

TABLE OF CONTENTS

	Page
COVER PAGE	
APPROVAL BY THESIS SUPERVISORS	
APPROVAL BY THESIS EXAMINATION COMMITTEE	
ABSTRACT	v
<i>ABSTRAK</i>	vi
PREFACE	vii
TABLE OF CONTENTS.....	ix
LIST OF FIGURES	xi
LIST OF CODES.....	xii
LIST OF TABLES	xiii
LIST OF APPENDIXES	xiv
CHAPTER I INTRODUCTION	1
1.1. Background	1
1.2. Aims and Objectives.....	1
1.3. Scope of the Research.....	2
1.4. Research Method	2
1.5. Thesis Structure	2
CHAPTER II BASIC THEORY	4
2.1. Cascade Classifier	4
2.2. Eigenfaces	4
2.3. Raspberry Pi	5
2.4. OpenCV	6
2.5. Confusion Matrix.....	6
2.6. Accuracy, Sensitivity, and Specificity.....	6
2.7. Cascade GUI Trainer	7
CHAPTER III RESEARCH METHODOLOGY	9
CHAPTER IV FACE RECOGNITION MODEL DESIGN	12
4.1. Training the face recognition model.....	12
4.2. Creating Datasets for the Enhanced Training	13
4.3. Creating Datasets for the Enhanced Training	13
4.4. Training the Model to Recognize Individual Faces	15
4.5. Implementing the Model and Assembling the Hardware	18
CHAPTER V RESULTS AND ANALYSES	22
5.1. Data Gathering for the Face Recognition Model	22
5.2. Data Gathering for the Enhanced Training Model	29

5.3.	Determining the Accuracy of Both Model.....	29
5.4.	Determining the Sensitivity of Both Model.....	30
5.5.	Determining the Specificity of Both Model.....	30
CHAPTER VI CONCLUSION AND SUGGESTIONS		32
6.1.	Conclusion	32
6.2.	Suggestions for Future Outlooks.....	33

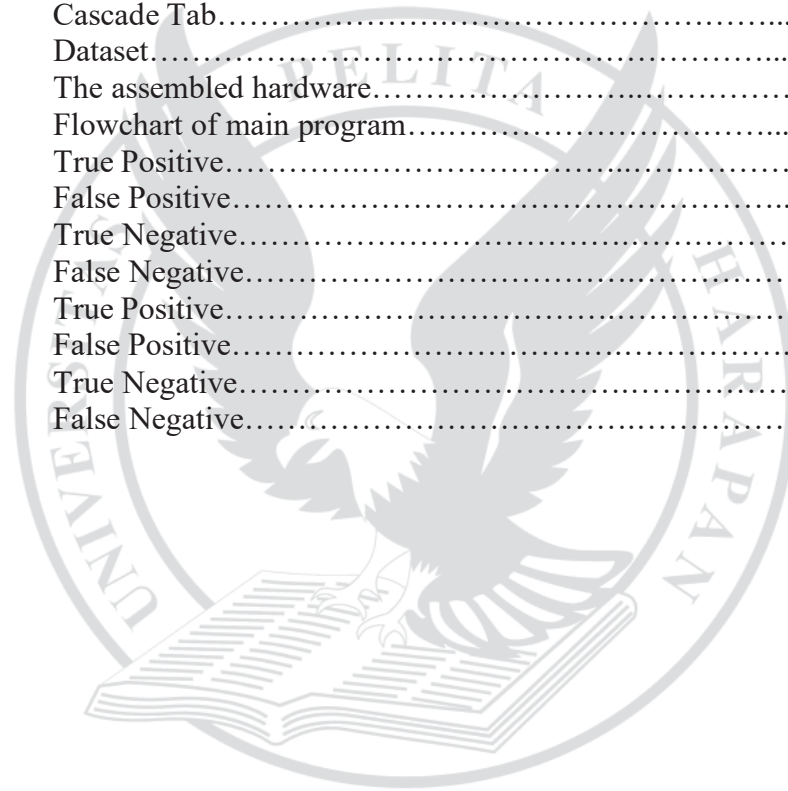
REFERENCES

APPENDIX



LIST OF FIGURES

	Page
Figure 2.1	Square features as described by Viola and Jones.....4
Figure 2.2	Raspberry Pi 4.....5
Figure 2.3	Confusion Matrix Table.....6
Figure 2.4	Cascade GUI Trainer Main Menu.....8
Figure 3	Research Methodology Flowchart.....10
Figure 4.1	Input Tab..... 16
Figure 4.2	Common Tab..... 16
Figure 4.3	Cascade Tab..... 17
Figure 4.4	Dataset..... 17
Figure 4.5	The assembled hardware..... 20
Figure 4.6	Flowchart of main program..... 20
Figure 5.1	True Positive..... 24
Figure 5.2	False Positive..... 24
Figure 5.3	True Negative..... 24
Figure 5.4	False Negative..... 25
Figure 5.5	True Positive..... 28
Figure 5.6	False Positive..... 28
Figure 5.7	True Negative..... 29
Figure 5.8	False Negative..... 29



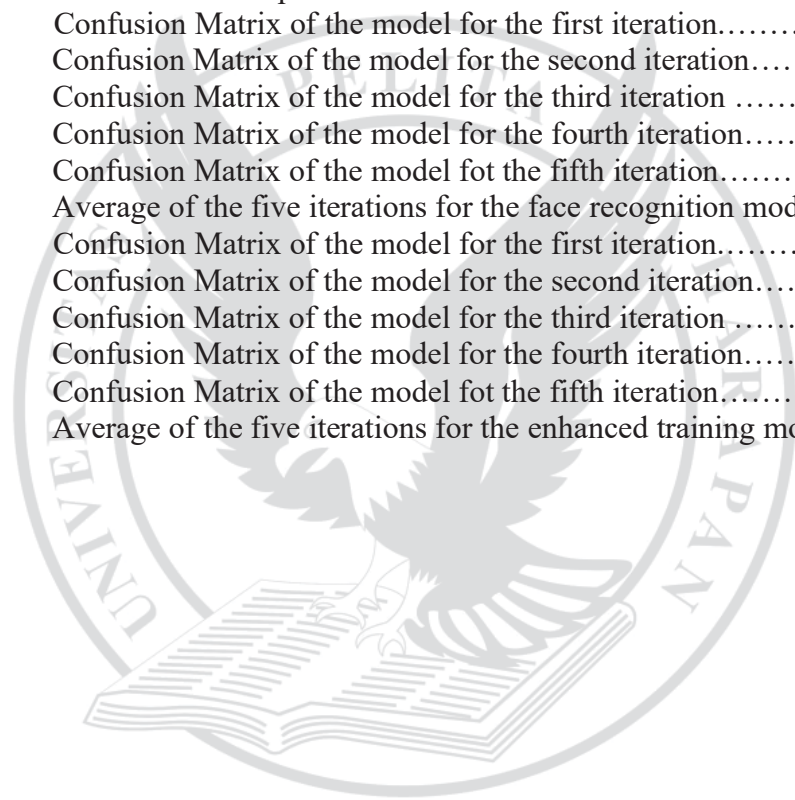
LIST OF CODES

	Page
Code 4.1	Importing libraries and camera setup.....12
Code 4.2	Locating the classifier.....12
Code 4.3	Creating Datasets.....15
Code 4.4	Training Function.....18
Code 4.5	The function and the rest of the trainer program.....18
Code 4.6	Recognizer function and trainer file.....19
Code 4.7	Determining the size of the green square.....19
Code 4.8	Looping for continuous face recognizing.....21



LIST OF TABLES

	Page
Table 4.1	Confusion Matrix of the model for the first iteration.....13
Table 4.2	Confusion Matrix of the model for the second iteration..... 13
Table 4.3	Confusion Matrix of the model for the third iteration 14
Table 4.4	Confusion Matrix of the model for the fourth iteration..... 14
Table 4.5	Confusion Matrix of the model fot the fifth iteration..... 14
Table 4.6	Average of the five iterations for the face recognition model using 30 faces for each person on the database14
Table 5.1	Confusion Matrix of the model for the first iteration.....22
Table 5.2	Confusion Matrix of the model for the second iteration.....22
Table 5.3	Confusion Matrix of the model for the third iteration 23
Table 5.4	Confusion Matrix of the model for the fourth iteration..... 23
Table 5.5	Confusion Matrix of the model fot the fifth iteration..... 23
Table 5.6	Average of the five iterations for the face recognition model.....23
Table 5.7	Confusion Matrix of the model for the first iteration.....26
Table 5.8	Confusion Matrix of the model for the second iteration..... 26
Table 5.9	Confusion Matrix of the model for the third iteration 26
Table 5.10	Confusion Matrix of the model for the fourth iteration..... 26
Table 5.11	Confusion Matrix of the model fot the fifth iteration..... 26
Table 5.12	Average of the five iterations for the enhanced training model.... 27



LIST OF APPENDIXES

	Page
APPENDIX A.....	A-1
APPENDIX B.....	B-1
APPENDIX C.....	C-1
APPENDIX D.....	D-1
APPENDIX E.....	E-1

