



**WEB BASED USING
CONTENT BASED IMAGE RETRIEVAL**

UNDERGRADUATE THESIS
Submitted as one of the requirements to obtain
Sarjana Komputer (S.Kom)

By:

Daniel Raul Rurubua
001201900083

FACULTY OF COMPUTING
INFORMATION TECHNOLOGY STUDY PROGRAM
CIKARANG
MEI, 2023

PANEL OF EXAMINER APPROVAL

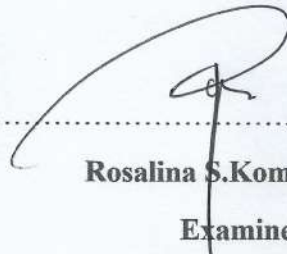
The Panel of Examiners declare that the undergraduate thesis entitled **Web Based Content Based Image Retrieval** that was submitted by Daniel Raul Rurubua majoring in Information Technology from the Computing was assessed and approved to have passed the Oral Examination on 31 May 2023

Panel of Examiner



.....
Genta Sahuri, S.Kom., M.Kom.

Chair of Panel Examiner



.....
Rosalina S.Kom., M.Kom.

Examiner I



.....
Ronny Juwono S.Pd., M.T.

Advisor

STATEMENT OF ORIGINALITY


In my capacity as an active student of President University and as the author of the undergraduate thesis/final project/business plan (underline that applies) stated below:

Name : Daniel Raul Rurubua
Student ID number : 001201900083
Study Program : Information Technology
Faculty : Computing

I hereby declare that my undergraduate thesis/final project/business plan entitled "Web Based Content Based Image Retrieval" is, to the best of my knowledge and belief, an original piece of work based on sound academic principles. If there is any plagiarism, including but not limited to Artificial Intelligence plagiarism, is detected in this undergraduate thesis/final project/business plan, I am willing to be personally responsible for the consequences of these acts of plagiarism, and accept the sanctions against these acts in accordance with the rules and policies of President University.

I also declare that this work, either in whole or in part, has not been submitted to another university to obtain a degree.

Cikarang, 31 May 2023

(
.....)
Daniel Raul Rurubua

SCIENTIFIC PUBLICATION APPROVAL FOR ACADEMIC INTEREST

As a student of the President University, I, the undersigned:

Name : Daniel Raul Rurubua
Student ID number : 001201900083
Study program : Computing

for the purpose of development of science and technology, certify, and approve to give President University a non-exclusive royalty-free right upon my final report with the title:

Web Based Using Content Based Image Retrieval

With this non-exclusive royalty-free right, President University is entitled to converse, to convert, to manage in a database, to maintain, and to publish my final report. There are to be done with the obligation from President University to mention my name as the copyright owner of my final report.

This statement I made in truth.

Cikarang, 31 May 2023

(
.....)

Daniel Raul Rurubua

ADVISOR APPROVAL FOR JOURNAL/INSTITUTION'S REPOSITORY

As an academic community member of the President's University, I, the undersigned:

Name : Ronny Juwono S.Pd, M.T.

ID number :

Study program : Information Technology

Faculty : Computing

declare that following thesis :

Title of thesis : Web Based Content Based Image Retrieval

Thesis author : Daniel Raul Rurubua

Student ID number : 001201900083

will be published in **journal / institution's repository / proceeding / unpublish /**
..... (underline that applies)

Cikarang, 26 June 2023


(.....)

Ronny Juwono S.Pd, M.T.

Web Based Using Content Based Image Retrieval

ORIGINALITY REPORT

8%
SIMILARITY INDEX

5%
INTERNET SOURCES

1%
PUBLICATIONS

4%
STUDENT PAPERS

PRIMARY SOURCES

1 repository.president.ac.id 2%
Internet Source

2 Submitted to President University 2%
Student Paper

3 Submitted to Universiti Tunku Abdul Rahman <1%
Student Paper

4 Submitted to Higher Education Commission
Pakistan <1%
Student Paper

5 www.theses.fr <1%
Internet Source

6 Submitted to German University of
Technology in Oman <1%
Student Paper

7 Submitted to Midlands State University <1%
Student Paper

8 Submitted to Southampton Solent University <1%
Student Paper

9 Submitted to Cork Institute of Technology

Stats

Average Perplexity Score: 6871.698

A document's perplexity is a measurement of the randomness of the text

Burstiness Score: 17008.469

A document's burstiness is a measurement of the variation in perplexity

Your sentence with the highest perplexity, "*Google Lens12*", has a perplexity of: **83633**

ABSTRACT

Department Store is a store that provides various products such as clothes, pants and shoes for men and women. Department stores really help customer needs in dressing according to the current era. This project uses Content Based Image Retrieval to help customers find the product they want using images by taking images and uploading images. this project to find the five best recommendations according to this program system, so that customers can be helped by this system.

DEDICATION

I would like to dedicate this final project to my dad, my sister, my beloved one, my whole family and friends who are always supporting me at this time.

ACKNOWLEDGEMENTS

First, I would like to thank God for his blessing, guidance and joys that he gave me, so that I can complete this final project. I would like to deliver my dearest gratitude to:

1. My final project advisor, Ronny Juwono, S.Pd., M.T. Thank you for the patience and advice during this final project development.
2. My beloved family who always supports me and gives me valuable advice during my university life.
3. All of the computing lecturers who gave me valuable knowledge and advice during my university life.
4. All of my friends on the internship period, your advice and valuable memories has gave me strength to do my best up to this point.
5. All of my intern friend's that I can't tell one by one, your experience will live on me, thank you for this friendship.

TABLE OF CONTENT

ABSTRACT	i
DEDICATION	ii
ACKNOWLEDGEMENTS	iii
TABLE OF CONTENT	iv
CHAPTER I	1
INTRODUCTION	1
1.1. Background	1
1.2. Problem Statement	2
1.3. Final Project Objectives	3
1.4. Scope and Limitation	3
1.4.1. Scope.....	3
1.4.2. Limitation	3
1.5. Final Project Methodology	3
1.6. Final Project Outline	5
CHAPTER II	7
LITERATURE REVIEW	7
2.1. Artificial Intelligence.....	7
2.2. Machine Learning	7
2.2.1. Instances Based Learning	7
2.2.1.1. K-Nearest Neighbor	8
2.3. Content Based Image Retrieval.....	8
2.4. Image Based Neural Network	10
2.5. Getting the inventory.....	12
2.6. Recommendation Generation	12
2.7. Google Lens	13
CHAPTER III	15
SYSTEM ANALYST	15
3.1. General Idea	15
3.2. Function Analysis	15
3.3. Hardware and Software Requirements.....	16
3.4. Use Case Diagram	17

3.5. Use Case Narrative.....	18
3.6. Swim Lane Activity Diagram.....	25
CHAPTER IV.....	31
SYSTEM DESIGN.....	31
4.1. Physical Design.....	31
4.2. User Interface Design.....	32
4.2.1. Home Page.....	32
4.2.2. List of product Page.....	32
4.2.3. Camera Search Feature Page.....	33
4.2.4. File Uploader Search Feature Page.....	33
4.2.5. About Page.....	34
4.2.6. Contact Page.....	35
4.2.7. Login Page.....	35
4.2.8. Sign Up Page.....	35
4.2.9. Create Page.....	35
4.2.10. Update Page.....	36
4.2.11. Delete Page.....	37
4.2.11.1. Remove Image Storage Page.....	37
4.2.11.2. Remove Image Uploads Storage Page.....	37
4.2.11.3. Delete Admin Account Page.....	38
4.2.12. Reload Page.....	38
CHAPTER V.....	39
SYSTEM IMPLEMENTATION.....	39
5.1. User Interface Development (Role:Customer).....	39
5.1.1. Home Page.....	39
5.1.2. List of product Page.....	39
5.1.3. Camera Search Feature Page.....	44
5.2. User Interface Development (Role:Admin).....	48
5.2.1. Login Page.....	48
5.2.2. Sign Up Page.....	49
5.2.3. Create Page.....	49
5.2.4. Update Page.....	51
5.2.5. Delete Page.....	52
5.2.6. Reload Page.....	53
CHAPTER VI.....	55
SYSTEM TESTING.....	55

6.1. Testing Environment	55
6.2. Testing Scenario	55
6.2.1. Home Page	55
6.2.2. List of product Page	56
6.2.3. Camera Search Feature Page	57
6.2.4. File Uploader Search Feature Page.....	60
6.2.5. Login Page	62
6.2.6. Sign Up Page	63
6.2.7. Create Page	64
6.2.8. Update Page	66
6.2.9. Delete Page	67
6.2.9.1. Remove Image Storage Page	67
6.2.9.2. Remove Image Uploads Storage Page	68
6.2.9.3. Delete Admin Account Page	69
6.2.10. Reload Page	70
6.2.11. Accuracy	71
CHAPTER VII.....	72
CONCLUSION AND FUTURE WORKS	72
7.1. Conclusion.....	72
7.2. Future Works	72
REFERENCES.....	74

LIST OF TABLES

Table 3.1 Function Analysis.....	15
Table 3.2 View User Page Use Case Use Case Narrative.....	19
Table 3.3 Camera Search Feature Page Use Case Narrative	19
Table 3.4 File Uploader Search Feature Page Use Case Narrative.....	20
Table 3.5 Product Recommendation Result	20
Table 3.6 Admin Login Page Use Case Narrative	21
Table 3.7 Admin Sign Up Use Case Narrative	21
Table 3.8 Admin Page Use Case Narrative	22
Table 3.9 Admin Create New Data and Image Storage Use Case Narrative	22
Table 3.10 Remove Data and Image Storage Use Case Narrative	23
Table 3.11 Reload Data and Image Storage Use Case Narrative	23
Table 3.12 Remove Image Uploads Use Case Narrative	24
Table 3.13 Remove Admin Account Use Case Narrative	24
Table 3.14 Update Product Use Case Narrative.....	25
Table 4.1 Software Requirement.....	30
Table 4.2 Hardware Requirement	30
Table 6.1 Home Page – Testing Scenario	53
Table 6.2 List Of Products – Testing Scenario.....	54
Table 6.3 Camera Search Feature Page – Testing Scenario	55
Table 6.4 File Uploader Search Feature Page – Testing Scenario	58
Table 6.5 Login Page – Testing Scenario.....	60
Table 6.6 Sign Up Page – Testing Scenario	61
Table 6.7 Create New Image Storage Page – Testing Scenario	62
Table 6.8 Update Shirt Page – Testing Scenario	64
Table 6.9 Remove Image Storage Page – Testing Scenario.....	65
Table 6.10 Remove Image Uploads Storage Page – Testing Scenario	66
Table 6.11 Remove Admin Account Page – Testing Scenario.....	67
Table 6.12 Reload Image Storage Page – Testing Scenario.....	68

LIST OF FIGURES

Figure 1.1 Rapid Application Development (RAD)	4
Figure 2.1 Feature Extraction	8
Figure 2.2 Core Components of an Image Search System	9
Figure 2.3 Core Components a CNN Network.....	9
Figure 2.4 Image Search Result by shirt.....	10
Figure 2.5 Image search results by watch.....	10
Figure 2.6 Diagram	11
Figure 2.7 ResNet50 Architecture.....	12
Figure 2.8 Sample Inventory Data	12
Figure 2.9 Outfits generated by our proposed approach (1)	13
Figure 2.10 Outfits generated by our proposed approach (2).....	13
Figure 2.11 Google Lens.....	14
Figure 3.1 Use Case Diagram User.....	18
Figure 3.2 Use Case Diagram Admin	18
Figure 3.3 User Camera Search Feature Activity Diagram	26
Figure 3.4 User File Uploader Search Feature.....	26
Figure 3.5 Create New Image Activity Diagrams.....	27
Figure 3.6 Remove Image Storage Activity Diagram.....	27
Figure 3.7 Reload Image Storage Activity Diagram	28
Figure 3.8 Remove Image Uploads Activity Diagram	28
Figure 3.9 Remove Admin Account Activity Diagram	29
Figure 4.1 Home Page.....	31
Figure 4.2 List of Product Page	31
Figure 4.3 Camera Search Feature Page	32
Figure 4.4 File Uploader Search Feature Page	32
Figure 4.5 About Page.....	33
Figure 4.6 Contact Page.....	33
Figure 4.7 Login Page.....	34

Figure 4.8 Sign Up Page	34
Figure 4.9 Create Page.....	35
Figure 4.10 Update Page.....	35
Figure 4.11 Remove Image Storage Page.....	36
Figure 4.12 Remove Image Uploads Storage Page	36
Figure 4.13 Remove Account Page.....	37
Figure 4.14 Reload Page	37
Figure 5.1 Home Page.....	38
Figure 5.2 List of Product Page	39
Figure 5.3 Camera Search Feature Page	43
Figure 5.4 Login Page.....	46
Figure 5.5 Sign Up Page	47
Figure 5.6 Create Page.....	48
Figure 5.7 Update Page.....	49
Figure 5.8 Remove Image Storage Page.....	50
Figure 5.9 Reload Page	51
Figure 6.1 Home Page.....	54
Figure 6.2 List of Product Page (1).....	55
Figure 6.3 List of Product Page (2).....	55
Figure 6.4 Camera Search Feature Page (1)	56
Figure 6.5 Camera Search Feature Page (2)	56
Figure 6.6 Camera Search Feature Page (3)	57
Figure 6.7 Camera Search Feature Page (4)	57
Figure 6.8 File Uploader Search Feature Page (1).....	58
Figure 6.9 File Uploader Search Feature Page (2).....	59
Figure 6.10 File Uploader Search Feature Page (3).....	59
Figure 6.11 File Uploader Search Feature Page (4).....	59
Figure 6.12 Login Page (1)	60
Figure 6.13 Login Page (2).....	61
Figure 6.14 Sign Up Page	61
Figure 6.15 Create Product Data Page (1)	62

Figure 6.16 Create Product Data Page (2)	63
Figure 6.17 Create Product Data Page (3)	63
Figure 6.18 Create Product Data Page (4)	63
Figure 6.19 Update Data Page (1).....	64
Figure 6.20 Update Data Page (2).....	64
Figure 6.21 Remove Product Data Page (1)	65
Figure 6.22 Remove Product Data Page (2)	65
Figure 6.23 Remove Product Data Page (3)	66
Figure 6.24 Remove Uploads Image Page.....	67
Figure 6.25 Remove Admin Account Page (1)	67
Figure 6.26 Remove Admin Account Page (2)	68
Figure 6.27 Reload Page (1)	68
Figure 6.28 Reload Page (2)	69
Figure 6.28 Reload Page (3)	69