



UNIVERSITI TEKNIKAL MALAYSIA MELAKA

**A STUDY OF AUTOMATIZING VISION BASE
(CAMERA) OBJECT DIMENSION MEASUREMENT BY
USING MATLAB**

This report is submitted in accordance with the requirement of the Universiti Teknikal Malaysia Melaka (UTeM) for the Bachelor of Mechanical Engineering Technology (Telecommunication) with Honours.

by

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ABSTRAK

Salah satu masalah yang mempengaruhi pembangunan kaedah pengukuran objek adalah ketepatan objek yang diukur berulang kali. MATLAB dengan pengaturcaraan Imej dan teknik penapisan imej meningkatkan ketepatan pengukuran tanpa sentuhan. Projek ini menunjukkan pengendali pengesanan pinggir, iaitu Canny. Metodologi yang dicadangkan membentangkan teknik-teknik untuk mengukur dimensi objek menggunakan kaedah pengaturcaraan MATLAB sebagai sistem tak sentuh yang merupakan gabungan objek imej dan pengekodan MATLAB untuk mengesan ketinggian dan lebar objek. Sistem pengukuran yang dicadangkan adalah mudah alih, tepat dan mudah digunakan, yang terdiri daripada kamera telefon pintar sebagai kamera mono-cam untuk menangkap imej objek dalam jarak fokus yang tepat. Ia bukan membina bangunan robot pada asasnya ia memberi tumpuan kepada penglihatan imej dalam MATLAB. Hasil dalam literatur lepas ditunjukkan dan dibincangkan dalam karya ini. Pendekatan ini adalah mungkin dan penambahbaikan masa depan ini juga dibincangkan.

ABSTRACT

One of the problems that affect in development measuring object method is an accuracy of the object that measured repeatedly. MATLAB with Image programming and filtration technique of image improves the accuracy of non-contact measurement. This project shows an edge detection operator, which is Canny. Proposed methodology presents techniques for measuring object dimension using MATLAB programming method as non-contact measure system which is a combination of image object and MATLAB coding to detect height and width of the object. The proposed measurement system is portable, accurate and easy to use, consisting of smartphone camera as a mono-cam camera to capture object image in exact focal length. It is not a robot building hunt basically it focuses on image vision in MATLAB. Results in past literature are shown and discussed in this paper. This approach is possible & future refinements of this also discussed.

DEDICATION

Alhamdulillah, praise to the Almighty Allah S.W.T

This project is dedicated to:

My parents,
My beloved family,
My Supervisor,
My lecturers,
And all my friends

Sincerely from my heart, thank you for helping and support.

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TABLE OF CONTENTS

	PAGE
TABLE OF CONTENTS	viii
LIST OF TABLES	xii
LIST OF FIGURES	xiii
LIST OF APPENDICES	xvi
LIST OF SYMBOLS	xvii
LIST OF ABBREVIATIONS	xviii
LIST OF PUBLICATIONS	xix
CHAPTER 1 INTRODUCTION	1
1.1 Introduction	1
1.2 Background	1
1.3 Problem Statement	2
1.4 Objective	3
1.5 Scope	3
1.6 Report out Line	3
CHAPTER 2 LITERATURE REVIEW	5
2.1 Introduction	5
2.2 Camera	5

2.2.1	Comparison CMOS and CCD	8
2.2.2	Stereovision	9
2.2.3	Monovision	10
2.3	MATLAB	11
2.4	Image processing	12
2.4.1	Analogue image processing	13
2.4.2	Digital image processing	14
2.4.3	Filtering image	15
2.5	Edge detection	16
2.5.1	Sobel Operator	18
2.5.2	Prewitt Operator	20
2.5.3	Canny Operator	21
2.5.4	Laplace operator	22
2.6	Pixel	23
2.6.1	Colour Imaging Systems	24
2.6.2	Resolution	25
2.6.3	Technical	26
CHAPTER 3	METHODOLOGY	28
3.1	Introduction	28
3.2	Methodology	28
3.3	Problem Solving Method	29
3.4	Hardware Development	30

3.4.1	CCD Camera	30
3.5	Single Vision setup	31
3.6	Software Development	32
3.6.1	MATLAB Software	32
3.7	Edge detection technique	33
3.8	Flow chart of canny edge detection algorithm	35
3.9	Coding Developing	37
3.10	Simulation and Testing	37
3.11	Documentation and reporting	38
CHAPTER 4	RESULT & DISCUSSION	39
4.1	Introduction	39
4.2	Object	39
4.3	Verify setup	41
4.3.1	Ruler	41
4.3.2	Vernier Callipers	41
4.3.3	Mono camera	42
4.3.4	MATLAB Software	42
4.4	Data collect for contact measurement method	45
4.4.1	SD Card	45
4.4.2	Integrated Circuit (UA741CN)	46

4.4.3	Buzzer	47
4.5	Project Analysis	48
4.6	Testing non-contact measurement method	48
4.6.1	Auto measure SD Card	48
4.6.2	Auto measure IC	52
4.6.3	Auto measure buzzer	55
4.7	Discussion	58
CHAPTER 5	CONCLUSION & FUTURE WORK	59
5.1	Conclusion	59
5.2	Future Work	60
REFERENCES		61
APPENDIX I		62
APPENDIX II		64

LIST OF TABLES

TABLE	TITLE	PAGE
Table 2.1:	Comparison of CCD and CMOS world image sensor	8
Table 2.2:	Comparison of CMOS Vs CCD on system requirement.	8
Table 4.1:	Specification size of an object	40
Table 4.2:	Data of contact measurement for SD Card	45
Table 4.3:	Data of contact measurement for Integrated Circuit (UA741CN)	46
Table 4.4:	Data of contact measurement for buzzer.	47
Table 4.5:	Data collect for non-contact measurement of SD card.	48
Table 4.6:	Data collect for non-contact measurement of IC	52
Table 4.7:	Data collect for non-contact measurement of buzzer.	55

LIST OF FIGURES

FIGURE	TITLE	PAGE
Figure 2.1:	Type of CCD chip and CCD cameras	6
Figure 2.2:	CMOS camera	7
Figure 2.3:	CCDs move photogenerated charge	9
Figure 2.4:	Stereovision camera	9
Figure 2.5:	Example of monovision camera.	10
Figure 2.6:	Digital Filter	15
Figure 2.7:	Edge detection using various operators	18
Figure 2.8:	Sobel Method.	20
Figure 2.9:	The function of Prewitt edge detector is almost same as of sobel detector but have different kernels.	20
Figure 2.10:	Example Prewitt Method.	21
Figure 2.11:	Canny Method.	21
Figure 2.12:	Example Laplace Method.	23
Figure 2.13:	Reconstructing an image	25
Figure 2.14:	Types of resolution size.	26
Figure 3.1:	Project Methodology	28
Figure 3.2:	Block diagram project	29

Figure 3.3:	Project Flowchart	29
Figure 3.4:	Symbol MATLAB	3
Figure 3.5:	Various Edge Detection Techniques	33
Figure 4.1:	Ruler as contact measurement method.	41
Figure 4.2:	Vernier callipers as contact measurement method.	41
Figure 4.3:	Oppo A37 monocamera	42
Figure 4.4:	Creating coding in Matlab Software.	43
Figure 4.5:	Include all the image object that will measured in current folder.	43
Figure 4.6:	Open the auto measure coding that had been created and change the name of image that want to measured.	44
Figure 4.7:	Run the simulation and the result will appeared with “help dialog” that shows the width and height of an object.	44
Figure 4.8:	Measure width and height of SD Card using ruler and Vernier Caliper.	45
Figure 4.9:	Measure width and height of IC UA741CN using ruler and Vernier Caliper	46
Figure 4.10:	Measure width and height of buzzer using ruler and Vernier Caliper.	47
Figure 4.11:	Output auto measure dimension SD Card in MATLAB	49
Figure 4.12:	Percentage error of SD Card width at different focal length.	50
Figure 4.13:	Percentage error of SD Card width at different focal length.	50
Figure 4.14:	Percentage error of SD Card height at different focal length	51

Figure 4.15:	Accuracy of height SD Card measurement at 18.5 focal length	51
Figure 4.16:	Output auto measure dimension IC in MATLAB	53
Figure 4.17:	Percentage error of IC width at different focal length.	53
Figure 4.18:	Accuracy of width IC measurement at 18.5 focal length	54
Figure 4.19:	Percentage error of IC height at different focal length.	54
Figure 4.20:	Accuracy of height IC measurement at 18.5 focal length	55
Figure 4.21:	Output auto measure dimension buzzer in MATLAB	56
Figure 4.22:	Percentage error of buzzer buzzer at different focal length.	57
Figure 4.23:	Accuracy of diameter buzzer measurement at 18.5 focal length	57

LIST OF APPENDICES

APPENDIX	TITLE	PAGE
Appendix I	Coding MATLAB	62
Appendix II	Gantt Chart	64

LIST OF SYMBOLS

LIST OF ABBREVIATIONS

mm	milimeter
cm	Centimeter
CCD	Charge Couple Device
CMOS	Complementary Metal Oxide Semiconductor
Dpi	Dots per Inch
MP	MegaPixels
Ppi	Pixels per inch
HDR	High Definition Resolution
IC	Integrated Circuit

LIST OF PUBLICATIONS

CHAPTER 1

INTRODUCTION

1.1 Introduction

This chapter provides an overview of the object measurements by using MATLAB and survey of existing techniques in edge detection in image processing. The problem background and problem statement are described next. This is followed by research objectives and scope of the study involving the type of edge detection technique. The main goal of this chapter is to give the reader a comprehensive knowledge of previous studies and technical information about an auto measurement of dimension of an object in MATLAB that using an edge detection technique in image processing.

1.2 Background

Since edge detection is in the forefront of image processing for object detection, it is important to have a good comprehension of edge detection algorithms. This report introduces a new classification of most important and normally used edge detection algorithms.

An essential problem in image processing is the detection of edges in a given image. Since the problem is hard (to solve and to define) a large number of schemes have been presented in the literature. An Image analysis includes processing an image into fundamental components in order to extract statistical data. Image analysis can include such tasks as finding shapes, detecting edges, removing noise, counting objects, and measuring region and image properties of an object. A person can perform image analysis

in MATLAB with the Image Processing Toolbox, which is provides image processing algorithms, tools, and a comprehensive environment for data analysis, visualization, and algorithm development.

1.3 Problem Statement

Measuring object in image need an image that has low noise and sharp image to get a better shape of object so that the value of measurement of object will be more accurate than manual measurement. This project need to solve the problem of measure object in MATLAB from manual to auto. In image processing, for the most intensively studied sub problems in computer vision considerations is a way to observe edges from grey-level images. The importance of edge information for early machine vision is typically motivated from the observation that under rather general assumptions concerning the image formation process. So far, several algorithms have been presented in edge detection field despite all this, the edge detection of digital image has not been absolutely resolved. However still it's the most important challenge in image processing to improve the accuracy and the signal-to-noise ratio of edge detection algorithm. This is because the traditional edge detection algorithm is based on gradient differential; there are different degrees of limitations of these algorithms. It's the most important challenge in image processing to improve the accuracy and also the signal-to-noise ratio of edge detection algorithm, thus making the algorithm an emphasis of professional study.

1.4 Objectives

- i. To compare an accuracy of contact and non-contact measurement.
- ii. To make an auto measure of dimension object using MATLAB.

1.5 Scope

The scopes for this project are to auto detect the measurement of an object in vision system by using MATLAB. For this project, the captured images by Monocam camera need to be filtering by using edge detection technique to reduce some noise to allow the MATLAB measure an object image. This process need to choose from the different edge detection technique which Sobel, Canny and Prewitt to apply in filtering image. Auto measurement is a main thing that need to focus in this project. All the relevant measurement that happens in vision system will be observed.

1.6 Report out Line

There are five chapters in this report that consists of introduction, literature review, methodology, results and discussion and lastly the conclusion. Firstly, chapter 1 is about an introduction. This chapter was explained in detail about the concept of this project, the objective, problem statement of the study and the project scope. The next chapter is literature review; the related pass research about the measure dimension object using MATLAB is stated in this chapter. The related researches are come from the international research's source. So it's mean the related research in this chapter are from in the country and overseas. The third chapter are completely explained about how to

build this project from the basic till the end. All the recorded results for this study are stated in the next chapter that is chapter 4. In chapter 4, all the results are showed. Lastly, the conclusion about this study has been concluding in the chapter 5.