Segregation of RFID Tags using Robotic Mechanism

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Abstract— This paper presents an application to segregate basic geometric shapes and various colours in a two-dimensional image using image processing techniques with the help of MATLAB. The basic shapes included are circle and rectangle. We have a camera placed on the top of the mechanical conveyor belt. With the images captured by the camera, the software will perform the algorithms to identify color or shape. The sorting system uses solenoid valve which pushes different coloured objects and sorts them placing in different cups. The area of the minimum bounding rectangle is calculated irrespective of the angle of rotation of the object and ratio of this area to an area of the object is calculated and compared to the predefined ratio to determine the shape of the given object. The dominant color pixels present helps to determine the color of the object. The practical aspects of this include reducing the manual labour in industries used to segregate the products and providing real-time vision fraud. Malware is also detected before the time of downloading.

Key words: MATLAB, Segregation, Conveyor Belt, Color & Shape Detection

I. INTRODUCTION

Sorting of products in an industry is a tedious process which is carried out manually. Continuous manual sorting creates quality consistency issues. Existing sorting method uses a set of inductive, capacitive and optical sensors to differentiate object color. To improve existing sorting system which consists of four integrated stations of identification, processing, selection and sorting with image processing feature. This project presents a automated material handling system with the application of image processing. Image processing procedure senses the real time objects captured by a webcam and then processed in MATLAB.

II. LITERATURE SURVEY

There are many ways for detecting shapes and color of objects which has been introduced previously. The MATLAB functions used in this process are explained in detail in [1]. It tells regarding conversion of RGB image to grey scale image, image cropping and then to black and white (binary) image and much more. Moreover the study of color and shape recognition can be found in [2].This paper gives an approach to identify basic geometric shapes and primary RGB colors in a two dimensional image using image processing techniques with the help of MATLAB The idea of sorting of moving objects on conveyor belt is very well explained in[3]. Shape recognition consists of methods like thresholding, segmentation, bounding box calculation can be referred through [4]. Detailed algorithm and flowchart are referred from [5].This paper gives an idea to count colored objects and sort them using robotic mechanism.

III. METHODOLOGY

The fig.1 shows block diagram of a system. The basic theme of this project is colored RFID tags flowing on conveyor are sensed through IR sensor. The response is then sent to MATLAB to activate the webcam. Then webcam captures the image of the RFID tag. The response is again sent to MATLAB for processing purpose such that it displays the status of the RFID tag i.e. colour or shape. On the basis of colour or shape, corresponding solenoid valve punches the object in its respective pre-programmed place.

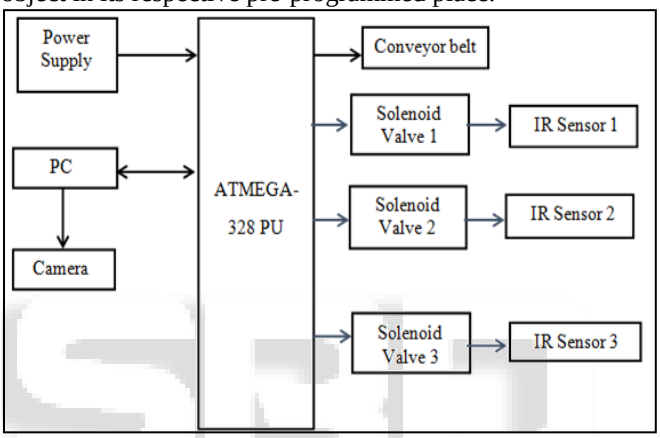

Fig.1: Block Diagram

IV. ALGORITHM

1) Start
2) Initialize the DC motor to rotate the conveyor belt
3) Turn on the camera and acquire the Image
4) Move RFID Tags along conveyor belt
5) Detect the presence of Tags using IR sensors
6) Compare MATLAB processed image pixel value with database image pixel value
7) If matched, send command to respective solenoid
8) Segregate the RFID Tags
9) Count++
10) End

V. FLOWCHART

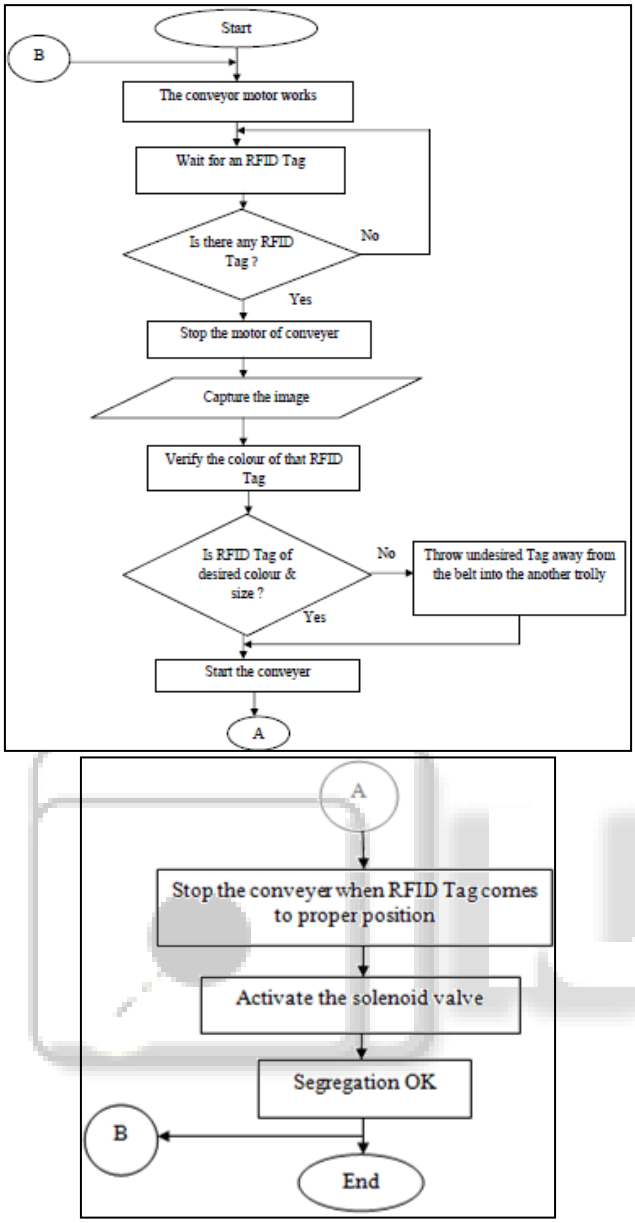

Fig. 2: Flowchart

VI. CONCLUSION

Above system can be used in any field where shape or color recognition comes into picture. eg: Medical science, Wine industries, Food industries, etc. System can be treated as automated material handling system. Has got many future scopes using many other advance methods.

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