MECHATRONICS BOOK SERIES SYSTEM DESIGN AND SIGNAL PROCESSING

VOLUME 1

Editors
Asan G. A. Muthalif
Amir Akramin Shafie
Siti Fauziah Toha
Iskandar Al-Thani Mahmood

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CHAPTER 24

Conceptual Design of an Intelligent Coconut Dehusking

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24.1 Introduction

The coconut industry is one of the sources of income in many countries especially in developing country like Malaysia. In Malaysia alone, over 109,000 hectares of land are said to be cultivated by [1]-[2]. Coconut is said to be the "tree of life" because of its usefulness in many aspect of life for example, its husk can be used to make broom, its grated flesh can produce milk that can be used to make curry and the dried coconut meat can produce vegetable oil and this oil has been scientifically proving to be good for health because of coconut deshelling machine has two cutting heads and it requires two operators to hold the coconut while deshelling which is not so efficient in terms of labor used, very tedious and time consuming and also unsafe for the operator. Based on these disadvantages of manual deshelling of coconut, an automatic coconut deshelling machine is proposed in this research that will remove the coconut shell and gave the round shape of the kernel. The machine would consist of two sub-systems. The first sub-system is for gripping process which consists of a pair of grippers with two motors. The second sub-system is for the application of torsion load where a rotating base is designed to provide a twisting mechanism to break the shell without damaging the kernel.

A coconut is a simple dry fruit known as a fibrous drupe (not a true nut). The husk (mesocarp) is composed of fibers called coir and there is an inner "stone" (the endocarp) or the shell as shown in Fig. 24.1.

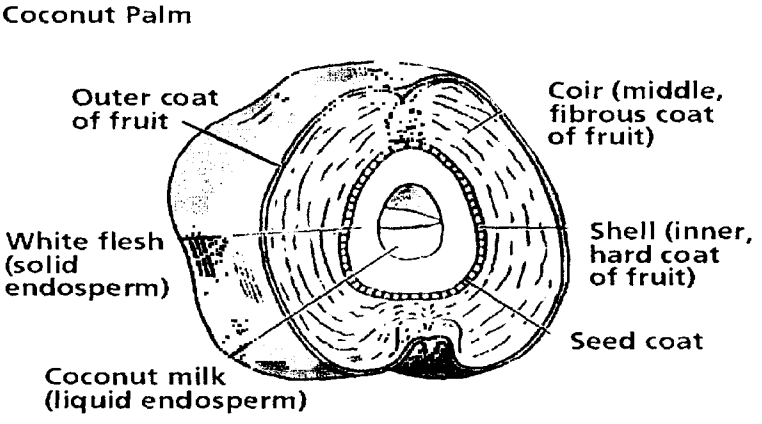

Figure 24.1: Husk and Shell Coconut [3]

This hard endocarp (the outside of the coconut as sold in the shops of non-tropical countries) has three germination pores that are clearly visible on the outside surface once the husk is removed [3]. It is through one of these that the radical emerges when the embryo germinates. Adhering to the inside wall of the endocarp is the tester, with a thick albuminous endosperm (the coconut "meat"), the white and fleshy edible part of the seed. The endosperm surrounds a hollow interior space, filled with air and often a liquid referred to as coconut water, not to be confused with coconut milk. Coconut milk is made by grating the endosperm and mixing it with (warm) water.