MECHATRONICS BOOK SERIES SYSTEM DESIGN AND SIGNAL PROCESSING

VOLUME 1

Editors
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68100 Batu Caves
Selangor Darul Ehsan
Tel: +603-6188 1542 / 44 / 45 Fax: +603-6188 1543
EMAIL: iiumprinting@yahoo.com

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CHAPTER 8

Design and Development of a Sorting Machine using Multiple Sensory System

Md Mozasser Rahman, Siti Fatimah binti Abdul Rahim

Department of Mechatronics Engineering, IIUM, Malaysia

mozasser@iium.edu.my

8.1 Introduction

The design and development of a sorting machine using multiple sensory systems has been described in this chapter. It involves the sorting of metal and non metal, ferrous and non ferrous materials and designed based on application in metal recycling plant to sort metal accordingly. The project consists of several sensory systems such as detection of object, metal verification and metal identification. The uses of several sensors give the flexibility inspection for material properties such as Hall Effect Cam Sensor, Inductive Proximity Sensor and IR Analog Sharp Sensor.

There are many type of sorting machine available in our industry today [1]. For example in agriculture field, we have sweet tamarind sorting machine [2], apple sorting machine and others. While in heavy industry, we have trash sorting machine, metal sorting machine and etc. Even in our banking system, we have machine to sort the coins. Although there are many types of machine, the purpose and usage of that are same which is to simplify the sorting process and reduce work.

Since the metal recycling become more popular in industries nowadays [3], we have planned to design and implement the metal sorting machine which can be used in recycling plant. This machine will sort the material based on its properties which are metallicity and ferrousity before it goes to be recycled. Our intention is to make recycle process to be easier and faster without manually sorting. There are some cases whereas the material to be recycles mixed with unnecessary elements such as wood, plastics, paper and others. It is impossible to sort it manually since we are running the time. In addition, there are also cases whereas materials in recycle bin mixed even there are three big different bins. It is all about human attitude. Therefore, we come with an idea to make life easier.

To achieve the optimization of power consumption, this project intended to use low- power control, Programmable Integrated Controller (PIC) and others. The implementation of this project will help manufacturer to increase their process productivity and accuracy.The integration of electronic, electrical, control and computer engineering with mechanical engineering is increasing forming in a crucial part of design, manufacture and maintenance of a wide range of engineering products and processes. Therefore, this project is combined these all engineering components in order to produce a sorting machine which can improve the efficiency of manufacturing performance. A sorting machine is modeled as a machine that has separate insertion and extraction phases, with operations for performing insertion and extraction, and for switching between phases. This approach to generalizing a single port operation admit any possible implementation of sorting, but also gives the implementer more freedom to distribute the costs among the small- effect operations in ways that are beneficial to clients with different calling patterns.

This project is to design and develop a sorting machine using multiple sensory systems with focusing to be implementing in metal recycling plant. Metal recycling is the process of reusing waste metals to produce new metal items. Aluminum and steel are the most recycled metal in the world and recycling them is easy. Therefore, metal recycling is one of the easiest ways to be environmental friendly. In addition, steel and aluminum do not lose any of their properties when