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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This report is submitted to the Faculty of Technology of Universiti Teknikal Malaysia Melaka (UTeM) as a partial fulfilment of the requirements for the Bachelor of Electronic Engineering Technology (Telecommunication) with Honours. The member of the supervisory is as follow:

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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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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.