



UNIVERSITI TEKNIKAL MALAYSIA MELAKA

**IMPLEMENTATION OF 3D AUTOMATED COCONUT
GRATING PROCESS**

This report is submitted in accordance with the requirement of the Universiti Teknikal Malaysia Melaka (UTeM) for the Bachelor of Electrical Engineering Technology (Industrial Automation & Robotics) with Honours.

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APPROVAL

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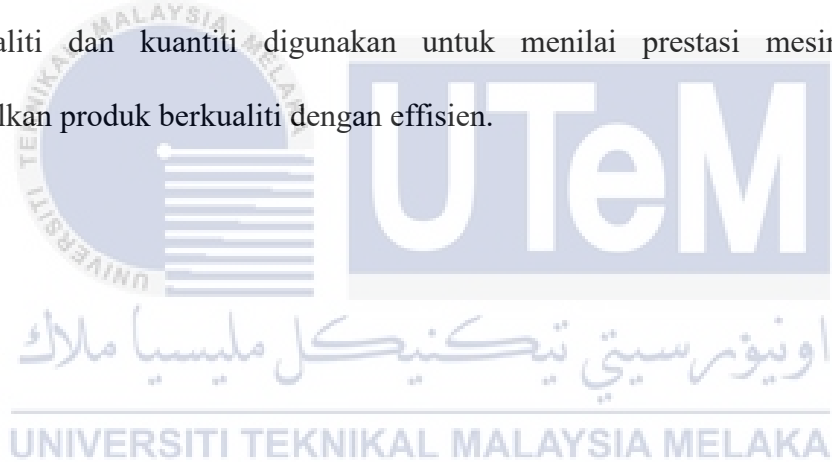
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ABSTRAK

Pada masa kini, robotik dalam industri amat banyak disebabkan oleh hal ini dapat meningkatkan prestasi sesuatu kerja. Terdapat pelbagai jenis mesin manual yang boleh di automasi bagi meningkatkan lagi produktiviti diantaranya adalah mesin pamarut kelapa. permintaan kelapa parut akan meningkat terutama ketika hendak menjelang musim perayaan seperti hari raya Aidilfitri. Untuk mengatasi masalah kekurangan kelapa parut, ia hendaklah dihasilkan dengan kuantiti yang banyak. Oleh itu, inovasi seperti mesin pamarut kelapa automatic amat diperlukan bagi meningkatkan lagi produktiviti. konsep putaran dan pergerakan linear dalam 3d dimensi axis Analisa dari segi kualiti dan kuantiti digunakan untuk menilai prestasi mesin agar dapat menghasilkan produk berkualiti dengan efisien.



ABSTRACT

Today, industrial robots are widely used because they can level up productivity respectively with their speed and accuracy. There are various types of manual machines that can be automated to enhance productivity including coconut extraction machines. To overcome the problem of scarcity of coconut, it should be produced in large quantities. Therefore, innovations such as automatic coconut carving machines are needed to enhance productivity and accuracy.



DEDICATION

I want to give a big applause for my parent, lecture which is my supervisor for aiding me and giving support for this projects. Not to forget my friend which also be there for me when I'm in need.



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Alhamdulillah, praise and blessing of Allah Al-Mighty for his blessing upon us. It is with innermost sense who given me healthiness of physical and mental, strength, tolerance and capability to complete this final project. I would like to thanks to my one and only supervisor, Mister Mohamed Azmi bin Said because he always encourages and guidance in solving problems for this final project

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LIST OF SYMBOLS

D, d	-	Diameter
F	-	Force
g	-	Gravity = 9.81 m/s
I	-	Moment of inertia
l	-	Length
m	-	Mass
N	-	Rotational velocity
P	-	Pressure
Q	-	Volumetric flow-rate
r	-	Radius
T	-	Torque
Re	-	Reynold number
V	-	Velocity
w	-	Angular velocity
x	-	Displacement
z	-	Height
q	-	Angle

LIST OF ABBREVIATIONS

3D	-	3 Dimension
DC	-	Direct Current
V	-	Volt
IR	-	Infra Red



CHAPTER 1

INTRODUCTION

1.1 Background

Coconut graters are standard cooking machine in tropical Asia-Pacific and Eastern Africa households which is coconut milk is one of the important ingredient in food serving. They reached as far as Polynesia through the Austronesian expansion prior to European contact.

The basic design of coconut graters consists of a low bench or stool attached to one end with a horizontal sharp disk (made of steel in Africa and Asia, and shell or sharp stone in Oceania). An individual sits at the bench and scrapes the inner surface of coconut shells repeatedly at the sharp steel with hands. The scrapings are collected by a container which is put below. Dating back to the mid-1800s, more recent mechanical coconut graters consist of serrated blades with a hand crank. This edition is considered to be an innovation of British origin.

In Malaysia, nowadays most of Malaysia use the mechanical grating machine which is the combination of ac motor 240v with special grinding tips attached to the motor for grate the flesh of the coconut. There is also a shield that made from stainless steel to avoid the flesh to spread around the workplace and there is also a basket holder under the motor to collect the coconut flesh. This type of grater machine is a manual machine that need human interference in the process. This type of machine is one of the most convenient to use for home and small business use because of its size and minimum component use. But the user need to be very conscious while using it because

of the risk of injuries is very high. The coconut that need to be grated is hold by bared hand.



Figure 1.1 shows mechanical or manual grater machine



Figure 1.2 shows injuries during process of work

This type of grater machine is a manual machine that need human interference in the process. This type of machine is one of the most convenient to use for home and small business use because of its size and minimum component use. But the user need to be very conscious while using it because of the risk of injuries is very high. The coconut that need to be grated is hold by bared hand. Lose control while holding the coconut can lead to injuries and accident. The design need to be improve so the human interference need to be reduce to decrease the risk of injuries.

Automation is the technology of procedure and process is carried out with little human interference with increased speed and precision. Automatic control which is automation that many type of operating equipment control systems, such as machinery, production processes and other applications, with limited or small human assistance.

In the simplest form of an automatic control loop, a controller compares a process calculated value with a desired set value and Processes the resulting error signal to change any process input in such a way that the process stays at its point of departure due to disturbances. This closed-loop control is a negative feedback applied to a system. This closed-loop test is a critical reinforcement on a machine.

In conclusion, all of the element of hardware and software need to be combined to archived to make a useful devices. Automation advantages include labour reductions, reductions in energy costs, material cost savings, and improvements in efficiency, precision , and accuracy.

1.2 Statement of Purpose

The purpose of research is to investigate and improve the design, build and testing the 3d automated coconut grating process.

1.3 Problem Statement

Grating coconut process can be tiring and Dangerous activity for humans because it is a repeat cycle and needs continuous attention because of ongoing research This activity may cause problems in productivity in industry with human labour that works for the whole day. Automation is commonly used in industry such as food and agriculture. An Industrial Automation is a production device that can configured with reasonable accuracy and precision to do hazardous, dirty and or repetitive tasks, industrial automation are increasingly being used in a variety of industries and applications.

1.4 Objectives Of Research

The objectives of this project as follow:

1. To design and evaluate the output of mechanism to hold the coconut
2. To fabricate and assemble the object that used to hold the coconut
3. To program the specific task that used in recognize between shell and flesh of the coconut
4. To test run the machine on the actual coconut

1.5 Work Scope of Project

The scopes of this project are as follows:

1. To replace human work for holding the coconut in the coconut grating process.
2. To reduce the dangerous risk of accident to human in grating process.



CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

To complete the task, the manual or mechanical coconut grater uses the cartesian system and 3 dimensional axis which can provide movement in the grating process. But mostly, the only exit system is manual or semi-auto. So this concept is still being used to automate the system but is being upgraded simultaneously with the system function.

2.2 Cartesian and 3D Axis

A Cartesian coordinate system (UK:/k ubiquitous ubiquitous/, US:/k ubiquitous ubiquitous/) is the system of Co-ordinates defines every of point at the planes uniquely by the sets of coordinate in number, which the distances signed to the point from the two perpendicular lines, measured at the same length unit. Every reference line are called the system's coordinate axis or a pure axis (plural axes), and point at which they intersect is their origin, at the ordered pair (0,0). The coordinates can be also be defined as the point's position perpendicular projections onto the two axes, Expressed as signed distances from the sources.

One can specify the same principle, by three Cartesian coordinates, Any point location in a three-dimensional space, Its signed distances to three planes perpendicular to each other (or equivalently, its perpendicular projection on three mutually perpendicular lines). In general, n Cartesian coordinates (an element of true n-space) specify the point for any dimension n in an The Euclidean space n-dimensional. These

coordinates are equal to the distances from point to n hyperplanes that are perpendicular to each other

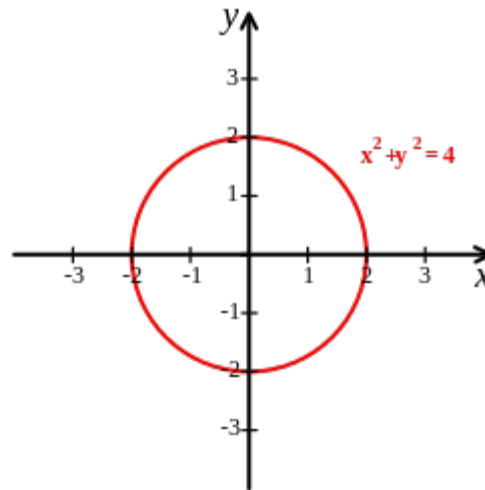


Figure 2.1 Cartesian co-ordination system with radius circle

Cartesian coordinate system centred at the origin marked in red, with a circle of radius 2. A circle equation is $(x - a)^2 + (y - b)^2 = r^2$ where a and b are the central coordinates (a, b) and r is the radius. In the 17th century, René Descartes discovered the Cartesian coordinates (Latinized name: Cartesius)

Two is radius circle, in the middle around of the plane. Cartesian coordinate system is marked with red at the origin, with a circle of radius. A circle equation is $(x - a)^2 + (y - b)^2 = r^2$ where a and b are the coordinates of the centre (a, b) and r is the radius. René Descartes' 17th-century discovery of Cartesian co-ordinates (Latinized name: Cartesius). The Cartesian Coordinates were basis of analytical Geometry and give many other enlightening geometric interpretations mathematical Branches, including linear algebra, differential geometry, multivariate calculus, complex analysis , group theory, etc.