable rice cultivation practices.

Keywords: rice leaf disease, MobileNetV3-Large, Grad-CAM, Explainable AI, mobile application

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Surabaya, March 30th 2026



Author

TABLE OF CONTENTS

| | |
|--|------|
| APPROVAL SHEET | ii |
| STATEMENT OF ORIGINALITY | iv |
| ABSTRACT | v |
| ACKNOWLEDGEMENTS | vi |
| TABLE OF CONTENTS | vii |
| LIST OF TABLES | xii |
| LIST OF CODE PROGRAMS | xiii |
| CHAPTER I INTRODUCTION | 1 |
| 1.1. Background | 1 |
| 1.2. Problem Statement | 3 |
| 1.3. Research Goals | 3 |
| 1.4. Research Benefits | 4 |
| 1.5. Research Limitations | 4 |
| CHAPTER II LITERATURE REVIEW | 5 |
| 2.1 Past Research | 5 |
| 2.2 Rice Leaf Diseases | 7 |
| 2.2.1 Leaf Blight Diseases | 7 |
| 2.2.2 Leaf Blast Diseases | 8 |
| 2.2.3 Brown Spot Diseases | 8 |
| 2.3 Digital Image | 8 |
| 2.4 Image Preprocessing | 9 |
| 2.4.1 Image Normalization | 9 |
| 2.5 Artificial Neural Network | 10 |
| 2.6 Convolutional Neural Network | 10 |
| 2.6.1 Convolutional Layer | 10 |
| 2.6.2 Pooling Layer | 11 |

| | | |
|------------------------------|--|----|
| 2.6.3 | Activation Function..... | 11 |
| 2.7 | MobileNetV3 | 11 |
| 2.7.1 | Depthwise Separable Convolution..... | 12 |
| 2.7.2 | Squeeze-And-Excitation | 14 |
| 2.8 | Explainable Artificial Intelligence (XAI) | 15 |
| 2.8.1 | Types of XAI Methods..... | 15 |
| 2.8.2 | Saliency Map..... | 15 |
| 2.9 | Gradient-weighted Class Activation Mapping (Grad-CAM)..... | 16 |
| 2.9.1 | Stages of Grad-CAM Computation..... | 16 |
| 2.10 | Mobile Inference | 18 |
| 2.11 | Client-Server Architecture | 18 |
| 2.12 | Model Evaluation | 19 |
| 2.12.1 | Confusion Matrix | 19 |
| 2.12.2 | Accuracy | 19 |
| 2.12.3 | Precision..... | 19 |
| 2.12.4 | Recall..... | 20 |
| 2.12.5 | F1-Score..... | 20 |
| CHAPTER III METHODOLOGY..... | | 21 |
| 3.1 | Research Process..... | 21 |
| 3.2 | Data Collection..... | 22 |
| 3.3 | Data Preprocessing..... | 24 |
| 3.3.1 | Resize | 25 |
| 3.3.2 | Normalization..... | 25 |
| 3.4 | Model Training..... | 26 |
| 3.4.1 | MobileNetV3-Large Architecture..... | 26 |
| 3.4.2 | Layer Conv2D..... | 28 |
| 3.4.3 | Hard-Swish..... | 29 |

| | | |
|---|---|----|
| 3.4.4 | Inverted Bottleneck | 29 |
| 3.4.5 | Classifier | 33 |
| 3.4.6 | Transfer Learning MobileNetV3-Large | 34 |
| 3.5 | Defining Model Testing Scenarios | 34 |
| 3.5.1 | Determining the Best Model | 36 |
| 3.6 | Export Model | 36 |
| 3.6.1 | Save Model | 37 |
| 3.6.2 | Convert Model | 37 |
| 3.6.3 | Import Model into Application | 37 |
| 3.7 | Grad-CAM Integration of MobileNetV3-Large with Grad-CAM | 37 |
| 3.8 | System Design | 38 |
| 3.8.1 | Client-Server Architecture Design | 39 |
| 3.9 | Mobile Application Mockup | 40 |
| CHAPTER IV RESULTS AND DISCUSSION | | 41 |
| 4.1 | Data Collection | 41 |
| 4.2 | Data Preprocessing | 44 |
| 4.3 | Model Training | 47 |
| 4.4 | Model Testing Results | 52 |
| 4.5 | Exporting Model | 57 |
| 4.6 | Creating API Server | 59 |
| 4.7 | Mobile App | 65 |
| 4.8 | Grad-CAM Heatmap Results | 68 |
| 4.9 | Mobile App Results | 70 |
| CHAPTER V CONCLUSION | | 74 |
| 5.1 | Conclusion | 74 |
| 5.2 | Future Work Suggestions | 74 |
| REFERENCES | | 76 |

LIST OF IMAGES

| | |
|--|----|
| Figure 2.1 Bacterial Leaf Blight Disease | 7 |
| Figure 2.2 Leaf Blast Disease | 8 |
| Figure 2.3 Brown Spot Disease..... | 8 |
| Figure 2.4 Digital Image | 8 |
| Figure 2.5 MobileNetV3 Architecture | 11 |
| Figure 2.6 Depthwise Separable Convolution Structure | 12 |
| Figure 2.7 Squeeze-And-Excite on MobileNetV3 | 14 |
| Figure 2.8 Saliency Map..... | 15 |
| Figure 2.9 Client-Server Architecture..... | 18 |
| Figure 3.1 Research Process | 21 |
| Figure 3.2 Data Gathering Flow | 22 |
| Figure 3.3 Data Preprocessing Workflow..... | 25 |
| Figure 3.4 Resize Process | 25 |
| Figure 3.5 Normalization Process | 26 |
| Figure 3.6 MobileNetV3-Large Architecture | 26 |
| Figure 3.7 Layer Conv2D Computation..... | 28 |
| Figure 3.8 2D Convolution Result | 29 |
| Figure 3.9 Hard-Swish Computation | 29 |
| Figure 3.10 Pointwise Convolution for Filter 1 | 30 |
| Figure 3.11 Result of Pointwise Convolution for Filter 1..... | 31 |
| Figure 3.12 Pointwise Convolution for Filter 2 | 31 |
| Figure 3.13 Result of Pointwise Convolution for Filter 2..... | 32 |
| Figure 3.14 Transfer Learning MobileNetV3-Large | 34 |
| Figure 3.15 Model Export Flow..... | 36 |
| Figure 3.16 Integration of MobileNetV3-Large with Grad-CAM | 37 |
| Figure 3.17 System Use Case..... | 38 |
| Figure 3.18 System Architecture Diagram | 39 |
| Figure 3.19 Mobile Application Mockup Design | 40 |
| Figure 4.1 Preprocessing Result..... | 44 |
| Figure 4.2 Effects Freeze Layer | 48 |
| Figure 4.3 Effects of Modifying MobileNetV3Large Classifier..... | 48 |
| Figure 4.4 Train & Loss Curve for Best Result of 90:10 Proportion..... | 53 |
| Figure 4.5 Confusion Matrix of 90:10 Proportion Best Model..... | 53 |

| | |
|--|----|
| Figure 4.6 Train & Loss Curve for Best Result of 70:30 Proportion..... | 54 |
| Figure 4.7 Confusion Matrix of 70:30 Proportion Best Model..... | 55 |
| Figure 4.8 Train & Loss Curve for Best Result of 80:20 Proportion..... | 56 |
| Figure 4.9 Confusion Matrix of 80:20 Proportion Best Model..... | 56 |
| Figure 4.10 Asset Folder of the Application..... | 58 |
| Figure 4.11 Model After Training..... | 59 |
| Figure 4.12 Result of Model Splitting, (a) Conv Model, (b) Classification Model... | 61 |
| Figure 4.13 Grad-CAM Class Leaf Blight, (a) input, (b) Grad-CAM..... | 68 |
| Figure 4.14 Grad-CAM Clas Brown Spot, (a) input, (b) Grad-CAM..... | 68 |
| Figure 4.15 Landing Page..... | 70 |
| Figure 4.16 Detection History Page..... | 70 |
| Figure 4.17 Encyclopedia Page..... | 71 |
| Figure 4.18 Farmer Data Collection Form..... | 71 |
| Figure 4.19 Picture Guide..... | 72 |
| Figure 4.20 Take Picture Page..... | 72 |
| Figure 4.21 Detection Result Page..... | 73 |

LIST OF TABLES

| | |
|--|----|
| Table 2.1 Confusion Matrix | 19 |
| Table 3.1 Kaggle Dataset Sample | 22 |
| Table 3.2 Image Count | 23 |
| Table 3.3 Data Split 1 (90:10)..... | 24 |
| Table 3.4 Data Split 2 (80:20)..... | 24 |
| Table 3.5 Data Split 3 (70:30)..... | 24 |
| Table 3.6 MobileNetV3-Large Architecture..... | 27 |
| Table 3.7 Model Testing Scenario 1 | 35 |
| Table 3.8 Model Testing Scenario 2 | 35 |
| Table 3.9 Model Testing Scenario 3 | 35 |
| Table 3.10 Evaluation Scenarios..... | 36 |
| Table 4.1 Result of 90:10 Data Proportion Scenario | 52 |
| Table 4.2 Result of 70:30 Data Proportion Scenario | 54 |
| Table 4.3 Result of 80:20 Data Proportion Scenario | 55 |
| Table 4.4 Best Result from Each Scenario | 57 |

LIST OF CODE PROGRAMS

| | |
|---|----|
| Program Code 4.1 Configuration and Seeding | 41 |
| Program Code 4.2 Class Name Normalization | 42 |
| Program Code 4.3 Directory Name Normalization..... | 42 |
| Program Code 4.4 Dataset Filtering..... | 43 |
| Program Code 4.5 Working Directory Creation & Dataset Filtering | 43 |
| Program Code 4.6 Data Preprocessing..... | 44 |
| Program Code 4.7 Train Dataset Creation | 45 |
| Program Code 4.8 Validation Dataset Creation..... | 45 |
| Program Code 4.9 Dataset Implementation | 46 |
| Program Code 4.10 Getting Sample Count..... | 46 |
| Program Code 4.11 Defining Experiment Configuration | 46 |
| Program Code 4.12 Constructing Experiment Configuration..... | 47 |
| Program Code 4.13 Creating MobileNetV3-Large..... | 47 |
| Program Code 4.14 Freeze Layer MobileNetV3-Large..... | 47 |
| Program Code 4.15 Modifying MobileNetV3-Large Classifier | 48 |
| Program Code 4.16 Compiling MobileNetV3-Large..... | 49 |
| Program Code 4.17 Training MobileNetV3-Large | 49 |
| Program Code 4.18 Model Fit & Metrics | 50 |
| Program Code 4.19 Getting Best Model | 50 |
| Program Code 4.20 Save Metrics and Clean Memory | 51 |
| Program Code 4.21 Catching Training Error | 51 |
| Program Code 4.22 Saving Training Result | 52 |
| Program Code 4.23 Saving to .h5 Format..... | 57 |
| Program Code 4.24 Converting to .tflite Format | 58 |
| Program Code 4.25 Adding LiteRT to an Android Project | 58 |
| Program Code 4.26 Splitting MobileNetV3-Large Model | 59 |
| Program Code 4.27 Getting The Name Of The Last Conv Layer | 60 |
| Program Code 4.28 Heatmap Creation Function..... | 60 |
| Program Code 4.29 Creating Feature Extraction and Classification Model..... | 60 |
| Program Code 4.30 Gradient Calculation..... | 61 |
| Program Code 4.31 Calculating Importance Weight | 62 |
| Program Code 4.32 Linear Combination | 62 |
| Program Code 4.33 Heatmap Generation | 62 |

| | |
|---|----|
| Program Code 4.34 Library Initialization..... | 63 |
| Program Code 4.35 Model Initialization..... | 63 |
| Program Code 4.36 Function of Making Grad-CAM Gradio..... | 63 |
| Program Code 4.37 Creating a Gradio Interface..... | 64 |
| Program Code 4.38 Running Gradio Server..... | 64 |
| Program Code 4.39 Model Creation Function in Kotlin..... | 65 |
| Program Code 4.40 Loading Labels..... | 65 |
| Program Code 4.41 Loading the Model..... | 66 |
| Program Code 4.42 Converting Bitmap to ByteBuffer..... | 66 |
| Program Code 4.43 Preprocess Function..... | 67 |
| Program Code 4.44 Running Inference..... | 67 |