



**IMPLEMENTATION SUPPORT VECTOR MACHINE (SVM)  
AND HISTOGRAM OF ORIENTED GRADIENTS (HOG) FOR  
REAL TIME FACE RECOGNITION APPLICATION**



**THESIS REPORT**

**UNIVERSITAS  
MUHAMAD IHRAM RASHKY KAMAL  
41519010075**

**PROGRAM STUDI TEKNIK INFORMATIKA  
FAKULTAS ILMU KOMPUTER  
UNIVERSITAS MERCU BUANA JAKARTA  
2023**



**IMPLEMENTATION SUPPORT VECTOR MACHINE (SVM)  
AND HISTOGRAM OF ORIENTED GRADIENTS (HOG) FOR  
REAL TIME FACE RECOGNITION APPLICATION**



**THESIS REPORT**

**UNIVERSITAS  
MUHAMAD IHRAM RASHKY KAMAL  
41519010075**

**Submitted as one of the requirements to obtain a bachelor's degree**

**PROGRAM STUDI TEKNIK INFORMATIKA  
FAKULTAS ILMU KOMPUTER  
UNIVERSITAS MERCU BUANA JAKARTA  
2023**

## OWN WORK STATEMENT PAGE

I am the undersigned:

Name : Muhammad Ihram Rashky Kamal  
NIM : 41519010075  
Courses : Teknik Informatika  
Thesis Report Title : Implementation Support Vector Machine and Histogram of Oriented Gradients for Real Time Face Recognition Application

Stating that this Thesis Report is my own work and not plagiarism, and all sources both cited and referenced have been correctly stated by me. If it turns out that it is found that in my Thesis Report there is an element of plagiarism, then I am ready to get academic sanctions that apply at Mercu Buana University.

Jakarta, 30 December 2022



Muhammad Ihram Rashky Kamal

UNIVERSITAS  
MERCU BUANA

## AFFIRMATION PAGE

This Thesis Report is submitted by:

Name : Muhamad Ihram Rashky Kamal  
NIM : 41519010075  
Courses : Teknik Informatika  
Thesis Report Title : Implementation Support Vector Machine and Histogram of Oriented Gradients for Real Time Face Recognition Application

It has been successfully defended at the hearing before the Board of Examiners and accepted as part of the requirements required to obtain a bachelor's degree in Informatics Engineering, Faculty of Computer Science, Mercu Buana University.

Authorized by:

Advisor	:	Vina Ayumi, M.Kom	(  )
NIDN	:	0311109003	
Chief Examiner	:	Ir. Emil R. Kaburuan, Ph.D., IPM	(  )
NIDN	:	0429058004	
Examiner 1	:	Dr. Leonard Goeirmanto, ST, M.Sc	
NIDN	:	110760318	(  )
Examiner 2	:	Afiyati, S.Si, MT	(  )
NIDN	:	0316106908	

Jakarta, 07 February 2023

Acknowledged,

Head of Study Program

Final Project Coordinator



Wawan Gunawan, S.Kom., M.T.



Ir. Emil R. Kaburuan, Ph.D., IPM

## FOREWORD

Praise be to God Almighty, because for His blessings and mercy, I was able to complete this Thesis Report. The writing of this Thesis Report is carried out in order to meet one of the requirements to achieve a Bachelor of Computer Science degree at the Faculty of Computer Science, Mercu Buana University. I realized that, without the help and guidance of various parties, from the lecture period to the preparation of this thesis, it was very difficult for me to complete this Thesis Report. Therefore, I would like to thank:

1. Prof. Dr. Andi Adriansyah, M. Eng. as rector of Mercu Buana University
2. Yaya Sudarya Triana, M.Kom., Ph.D. as Dean of the Faculty of Computer Science
3. Ir. Emil R. Kaburuan, Ph.D., IPM. as the Head of the Informatics Engineering Study Program
4. Vina Ayumi, M.Kom. as a Supervisor who has given time, energy, and thoughts to direct me in the preparation of this thesis;
5. Dr. Leonard Goeirmento, ST, M.Sc. as a Final Project Examiner Lecturer for corrections and directions and input.
6. Emil Robert Kaburuan, S.T., M.A, Ph.D. as a Chief Final Project Examiner Lecturer for corrections and directions and input.
7. Afiyati, S.Si, MT. as a Final Project Examiner Lecturer for corrections and directions and input.

Finally, I wish God Almighty the pleasure of repaying all the kindness of all those who have helped. Hopefully this Thesis Report will bring benefits for the development of science.

UNIVERSITAS  
MERCU BUANA

Jakarta, 07 February 2023



Muhamad Ihram Rashky Kamal

## FINAL PROJECT PUBLICATION APPROVAL STATEMENT PAGE FOR ACADEMIC PURPOSES

As an academic community member of Mercu Buana University, I am the undersigned:

Name : Muhamad Ihram Rashky Kamal  
NIM : 41519010075  
Courses : Teknik Informatika  
Thesis Report Title : Implementation Support Vector Machine and Histogram of Oriented Gradients for Real Time Face Recognition Application

For the development of science, hereby grant permission and agree to grant to Mercu Buana University a **Non-exclusive Royalty-Free Right** for my scientific work entitled above along with existing devices (if needed).

With this Non-Exclusive Royalty-Free Right, Mercu Buana University has the right to store, transfer media / format, manage in the form of a *database (database)*, maintain, and publish my Internship / Thesis / Thesis / Dissertation Report if it still lists my name as an author / creator and as the owner of copyright.

Thus, this statement I made actually.

Jakarta, 10 February 2023

Which states,



(Muhamad Ihram Rashky Kamal)

## Table of Contents

<b>TITLE PAGE</b> .....	<b>i</b>
<b>OWN WORK STATEMENT PAGE</b> .....	<b>ii</b>
<b>AFFIRMATION PAGE</b> .....	<b>iii</b>
<b>FOREWORD</b> .....	<b>iv</b>
<b>APPROVAL STATEMENT PAGE</b> .....	<b>v</b>
<b>Abstrak</b> .....	<b>vi</b>
<b>Abstra</b> .....	<b>vii</b>
<b>Table of Contents</b> .....	<b>viii</b>
<b>Table List</b> .....	<b>x</b>
<b>Image List</b> .....	<b>xi</b>
<b>CHAPTER I INTRODUCTION</b> .....	<b>1</b>
1.1 Introduction .....	1
1.2 Problem Formulation.....	2
1.3 Objectives And Benefits .....	2
1.4 Problem Limitation.....	3
<b>CHAPTER II LITERATURE REVIEW</b> .....	<b>4</b>
<b>CHAPTER III METHODOLOGY</b> .....	<b>6</b>
ANALYSIS AND DESIGN .....	6
SOURCE CODE .....	10
3.2 Programming Language .....	10
3.3 Source Code.....	10
Camera Activity .....	12
Face Recognition.....	14
Implementation Algorithm Classification .....	15
Algorithm HOG.....	15
Algorithm SVM.....	16
<b>CHAPTER IV RESULT AND DISCUSSION</b> .....	<b>17</b>
4.1 DATASET.....	17
4.2 STAGES OF THE EXPERIMENT .....	18
<b>CHAPTER V CONCLUSIONS AND RECOMMENDATION</b> .....	<b>21</b>
5.1 The Implementation HOG Extraction .....	21
5.2 The Implementation SVM classification.....	21
5.3 The Recommendation Output Type of Android.....	22

<b>BIBLIOGRAPHY .....</b>	<b>23</b>
<b>ATTACHMENT .....</b>	<b>24</b>
Attachment 1. Proof of Guidance.....	
Attachment 2. Proof Journal Submit .....	
Attachment 3. Identity KTP .....	
Attachment 4. FINAL PROJECT STATEMENT PAGE.....	
Attachment 5. Surat Pernyataan HKI.....	
Attachment 6. Curriculum Vitae .....	
Attachment 7. Journal Article .....	





## Table List

### TABLE LIST

Table 1. Comparison of some work related to face recognition.....	20
Table 2. Training Image Schema for Accuracy.....	34



## Image List

### IMAGE LIST

Figure 1. First Page Design. ....	6
Figure 2. RGB Page Design. ....	7
Figure 3. GrayScale Page Design. ....	7
Figure 4. BGR Page Design. ....	8
Figure 5. HSV Page Design. ....	9
Figure 6. Block Diagram. ....	9
Figure 7. Dataset to be converted into a model. ....	17
Figure 8. Dataset being trained into a model. ....	17
Figure 9. The Result of Android Samsung. ....	22
Figure 10. The Result of Android Oppo. ....	22
Figure 11. The facial recognition system flow chart. ....	27
Figure 12. Calculating a hyperplane's maximum margin. ....	31
Figure 13. Identification of Similarity and Classification. ....	32
Figure 14. Block face recognition diagram. ....	34
Figure 15. Face Detection Output. ....	35
Figure 16. Face Recognition Output. ....	35

