

**A COMPARATIVE STUDY ON IMAGE DEHAZING
TECHNIQUES FOR IMAGE RESTORATION**

UNDERGRADUATE THESIS



**KHAIRUNNISA SAVITRI
1162001033**

**INFORMATICS STUDY PROGRAM
FACULTY OF ENGINEERING AND COMPUTER SCIENCE
BAKRIE UNIVERSITY
JAKARTA
2023**

**A COMPARATIVE STUDY ON IMAGE DEHAZING
TECHNIQUES FOR IMAGE RESTORATION**

UNDERGRADUATE THESIS

**Submitted in partial fulfillment of the requirements for the degree of
Bachelor of Computer in Informatics Study Program, Universitas Bakrie**



**KHAIRUNNISA SAVITRI
1162001033**

**INFORMATICS STUDY PROGRAM
FACULTY OF ENGINEERING AND COMPUTER SCIENCE
BAKRIE UNIVERSITY
JAKARTA
2023**

STATEMENT OF ORIGINALITY

The material in this Undergraduate Thesis is the result of my own work, and all sources are quoted and cited properly.

Name : Khairunnisa Savitri

NIM : 1162001033

Signature :

A handwritten signature in black ink, consisting of several vertical and diagonal strokes, positioned to the right of the 'Signature' label.

Date : August 24th 2023


STATEMENT OF APPROVAL

This Research Report is prepared and submitted by:

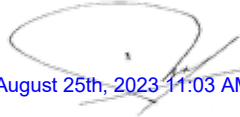
Name : Khairunnisa Savitri
NIM : 1162001033
Study Program : Informatics
Faculty : Engineering and Computer Science
Title : A Comparative Study on Image Dehazing
Techniques for Image Restoration

has been successfully defended in front of the Board of Examiners. It has been approved by Thesis Supervisor and the Board of Examiners and accepted as partial fulfilment of the requirements needed to obtain a Bachelor's degree in Informatics Department, Faculty of Engineering and Computer Science, Bakrie University.

BOARD OF EXAMINERS

Thesis Supervisor : Irwan Prasetya Gunawan, Ph.D. ()

Examiner 1 : Yusuf Lestanto, ST, M.Sc. ()

Examiner 2 : Berkah Iman Santoso, ST, MTI ( August 25th, 2023 11:03 AM)

Set in : Jakarta
Date : August 25th, 2023

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Jakarta, August 22th 2023

Author

A handwritten signature in black ink, consisting of several vertical and diagonal strokes, appearing to be the initials 'KS'.

Khairunnisa Savitri

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Name : Khairunnisa Savitri
NIM : 1162001033
Study Program : Informatics
Faculty : Engineering and Computer Science

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A COMPARATIVE STUDY ON IMAGE DEHAZING TECHNIQUES FOR IMAGE RESTORATION

Khairunnisa Savitri ¹

ABSTRACT

Image dehazing is the process of removing haze from images. It is a challenging problem due to the non-linear nature of the haze process and the lack of ground truth data. In recent years, deep learning techniques have been shown to be effective for image dehazing. This research presents a comparative study on image dehazing using CycleGAN and GMAN-Net. CycleGAN is a generative adversarial network that can translate images from one domain to another. GMAN-Net is a generic model-agnostic convolutional neural network that can be used to dehaze images by jointly estimating the transmission map and scene radiance. The study evaluated the performance of CycleGAN and GMAN-Net on a dataset of hazy images with ground truth clear images. The evaluation metrics were PSNR, SSIM, entropy, UIQM, and UCIQE. The results showed that GMAN-Net outperformed CycleGAN on all of the evaluation metrics. GMAN-Net also showed better visual results, with dehazed images that were more accurate and realistic than CycleGAN. The research concludes that GMAN-Net is better for image dehazing than CycleGAN. It is more accurate, realistic, and versatile than CycleGAN.

Keywords : image dehazing, CycleGAN, GMAN-Net, objective IQA, PSNR, SSIM, entropy, UIQM, UCIQE

¹Undergraduate Student of Informatics Study Program, Bakrie University

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LIST OF ABBREVIATIONS

Abbr.	Explanation
AQI	Air Quality Index
CNN	Convolutionary Neural Network
FR	Full-Reference
GAN	Generative Adversarial Network
GMAN-Net	Generic Model-Agnostic Convolutional Neural Network
HVS	Human Visual System
IQA	Image Quality Assessment
OQA	Objective Quantitative Assessment
MSE	Mean Square Error
NR	No-Reference
PM	Particulate Matters
PSNR	Peak Signal to Noise Ratio
RR	Reduced-Reference
SQA	Subjective Qualitative Assessment
SSIM	Structural Similarity Index
UCIQE	Underwater Color Image Quality Evaluation
UIQM	Underwater Image Quality Measure