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MACHINE VISION IN CHARACTER RECOGNITION

Yao Tee Seng

Bachelor of Mechatronics Engineering

May 2010

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"I hereby declared that I have read through this report entitle "***Machine Vision in Character Recognition***" and found that it has comply the partial fulfillment for awarding the Bachelor of Mechatronic Engineering."

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MACHINE VISION IN CHARACTER RECOGNITION

YAO TEE SENG

This Report is submitted in Partial Fulfillment of Requirements for Bachelor of Mechatronic Engineering.

Faculty of Electrical Engineering

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

MAY 2010

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"I declare that this report entitle "***Machine Vision in Character Recognition***" is the result of my own research except as cited in the references. The report has not been accepted for any degree and is not concurrently submitted in candidature of any other degree."

Signature : .....

Name : YAO TEE SENG

Date : 11 May 2010

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To my beloved mother and father

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ABSTRACT

As mention in the project title, this project is to design a machine vision system that can recognize character writing. Unlike other machine vision project, this machine vision system is build up with fundamental of image processing concept and add in an intelligent function. This project also difference with other character recognize product, because this project is using a webcam to capture input of the project and not using touch screen to write in character. The software part of this project will be build up with using VB.net or C programming and the hardware part will be a computer base system with the input image source is capture by webcam.

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ABSTRAK

Sama seperti dengan yang di nyatakan di tajuk, tujuan projek ini adalah mengaplikasikan satu sistem penglihatan mesin yang boleh faham tulisan. Beza system penglihatan mesin ini dengan yang lain adalah system ini di cipta dengan menggunakan konsep "image processing" dan ditambah dengan fungsi kercedikan mesin. Sistem ini juga berbeza dengan sistem mengecam tulisan yang sedang ada di pasaran disebabkan sistem ini menggunakan "WebCam" untuk dapatkan gambar masukan dan sistem lain pula menggunakan "touch screen". Pengatucaraan komputer yang digunakan untuk buat sistem ini adalah Visual Basic .net atau bahasa C dan sistem ini dibuat berdasarkan komputer sistem dan media untuk masukan image adalah "WebCam".

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TABLE OF CONTENTS

CHAPTER	TITLE	PAGE
	ACKNOWLEDGEMENTS	**v**
	ABSTRACT	**vi**
	ABSTRAK	**vii**
	TABLE OF CONTENT	**viii**
	LIST OF TABLE	**xii**
	LIST OF FIGURE	**xii**
	ABBREVIATION	**xv**
	LIST OF APPENDICES	**xvi**
1	**INTRODUCTION**	**1**
	1.1 Problem Statement	2
	1.2 Project Objective	3
	1.3 Project Scope	4
2	**LITERATURE REVIEW AND PROJECT BACKGROUND**	**5**
	2.1 LITERATURE REVIEW	6
	2.1.1 Program	6
	2.1.1.1 Optical Character recognizes system by Herve Cadieu	6
	2.1.1.2 Webcam Viewer by open source website	8
	2.1.1.3 Current Mobile phone handwriting recognize software on market (MobileWrite)	9

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2.1.1.4 Handling Bitmaps in VB6 11

2.1.2 **Theory** **12**

2.1.2.1 Artificial neural networks (ANN) 12

2.1.2.2 In the 1970 engineers in Milwaukee creates a machine vision system that success count the number of holes in crossbars 15

2.1.2.3 Learning Vector Quantization (LVQ) system describe by Sri Kusumadewi in his published book.[16] 16

2.2 **PROJECT BACKGROUND** **18**

2.2.1 Character Recognition System 18

2.2.2 Visual Basic.net 21

2.2.3 Sensonic Webcam 8000 22

2.2.4 Processor (computer base, Minimum Requirement) 22

3 METHODOLOGY **23**

3.1 Over all concept of project 24

3.2 Handwriting recognition 25

3.2.1 On-Line Handwriting Recognition 25

3.2.2 Off-Line Handwriting Recognition 25

3.3 study concept of machine vision 26

3.4 Artificial intelligent 32

3.4.1 Human Brain 33

3.4.2 The artificial neuron 34

3.4.3 The Perceptrons 35

3.4.4 Backpropagation 37

3.4.5 Learning Vector Quantization (LVQ) 39

3.5 decide algorithms, software and hardware to use 40

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	3.6	design machine vision system and testing	40
	3.7	Details in design charcter reading system	41
		3.7.1 Getting BMP image from Webcam	42
		3.7.2 Getting BMP file information	43
		3.7.3 Threshold	44
		3.7.4 Filtering	44
		3.7.5 Segmentation/crop	45
		3.7.6 Compress Image	47
		3.7.7 Edge detection	48
		3.7.8 LVQ recognition method	49
	3.8	Software design	50
4	**RESULT AND DISCUSSION**		**54**
	4.1	Introduction	55
	4.2	Start with the webcam	56
	4.3	Import image	59
	4.4	Image processing	61
	4.5	Image recognition	65
	4.6	Results	70
5	**ANALYSIS RESULT**		**75**
	5.1	Introduction	76
	5.2	Adjusted and default setting result	76
	5.3	Pair of alphabet that makes the system confuses	77
	5.4	Total accuracy	78
6	**RECOMMENDATION AND CONCLUSION**		**79**
	6.1	RECOMMENDATION	80
		6.1.1 Further improve for this system accuracy	80
		6.1.2 Suit the system for custom usage	80
		6.1.3 Increase the level of difficulties	80

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6.1.4 Improve Hardware used 81

6.2 CONCLUSION 81

REFERENCES 82

APPENDICES 84

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LIST OF TABLES

TABLE	TITLE	PAGE
2.1	level description of character recognition according to its difficulty	20
3.1	Table BMP file structure	27
3.2	Bitmapfileheader structure	28
3.3	BitmapInfoHeader structure	28
3.4	backpropagation algorithm	37
4.1	Result findings for this system	71
4.2	Percentage of success for this system	73

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LIST OF FIGURES

FIGURE	TITLE	PAGE
2.1	Result shows that the system success recognizes the character "C"	7
2.2	Result shows that the system success recognizes the character "H"	7
2.3	Result shows that the system fail recognizes the character "C" with noise adds to the system.	8
2.4	the outlook of Webcam Viewer forms	9
2.5	This figure shows the demo software for Screen Shot of Windows Mobile Version	10
2.6	The character that teach for the system	10
2.7	The design view of the Bitmap data system	11
2.8	Von Neumann computer (ANN) versus Biological neural system	12
2.9	A taxonomy of feed-forward and recurrent network architectures	13
2.10	Method of ANN in recognized text	14
2.11	A number of holes in a plate	15
2.12	2 X 2 external corner patterns	15
2.13	2 X 2 internal corner patterns	15
2.14	Visual basic .net programming view	21
2.15	image of Sensonic webcam 8000	22
3.1	Overall flow chart of project	24
3.2	Flowchart of Study concept of machine vision	26
3.3	by applying dilation the broken character "ea" can be reconstruct	30
3.4	Lobes of human brain as seen in an exposed view	33
3.5	a biological neuron (human neuron) [15]	34
3.6	An artificial neuron model [15]	34

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3.7	The flow process in system design	41
3.8	example of image data, the origin is at (2, 2)	45
3.9	the program figure out the outer vertex for each section	46
3.10	the program crop the selected image	46
3.11	the sample image for edge detection	48
3.12	The handwriting character recognition system design view	50
3.13	the second part of this system "Image Processing"	51
3.14	the final part of the system "Recognition"	52
4.1	outlook of program	55
4.2	shows that this system is starting up webcam	56
4.3	The video image from "Webcam Starting form" is success transfer in "Get frame" form.	57
4.4	the webcam image of 32 bits image is change to 24 bits grayscale image	58
4.5	The pop up windows enable user to choose input image	59
4.6	Demo of data	60
4..7	Image properties of character "A" is insert into the system	60
4.8	Image processing section	61
4.9	The filtering result	62
4.10	Character crop out from its original image.	63
4.11	the compress result of character "A"	64
4.12	The system recognition part	65
4.13	show the system is ready for recognize	66
4.14	the result show the system success recognize the input character as "A"	67
4.15	the system success recognize character "B"	68
4.16	the system success recognize character "B"	68
4.17	the system success recognize character "F"	69
4.18	the system failed to recognize character "E"	69

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ABBREVIATION

ANN	-	Artificial neural networks
CV	-	Computer Vision
RAM	-	Random Access Memory
G	-	Giga
VB	-	Visual Basic
FYP 1	-	Final Year Project 1
FYP 2	-	Final Year Project 2
i.e	-	In Example
MHz	-	Mega Hertz
PC	-	Personnel Computer
R&D	-	Research and development
UTeM	-	Universiti Teknikal Malaysia Melaka
Mb	-	Mega byte
JPG	-	Joint Photographic Experts Group
BMP	-	bitmap file

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LIST OF APPENDICES

APPENDIX	TITLE	PAGE
A	PROGRAM SOURCE CODE	84
B	IMAGE PROPERTIES IN VISUAL BASIC.NET	95
C	DATA SET FOR THE SYSTEM	97
D	PROJECT PLANNING	108
E	ARTICLE	110

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CHAPTER1

INTRODUCTION

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1.1 PROBLEM STATEMENT

Nowadays human energy is replaced by machine in certain field to increase working efficiency. This phenomenon can be found especially in production line. Production line is one of the important departments in an industry, so there is a need of increase the worker working performance to increase the productivity of production line. As human, we know that we are easy affected by other out coming effect such as family problem, financial problem and so on. Such of this problem will decrease our working performance; indirectly it will affect the productivity in the production line. As an example, usually human energy is used to check expired date of a product, but base on the weakness of human ability, the worker easy make mistake especially when working in long period of time because of feel tired. This problem can be avoided by using machine vision for checking expired date in production line. It will increase the speed, accuracy and improve the performance for a production line.

There are still a lot of people sending their document or items by post. Using human energy to sort the sending document or items follow their postal code is not practical and low efficiency. Replacing human energy with machine vision system, will increase the performance of work, this is because machine vision system is able to recognize the postal code and sort the document according to their postal code.

In this century, time is an important asset for us; especially for business man, they need to save their time for having more business to gain a maximum profit, but unfortunately, they spent a lot of time in sending message, documents and data to their clients or workers; it will consume a lot of time for them in typing out message from a mobile phone instead of using handwriting. Maybe they will write message in a piece of paper and send it for their clines or workers, but, not every word from that handwriting will easily read by clines or workers because handwritten characters vary greatly, to solve this problem, we need a system that change the handwriting to proper typing words, we call this system as "machine vision".

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1.2 PROJECT OBJECTIVE

The main objective of this project is to design a machine vision system that can recognize character. The idea of this project is to make machine able to learn and understand human handwriting besides of typing character.

Another objective of this project is to design an image processing algorithm with programming skill. There is a lot of image processing algorithm library in market, e.g. OpenCV, for application purpose, we can just use that library to build up some image processing function, but for research purpose, we need to understand and to know the method or algorithm that usually builds up image processing system. Through this project, an image processing algorithm will be designed and used for purpose of character recognition to proof the image processing algorithm can function effectively.

Design a recognition system from those of the artificial intelligent system that already exists is also one of the objectives for this project. Through this project, a recognition system is design to recognize an input character of the system.

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1.3 PROJECT SCOPE

The result for this machine vision system will show in programming forms such as visual basic.net, C++ builder. The project will more concert in programming and theoretical, the hardware used for the system will not be covered fully in this project. To get a good result for this system, the input handwriting character preferred to be uniform and the tool used for writing is suggest to be 2.0 m/m tip with black in color. Character set is uppercase alphabets A until Z, other type of character such as numeric number and lowercase alphabets will not be cover in this project. The background of this machine vision system is suggested to be white in color with noiseless condition. The testing environment is suggested to be brightness condition. This machine vision system is a computer base system that required the processor of Pentium D (3.00MHz), RAM 1G or above and the input for the image source is a webcam with 1.3 megapixels.

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Chapter2

LITERATURE REVIEW AND PROJECT BACKGROUND

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2.1 LITERATURE REVIEW

2.1.1) PROGRAM (Software)

2.1.1.1: Optical Character recognizes system by Herve Cadieu

This optical character recognizes system is created by Herve Cadieu in VB 6 programming base. The system is tested by write a character in the text box given. After some training has been done for the system, the system can recognize the character that is written in the text box. But this system still have a lot of weakness, the percentage of success is not high and this program does not have filtering function, so it can just recognize a character that is no noise, beside of that, this is a program that does not involve image processing theory so it cannot be classify as a machine vision system [8] [9]. But the programming method that use to recognize character is helpful in building a machine vision system that recognize character.

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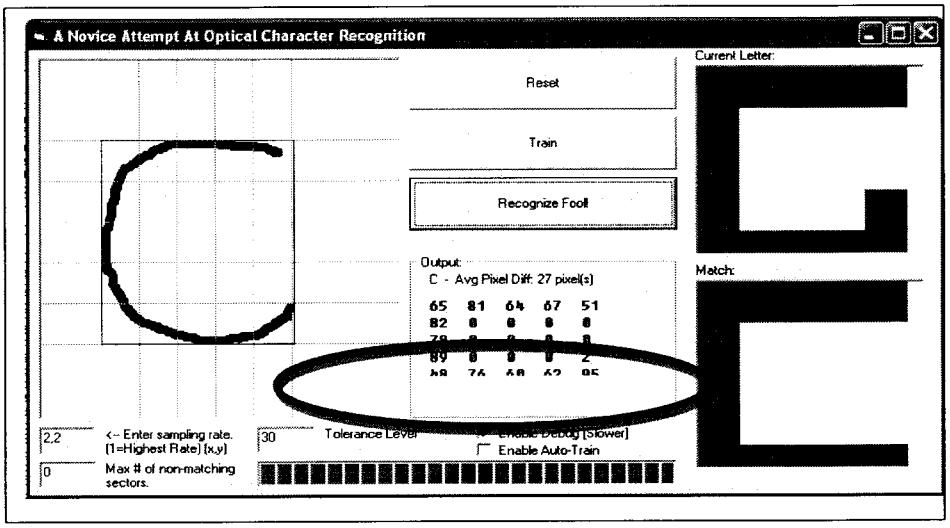

Figure 2.1: Result shows that the system success recognizes the character "C"

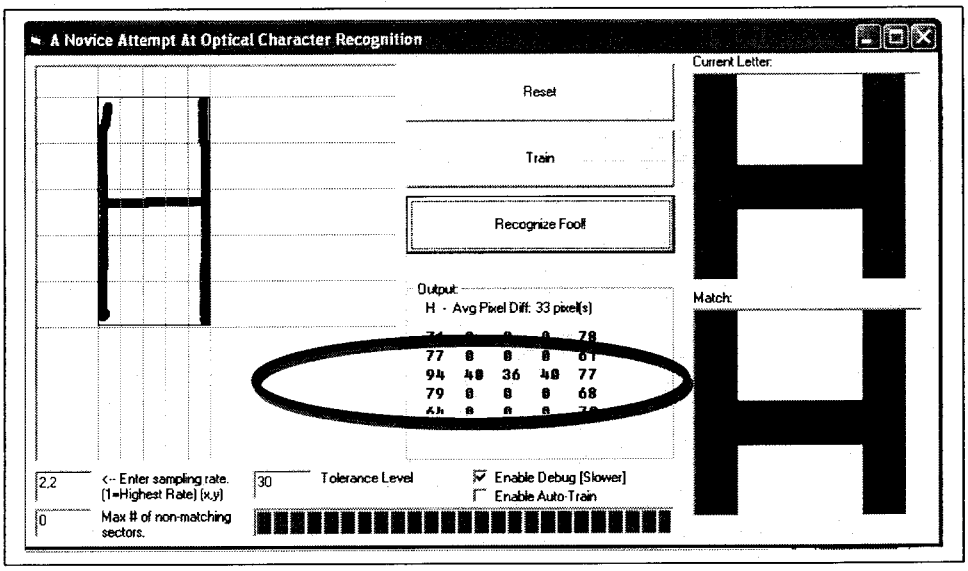

Figure 2.2: Result shows that the system success recognizes the character "H"

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