MULTI SIZE SHAPE DETECTION

LIM CZE SIANG

This report is submitted in particular fulfilment of the requirements for the award of Bachelor of Electronic Engineering with Computer Engineering With Honours

Faculty of Electronic and Computer Engineering
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BORANG PENGESAHAN STATUS LAPORAN

PROJEK SARJANA MUDA II

Tajuk Projek	MULTI SIZE SHAPE DETECTION
Sesi Pengajian	2009/2010 -2

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Specially dedicated to my family for their supports and eternal love.

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ABSTRACT

Shape is the characteristic surface configuration of a thing such as an outline or contour. It can also be described give a particular form to create. The objective of this project is to design a system that can detect same shape even though in various size. The input of the system will be an image which can be any type of files containing many shapes with example circle, square, rectangular and others with multiple sizes. This project is mainly concern with shape classification using image processing technique. The proposed methods can be extended to various purpose especially in speeding up the processing time to search the shapes in the image. The system will be developed using MATLAB. For example in industrial, wafer dicing is the process by which die are separated from a wafer of semiconductor following the processing of the wafer. The die created may be any shape generated by straight lines, but they are typically rectangular or square shaped. The program developed may be used to check the accuracy of the die been created.

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ABSTRAK

Bentuk merupakan satu ciri dimana permukaan konfigurasi benda seperti garis atau kontur. Ia boleh dijelaskan seperti objek yang dihasilkan. Tujuan projek ini adalah menghasilkan satu sistem dengan kebolehan menemui bentuk yang sama tetapi dalam saiz yang berbeza. Input kepada sistem tersebut adalah dengan imej yang dalam bentuk format yang berbeza yang mengandungi bulatan, segi empat sama, segi empat dan lain-lain dalam saiz yang berbeza. Projek ini mengambil berat tentang klasfikasi bentuk dengan menggunakan teknik pemprosesan imej. Cara yang dicadangkan boleh digunakan dalam pelbagai sebagai mencepatkan masa pemprosesan dalam penemuan bentuk dalam image. Sistem tersebut akan dihasilkan dengan menggunakan MATLAB. Sebagai contoh dalam industri, pendaduan wafer merupakan proses dimana dadu diasingkan daripada wafer dalam industri semikonduktor dimana pemprosesing wafer dilakukan. Dadu boleh dihasilkan melalui penghasilan bentuk dengan garis lurus dengan bentuk segiempat dan segi empat sama bentuk. Program yang dihasilkan dapat digunakan untuk meyemak ketepatan dadu yang dihasilkan.

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LIST OF ABREVIATIONS

RBF	-	Radial Basis Function
JPEG	-	Joint Photographic Experts Group
GIF	-	Graphics Interchange Format
Bitmap	-	Microsoft Windows Bitmap
TIFF	-	Tagged Image File Format.
PNG	-	Portable Network Graphic

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CHAPTER I

INTRODUCTION

1.1 INTRODUCTION TO SHAPE ANALYSIS AND RECOGNITION

Shape analysis and recognition using computers always encounter many problems. In fact, the computational shape analysis involves several important tasks from image acquisition to shape classification. Shape processing for shape analysis which can be categories into 3 stages which are shape pre-processing, shape transformations and shape classification.

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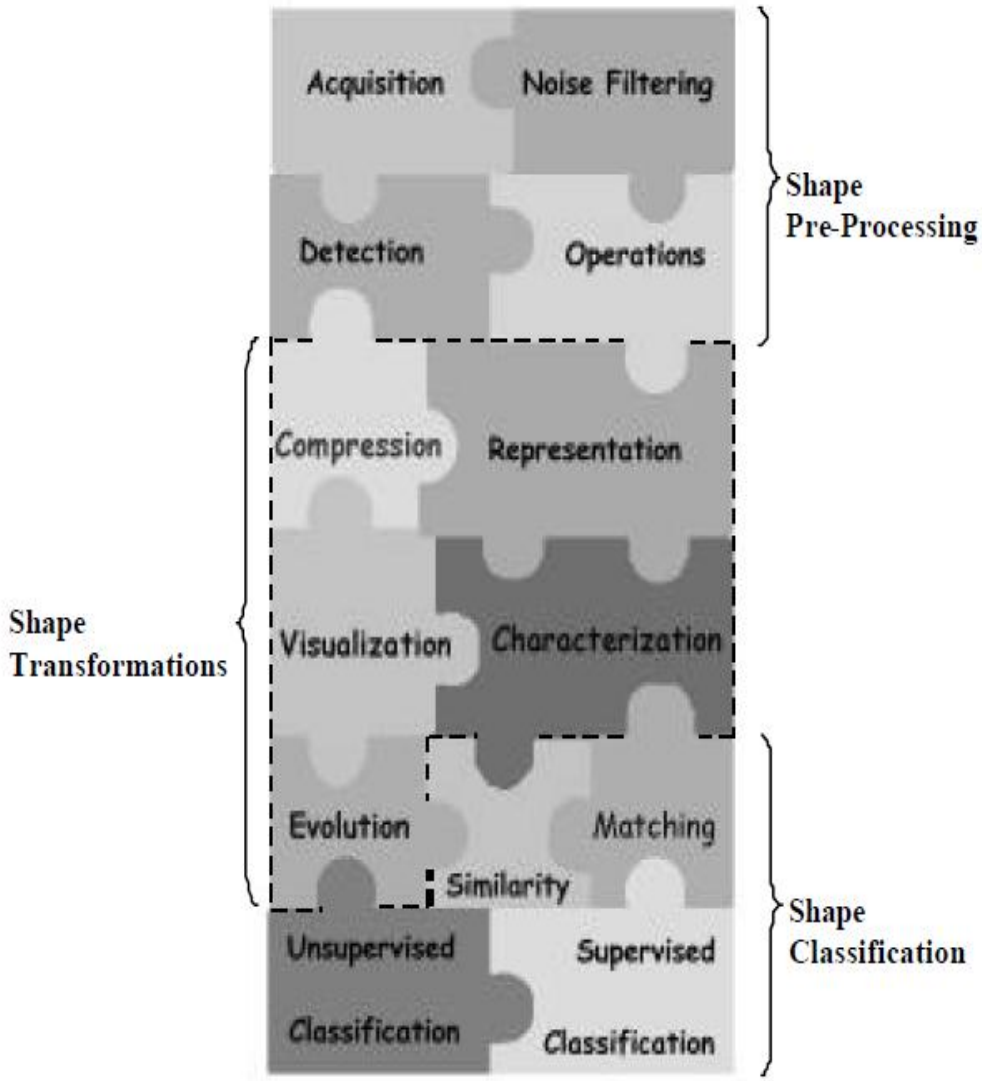

Figure 1.1: Typical shape analysis tasks and their organization into three main classes.

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Shape Pre-Processing

The first step toward shape analysis of a given object involves acquiring and storing an image of it and separating the object of interest from other unwanted image structures. Furthermore, digital images are usually corrupted with noise and other undesirable effects such as occlusion and distortions. Therefore, it required special procedures to apply the application shape preprocessing.

Shape Transformations

Once the shape of interest has been acquired and processed. Next, the noise has been substantially reduced using some function available in MATLAB. A set of techniques or algorithms can be applied in order to extract information from the shape, so that it can be proceed to analyze potion. Such information in normally extracted by applying suitable shape transformations. Such transformations are mappings that allow both representation of the shape in a more appropriate manner with respect to a specific task and extraction of measures that are used by classification schemes.

Shape Classification

Finally, after shape processing, representation and characterization which often involving feature extraction, classification algorithms are usually applied in order to assign a class to each considered shape. There are two particularly important aspects related to shape classification. The first is the problem of is the given an input shape. Later, deciding whether it belongs to some specific predefined class. This can also be thought of as a shape recognition problem is known as supervised classification. The second equally important aspect of shape classification is how to define or identify the involved classes in a population of previously unclassified shapes. This represents a difficult task, and expert knowledge acquisition problems are usually involved. The latter situation is known as unsupervised classification or clustering. Both supervised and unsupervised classification involve comparing

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shapes which deciding how similar two shapes and how is done, in many situations, by matching important corresponding points of them.

Below are the Fields and examples of application which are using image processing:

Table 1.1: Shape analysis applications

Research Field	Examples of Applications
Neuroscience	Morphological taxonomy of neural cells, investigations about the interplay between form and function, comparisons between cells of different cortical areas and between cells of different species, modeling of biologically realistic cells, and simulation of neural structures
Document Analysis	World Wide Web(WWW), Optical Character Recognition (OCR), multimedia databases, and historical documents
Visual Arts	Video restoration, special effects, video tracking, games, computer graphics, visualizations, and image synthesis
Internet	Content-based information retrieval, watermarking, graphic design and usability,
Medicine	Tumor recognition, quantification of change and/or deformation of anatomical structures (e.g.,endocardial contour of left ventricle of heart, corpus callosum), morphometric analysis for diagnosis (e.g., multiple sclerosis and Alzheimer's disease), numerical analysis of chromosomes, identification of genetic pathologies, laparoscopy, genetic studies of dentofacial morphology.
Biology	Morphometric-based evolution comparison, taxonomy, interplay between form and function, comparative anatomy, cytology, identification and counting of cells (e.g., white blood cells), characterization of cells and

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	nuclear shapes, growth and shape modifications, analysis of human gait, analysis of electrophoretic gels, microscopy
Physics	Analysis of particle trajectories, crystal growth, polymers, characterization of star clusters in astronomy, several types of microscopy
Engineering	Semiconductors, quality control, danger detection, machine interpretation of line drawings, computer aided design of mechanical parts and buildings, automation, robotics, remote sensing, image and video format standards, spatial exploration,
Security	Fingerprint/face/iris detection, biometrics, human gait and signature verification
Agriculture	Harvest control, seed counting and quality control, species identification, fruit maturation analysis,

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