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Object Sorting On Conveyor Belt by Using MATLAB Software

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ABSTRACT

The goal of this project to developed sorting system, which will play a vital role in small and large industries. The bearing defects are the major problem for improvement of quality of the product. In industry the object sorting is manual and time consuming process. To identify the defect or size of the bearing it is most accurate inspection process by using sorting technique therefore we can improve the quality of that product. In manufacture industry the produced product is put on conveyor for proper distribution in random sequence. In this process, the object image image is capture by using web-cam and it is proceed to MATLAB for image processing technique. This image processing techniques also detect the color, dimensions of the object and appropriate output obtained in this project. The original image of the object is converted into RGB image into binary image by using image acquisition process. Later the output of the processed image compute the defective and non-defective bearing as an output.[1]

Keywords: Computer, webcam, conveyor belt system bearing, interfacing circuit, agriculture and food products.

I. INTRODUCTION

Determine the real time and highly accurate object for industrial sorting process. Normally in industry the object, sorting is done by using manually. In this case the possibility of minor error as well as time consuming process which will effect on production of sorting also for huge system the manpower required will be very high. This sorting system can be used to reduce the human error as well as time and save the money. [2]

Recently the conveyor belt system not only used for production of food plant, bottle plant but also for mining industries and production industries. Therefore it is today's important equipment or system for house material transportation. The computer vision systems have been used in food and agriculture area for the quality inspection. The image processing and image analysis are the core of computer vision system. In this system, the image capture by camera and it is send to the MATLAB software then the object is sorted because of physical and colour as well as dimension of the object. The identifies the object colour and send the signal ATMEGA microcontroller. [3]

The response of that signal produce the appropriate control signal which is send to the interfacing circuit and it is drives the motor therefore conveyor belt is in running action with the sorting mechanism then the finally achieve high accuracy and speed of the work and reduce the time.[4]

II. SYSTEM DESIGN AND METHODOLOGY

The image is core of the computer vision system. Computer vision systems are used increasingly in food industry for quality-checking purpose essentially such a system replaces the human efforts. These technique successfully used in colour separating purpose and quality inspection of the food. Alternatively, computer vision system is a non-destructive method measures the colour and other physical factor of the object. [4]

The application of computer vision system in food industry, the core element is the description of food product in image this is called as image feature that are extracted from food quantities. The food product image captured by computer system and it is stored, processed and display in the form of matrix is called as pixel for image processing purpose. [5]

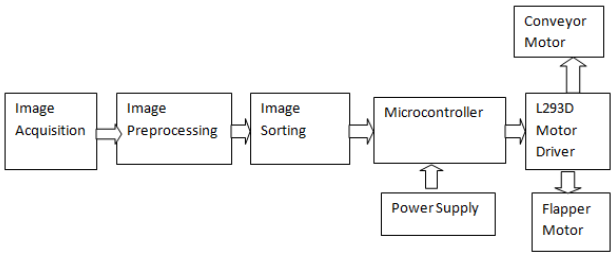

Figure 1. Block Diagram of Sorting System

A. Camera

The camera used in this case will be a overhead camera this camera is known as web-cam. It will be take the snapshot of the object for detection of effect or crack of the object and colour sensing purpose. The captured image is processed by image processing using MATLAB software. [6]

Figure2. Camera

B. Image acquisition

The object put on the conveyor belt and starts the conveyor belt by using motor therefore the conveyor will be in running action. After that, the object image is captured by using camera and this image is then send to the MATLAB workspace. The input image obtained from camera does not send for the processing. Pre-processing is done such asthresholding. In thresholding the original image is converted into the gray format and after that this image is converted into black and white format is known as binary format. This threshold image now read for the processing.[6]

C. Image Processing

The objects are sorted with the help of different parameters like colour, size, weight as well as dimension. If we can use for colour and size wise sorting there are two codes for calculating and identifying size and colour of the object. For calculating object size sum command is used for finding the white pixels present in the frame.[6]

To identifying colour, firstly, the image obtained from web-cam is converted into the grey format and then the thresholding is done. After the thresholding this grey image is converted into the black and white format before the colour component are extracted which is called as binary format.[3]

D. Sorting Mechanism

The output modules consist of stepper motor and conveyor assembly and after identifying colour with the size of the object command will be send to stepper motor through direct parallel port of the computer. The conveyor assembly is ON state therefore according to size and colour the object are determined.[6]

E. MATLAB

MATLAB is high performance language it is numerical computation visualization and programming environment .It is fourth generation modern programming language. It allow matrix calculation ,plotting the data, implementation of algorithm with the program written in different language such as example like C,C++,Java etc. These MATLAB software are widely used in academic as well as industrial enterprises.[4]

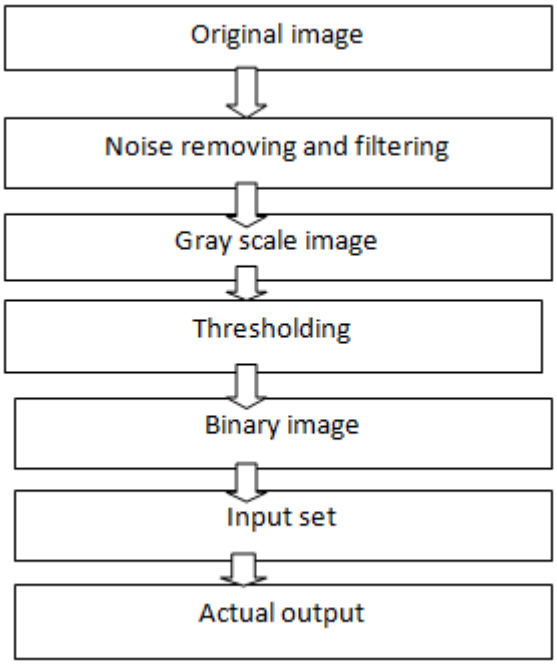

Figure3. Flow chart for Defect Recognizer

III. CONVEYOR BELT ASSEMBLY

It is mechanically movable belt usually made of rubber which is used for transporting the object. The conveyor motor receives power and signals from the central supply through control circuit. The control circuit consisting of microcontroller will allow the user to manually control the speed of conveyor belt by the regulatory knob. A conveyor belt consists of two pulleys, with a continuous loop of material the conveyor belt that rotates about them. One pulley is powered, moving the belt and the material on the belt forward. The power pulley is called the drive pulley while the other pulley is called idler pulley. [6]

Figure 4. Conveyor belt

A. DC Motor

A DC motor is any of a class of electrical machines that converts direct current electrical power into mechanical power. [6] The conveyor belt has one geared DC motor these is use to run the conveyor belt. The DC geared motor has following futures: must be in 12 pt. Times New Roman font.

- 12v DC
- 750 mA max current
- 45 rpm

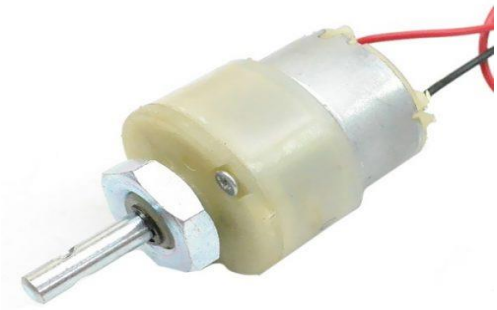

Figure 5. DC motor

IV. ADVANTAGES

- It has high efficiency
- High speed of sorting operation
- High precision, the margin of error reduced to great extent
- High degree of intelligence
- Low Failure rate with long life
- Reliable Operation and maintenance

- Fully automatic operation

V. APPLICATION

The system has many applications in various fields such as import application in agriculture field as well as industrial, domestic and magnetic field. It is also used in store department, small shops and malls. It is used in wine industry to sort the bottle.

VI. FUTURE SCOPE

This system will be a demo version for large scale production the camera, length of conveyor belt system can be modified. The mass production and distribution via conveyor belt is widely consider to be the reason which is responsible for the modern consumer culture leading to low unit cost for manufacture products. The conveyor belt design can be upgraded and delivered at a distance with faster speed. [1] The future of conveyor will be large scale development, expand the scope of used, automatic sorting, reduced energy consumption as well as reduce pollution. [4]

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