

PROJECT REPORT
DETECTION NOMINAL MONEY WITH
EUCLIDEAN DISTANCE AND
CORRELATION COEFFICIENT

MARINA GRACECIA

13.02.0021

2016

INFORMATICS ENGINEERING DEPARTMENT
FACULTY OF COMPUTER SCIENCE
SOEGIJAPRANATA CATHOLIC UNIVERSITY

APPROVAL AND RATIFICATION PAGE

PROJECT REPORT

Detection Nominal Money with
Euclidean Distance and Correlation Coefficient

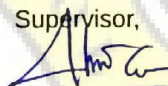
by

Marina Gracecia – 13.02.0021

This project report has been approved and ratified by the Faculty of
Computer Science on December 14, 2016

With approval,

Supervisor,



Shinta Estri Wahyuningrum, S.Si., M.Cs
NPP : 058.1.2007.272

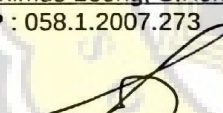
Examiners,

1.)



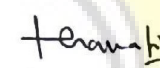
Hironimus Leong, S.Kom., M.Kom
NPP : 058.1.2007.273

2.)



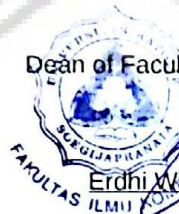
Suyanto Edward Antonius, Ir., M.Sc
NPP : 058.1.1992.116

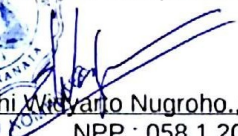
3.)



Rosita Herawati, ST., MT
NPP : 058.1.2004.263

Dean of Faculty of Computer Science,




Erdhi Wisyanto Nugroho, ST., MT
NPP : 058.1.2002.254

STATEMENT OF ORIGINALITY

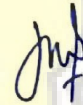
I, the undersigned:

Name : Marina Gracecia

ID : 13.02.0021

Certify that this project was made by myself and not copy or plagiarize from other people, except that in writing expressed to the other article. If it is proven that this project was plagiarizes or copy the other, I am ready to accept a sanction.

Semarang, December 14, 2016



Marina Gracecia

13.02.0021

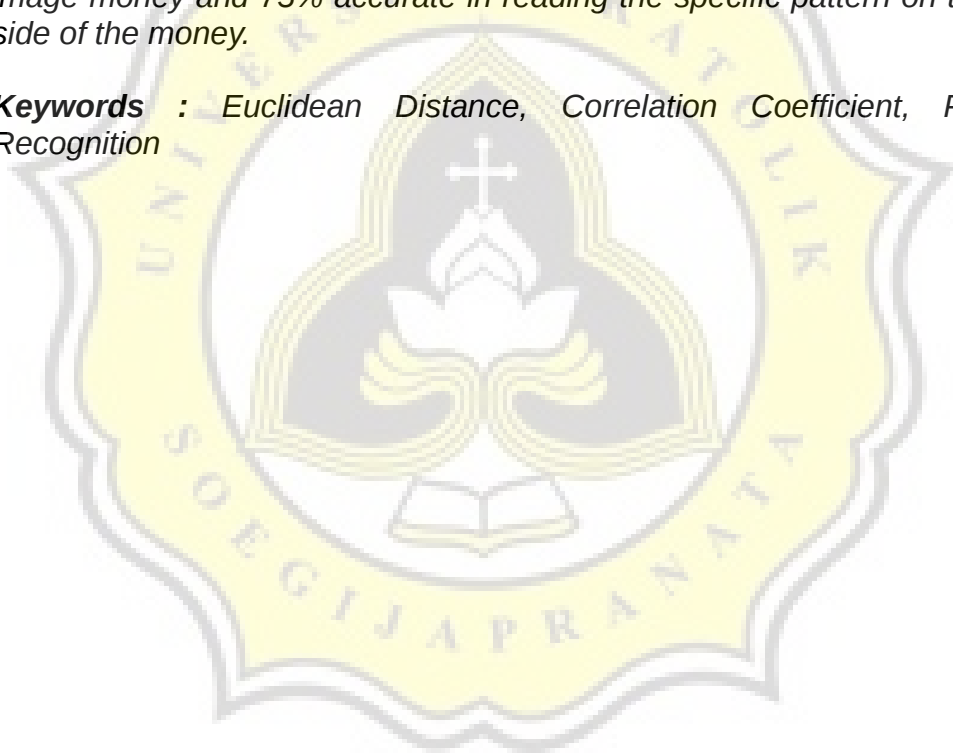
ABSTRACT

Detection of nominal money is based on grouping image by color and specific pattern on the left side of money. In the processing of buying and selling goods, sometimes there can be confusion between one and another money that is not grouping based on nominal money.

This project will detect the nominal money based on read histogram value and getting the specific pattern on the left side of the money. After getting the value of histogram and specific pattern, calculate the similarity of money using euclidean distance and coefficient correlation.

The result of this project is program can detect the nominal money based on the image scan of money. This program has been detect the right value of 95% accurate in reading the histogram color matching of image money and 75% accurate in reading the specific pattern on the left side of the money.

Keywords : Euclidean Distance, Correlation Coefficient, Pattern Recognition



PREFACE

In this project report, chapter I explain about background problems of detecting nominal money, the scope of the program and objective of the project or the result of the project. Chapter II discusses about literature study or journal that explain the algorithm that used in this project.

Chapter III describes about steps and methods that will be used in this project. Chapter IV explain and analyze the project, how the program created and explain all the step to finish the project. Use Case diagram, Flowchart and Class Diagram will be discussed in this chapter.

Chapter V explains about implementation of program and testing, there are some testing of image that will be displayed on the table. Chapter VI will discuss about the conclusion of the project.

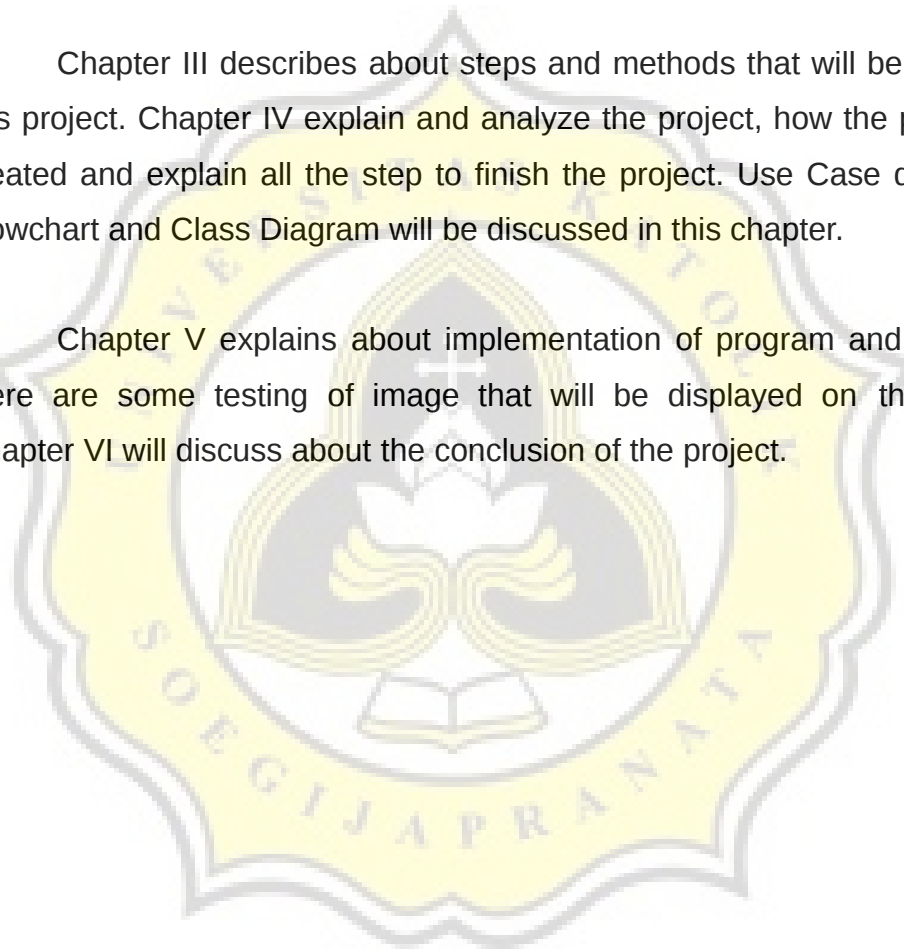


TABLE OF CONTENT

APPROVAL AND RATIFICATION PAGE.....	ii
STATEMENT OF ORIGINALITY.....	iii
ABSTRACT.....	iv
PREFACE.....	v
CHAPTER I INTRODUCTION.....	1
1.1. Background.....	1
1.2. Scope.....	1
1.3. Objective.....	2
CHAPTER II LITERATURE STUDY.....	3
CHAPTER III RESEARCH METHODOLOGY.....	5
3.1. Study of Algorithm.....	5
3.2. Design.....	5
3.3. Implementation and Testing.....	6
CHAPTER IV ANALYSIS AND DESIGN.....	7
4.1. Analysis.....	7
4.1.1. Use Case Diagram.....	7
4.1.2. Flowchart.....	8
4.1.2.1. Preprocessing.....	10
4.1.2.1.1. Cropping Money.....	10
4.1.2.1.2. Resize.....	11
4.1.2.2. Histogram.....	12
4.1.2.2.1. Euclidean Distance.....	12
4.1.2.3. Pattern Recognition.....	13
4.1.2.3.1. Mean Filtering.....	13
4.1.2.3.2. Thresholding.....	14

4.1.2.3.3. Edge Detection.....	15
4.1.2.3.4. Coefficient Correlation.....	16
4.1.3. Class Diagram.....	17
CHAPTER V IMPLEMENTATION AND TESTING.....	19
5.1. Implementation.....	19
5.1.1. Preprocessing.....	19
5.1.1.1. Crop Money.....	20
5.1.1.2. Resize.....	21
5.1.2. Histogram.....	22
5.1.2.1. Matching Histogram.....	23
5.1.3. Pattern Recognition.....	24
5.1.3.1. Crop.....	24
5.1.3.2. Mean Filtering.....	25
5.1.3.3. Thresholding.....	26
5.1.3.4. Edge Detection.....	26
5.1.3.5. Coefficient Correlation.....	27
5.1.4. Decision.....	28
5.2. Testing.....	29
5.2.1. Database Histogram.....	29
5.2.2. Database Pattern.....	30
5.2.3. Sample.....	31
CHAPTER VI CONCLUSION.....	45
6.1 Conclusion.....	45
6.2 Further Research.....	45
REFERENCES	

TABLE OF FIGURE

Figure 1. Use Case Diagram.....	7
Figure 2. Flowchart of Preprocessing, Histogram and Specific Pattern.....	8
Figure 3. Flowchart of Cropping Money.....	10
Figure 4. Flowchart of Resize.....	11
Figure 5. Flowchart of Euclidean Distance.....	12
Figure 6. Euclidean Distance Formula.....	12
Figure 7. Flowchart of Mean Filtering.....	13
Figure 8. Mean Filtering Formula.....	14
Figure 9. Flowchart of Thresholding.....	14
Figure 10. Thresholding Formula.....	14
Figure 11. Flowchart of Edge Detection.....	15
Figure 12. Edge Detection Formula.....	15
Figure 13. Flowchart of Coefficient Correlation.....	16
Figure 14. Coefficient Correlation formula.....	16
Figure 15. Class Diagram.....	17
Figure 16. Main Display.....	19
Figure 17. Preprocessing Code.....	19
Figure 18. Cropping Money.....	20
Figure 19. Cropping Money Code.....	20
Figure 20. Resizing Money.....	21
Figure 21. Resizing Code.....	21
Figure 22. Main Display after getting the Euclidean Distance value.....	22
Figure 23. Histogram Code.....	22
Figure 24. Euclidean Distance Code.....	23
Figure 25. Main Display after getting Coefficient Correlation value.....	24
Figure 26. Cropping Pattern.....	24
Figure 27. Cropping Pattern Code.....	25
Figure 28. Mean Filtering Pattern.....	25
Figure 29. Mean Filtering Code.....	25

Figure 30. Thresholding Pattern.....	26
Figure 31. Thresholding Code.....	26
Figure 32. Edge Detection Pattern.....	26
Figure 33. Edge Detection Code.....	27
Figure 34. Coefficient Correlation Code.....	27



TABLE OF TABLES

Table 1. Database Histogram.....	29
Table 2. Database Pattern.....	30
Table 3. Testing Image 1.....	31
Table 4. Testing Image 2.....	32
Table 5. Testing Image 3.....	32
Table 6. Testing Image 4.....	33
Table 7. Testing Image 5.....	34
Table 8. Testing Image 6.....	34
Table 9. Testing Image 7.....	35
Table 10. Testing Image 8.....	36
Table 11. Testing Image 9.....	36
Table 12. Testing Image 10.....	37
Table 13. Testing Image 11.....	38
Table 14. Testing Image 12.....	38
Table 15. Testing Image 13.....	39
Table 16. Testing Image 14.....	40
Table 17. Testing Image 15.....	40
Table 18. Testing Image 16.....	41
Table 19. Testing Image 17.....	41
Table 20. Testing Image 18.....	42
Table 21. Testing Image 19.....	43
Table 22. Testing Image 20.....	43