

VISION INSPECTION SYSTEM FOR HALAL CHICKEN AUTHENTICATION

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To my beloved mother and father

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ABSTRACT

Vision inspection system is a rapid, economic, consistent and objective inspection technique. This project focuses on the process to authenticate whether the slaughtered chickens images are halal and slaughtered correctly according to syariah law or not based on the slaughtered chicken images by using image processing methods and neural network. The captured images first undergo pre processing such as cropping, background subtraction process and erosion method. The pre processed images are then segmented using method such as component connected labeling method to detect the circularity of esophagus and trachea. Feature extraction is used to extract important information from the processed images and the features used in this project are circularity and the average value of red, green and blue (RGB) colours. Probabilistic neural network is used to classify the features of the image and compared with the trained feature to authenticate the halal status of the image. Time taken for authenticate slaughtered chicken image is fast and its accuracy is also reasonable.

ABSTRAK

Sistem pemeriksaan penglihatan ialah satu teknik pemeriksaan yang pantas, ekonomi, konsisten dan objektif. Projek ini menumpukan pada proses pengesahkan imej ayam yang telah di sembelih adalah halal atau tidak dan menurut undang-undang syariah dengan menggunakan kaedah-kaedah pemprosesan imej dan jaringan saraf. Imej-imej yang ditangkap mula menjalani pra-pemprosesan seperti memotong, proses penolakan latar belakang dan kaedah hakisan. Imej pra-proses kemudiannya di segmenkan menggunakan teknik seperti melabelkan komponen berhubung untuk mengesan kebulatan saluran pernafasan dan makanan. Pengekstrakan ciri adalah digunakan untuk mengambil maklumat penting dari imej-imej yang diproses dan ciri-ciri yang digunakan didalam projek ini ialah kebulatan dan nilai purata warna merah, hijau dan biru (RGB). Jaringan saraf kebarangkalian adalah digunakan untuk mengelaskan ciri imej dan dibandingkan dengan ciri terlatih mengesahkan status halal imej. Masa diambil untuk mengesahkan imej ayam sembelihan adalah laju dan ketepatan juga munasabah.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

This section discuss about the introduction of the study which are overview of Halal, slaughtering process and computer vision, problem statement, objectives, and scope of study.

1.2 Overview of Halal

In Islam, there are mainly two terms that mean Islamic prohibition or restriction on food: Halal and Haram. "Halal" is an Arabic word meaning "lawful" or "permissible", and the term not only covers food and drink, but also to all matters of daily life. When it comes to halal food, most people think of meat foods. "Haram" is an Arabic word meaning "unpermissible" as example in food, Muslim are Haram to eat swine flesh.

It was explain in Quran surah An-Nahl verse 114:

“He has only forbidden you dead meat, and blood, and the flesh of swine, and any (food) over which the name of other than Allah has been invoked.”

1.3 Overview of Slaughtering Process

The slaughtering process is done accordance to the Shariah law and Malaysia Standard MS1500:2009 by following these requirements to be complied with [5]:

- i) Slaughtering shall be performed only by a practicing muslim who is mentally sound, baligh, fully understands the fundamental rules and conditions related to the slaughter of animal in Islam.
- ii) The act of slaughtering shall be done with niyyah (intention) in the name of Allah and not for other purposes.
- iii) The animal to be slaughtered has to be an animal that is Halal.
- iv) The animal to be slaughtered shall be alive or deemed to be alive at the time of slaughter.
- v) The slaughter act shall sever the trachea (halqum), oesophagus (mari') and both the carotid arteries and jugular veins (wadajain) to hasten the bleeding and death of animal.

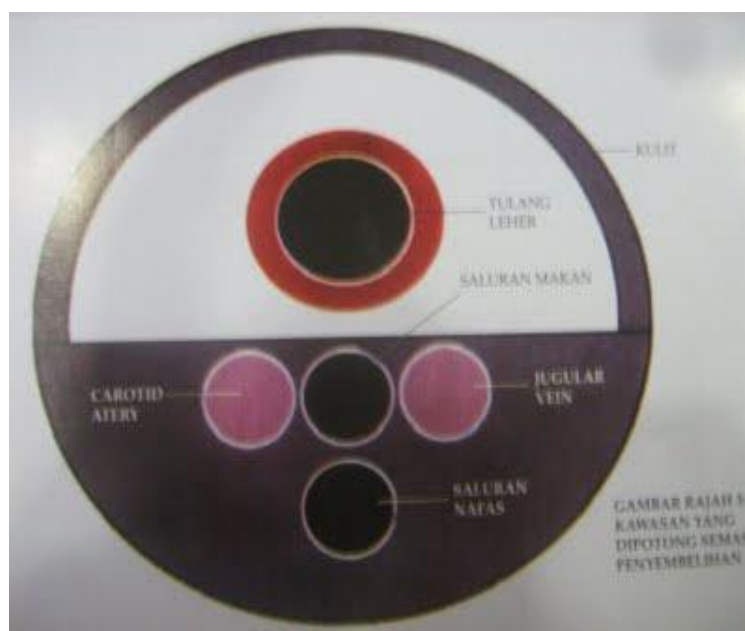


Figure 1.1 Slaughtering part of chicken [5]

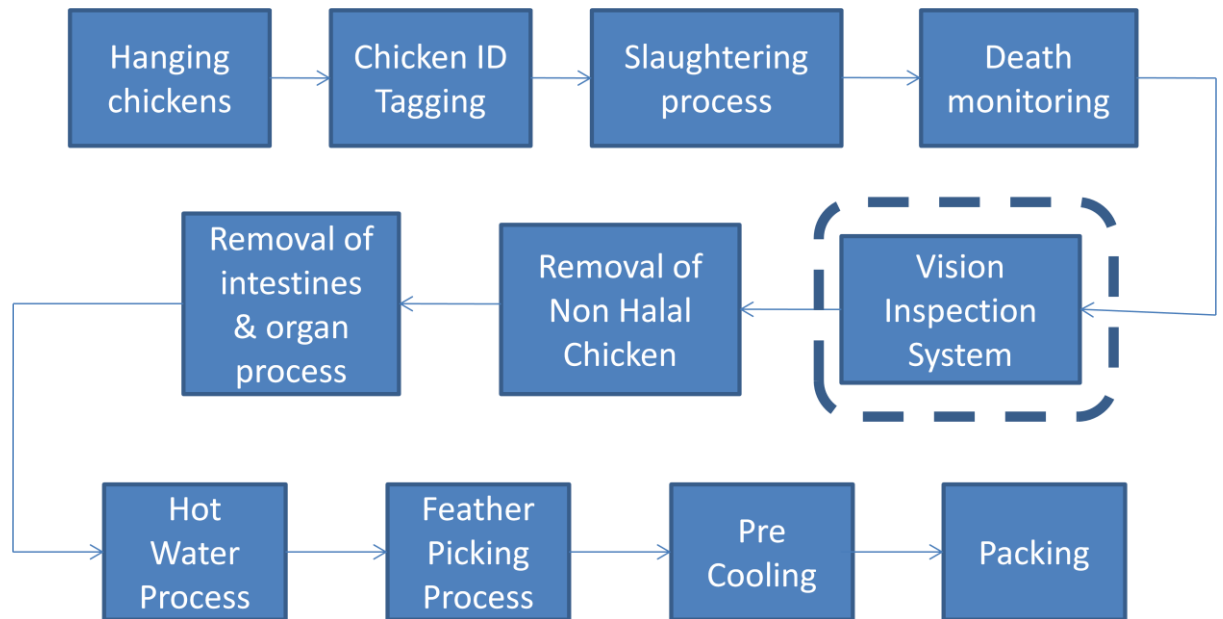


Figure 1.2 Syariah-compliant automated chicken processing system

1.4 Overview of Computer Vision

Computer vision is a field that includes methods for acquiring, processing, analyzing, and understanding images and, in general, high-dimensional data from the real world in order to produce numerical or symbolic information, *e.g.*, in the forms of decisions. A theme in the development of this field has been to duplicate the abilities of human vision by electronically perceiving and understanding an image [3].

This image understanding can be seen as the disentangling of symbolic information from image data using models constructed with the aid of geometry, physics, statistics, and learning theory. Computer vision has also been described as the enterprise of automating and integrating a wide range of processes and representations for vision perception [4].

1.5 Problems Statements

There are three main problem statements in this project:

- i) Authentication of halal by human is not trustable and not accurate because of the amount of chickens being slaughter and the slaughter process is nonstop.
- ii) 1000 slaughtered chickens per hour to be check by halal inspector.
- iii) Hiring the halal inspector cost lot of money.

1.6 Objectives

There are three main objectives to be achieved:

- i) To authenticate the halal slaughter chicken using image processing method.
- ii) To classify halal and non halal slaughtered chicken using artificial intelligence method.

1.7 Scope of Study

There are three scopes listed to ensure that the study is conducted within the boundary:

- i) Use image processing toolbox in Matlab as image processing tool.
- ii) Detecting regular and irregular shape of esophagus and trachea channel by using image processing methods.
- iii) Classify halal of chicken slaughtering images by using artificial intelligence method.

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