



UNDERGRADUATE THESIS

IMPLEMENTATION OF A TRANSFER-LEARNING-BASED CONVNEXT-TINY MODEL FOR CLASSIFYING TEA LEAF DISEASES

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FACULTY OF COMPUTER SCIENCE
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SURABAYA
2026**

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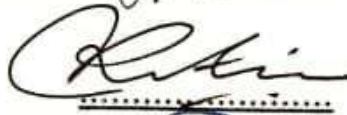
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ABSTRACT

Nama Mahasiswa / NPM : Rajawali Shaktika Anugrah Prasetya/
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Judul Skripsi : Implementation Of A Transfer-Learning-Based
ConvNeXt-Tiny Model For Classifying Tea Leaf
Diseases
Dosen Pembimbing : 1. Eva Yulia Puspaningrum, S.Kom., M.Kom.
2. Chrystia Aji Putra, S.Kom., M.T.

Data from the Central Statistics Agency (BPS, 2024) show that national dried tea leaf production declined from 144,063 tons (2020) to 118,895 tons (2024), while average tea plantation productivity fell from 1,545 kg/ha (2023) to 1,528 kg/ha (2024). The Directorate General of Estate Crops at the Indonesian Ministry of Agriculture reported that Plant Disturbing Organisms (OPT) in the form of pests and leaf diseases remain a limiting factor in tea cultivation, making early and accurate identification of tea leaf disease a specific need to support field-level control efforts. Based on this information, this study implements a ConvNeXt-Tiny model based on transfer learning to classify seven classes of tea leaf conditions, namely Tea Algal Leaf Spot, Brown Blight, Gray Blight, Helopeltis, Red Spider, Green Mirid Bug, and Healthy Leaf, using the teaLeafBD dataset. The model was trained using pretrained ImageNet weights with a freeze-unfreeze strategy over 30 epochs and data augmentation, along with hyperparameter exploration covering learning rate, dropout rate, batch size, and optimizer. The optimal configuration (learning rate 1×10^{-4} , dropout 0.2, batch size 16, Adam optimizer) produced a Test Accuracy of 0.9237 and a Test F1 Macro of 0.9114. Learning rate had the most significant effect on model performance, while dropout rate and batch size were not significant. The Brown Blight class consistently performed the worst due to its visual similarity to Gray Blight and Tea Algal Leaf Spot. This study produced a tea leaf disease classification model implemented on a website-based system using FastAPI and React.js as a real-time support system for classifying tea leaf disease based on user-uploaded images.

Keywords: Tea Leaf Disease Classification, ConvNeXt-Tiny, *Transfer Learning*, *Fine-Tuning*, *Deep Learning*, CNN.

ACKNOWLEDGEMENTS

Praise and thanks be to Allah SWT for all His mercy, guidance, and blessings, which have enabled the author to successfully complete this thesis titled **“Implementation of the Transfer Learning-Based ConvNeXt-Tiny Model for the Classification of Tea Leaf Diseases.”**

The author would like to thank Ms. Eva Yulia Puspaningrum, S.Kom., M.Kom., as the primary advisor, and Mr. Chrystia Aji Putra, S.Kom., M.T., as the co-advisor, for taking the time to provide invaluable guidance, advice, and motivation to the author. The author also received a great deal of support from various parties, whether moral, spiritual, or material. For this, the author would like to thank:

1. To my parents and my beloved family, for their prayers and both moral and material support throughout my education.
2. Prof. Dr. Ir. Novirina Hendrasarie, M.T., Dean of the Faculty of Computer Science at the Universitas Pembangunan Nasional Veteran Jawa Timur.
3. Dr. Intan Yuniar Purbasari, S.Kom., M.Sc., Coordinator of the Informatics Study Program at the Universitas Pembangunan Nasional Veteran Jawa Timur.
4. Ms. Retno Mumpuni, S.Kom., M.Sc., and Ms. Henni Endah Wahanani, S.T., M.Kom., as thesis examiners, for their advice, feedback, and constructive criticism.
5. Mr. Fawwaz Ali Akbar, S.Kom., M.Kom., and Mr. Vinza Hedi Satria, S.Kom., M.Kom., as the author’s academic advisors, who provided guidance and assistance throughout the author’s studies
6. All faculty members of the Informatics Study Program, Faculty of Computer Science, Universitas Pembangunan Nasional Veteran Jawa Timur, who have imparted their knowledge to the author during the course of his studies
7. To all my friends in the Computer Science program, class of 2022, for your camaraderie and support.
8. All my friends which are both my school friends and my online friends on Discord and Roblox who supported me throughout the process of writing my thesis, from the proposal to the defense.

The author acknowledges that this thesis is far from perfect. Therefore, the author would greatly appreciate constructive criticism and suggestions. In closing,

may this thesis contribute to the advancement of science, particularly in the field of computer science.

Surabaya, July 22nd, 2026

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