A Review of Classification Production using Controlled Conveyor

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Abstract

Classification of products in industry is a tiresome problem, which is carried out manually in general. Quality consistency issues can be created by continuous manual classification. The aim of this paper is to summarize studies that used automatic classification technique and what we will present to control and program of the controller for the conveyor.

Keywords: *Classification, Controller, Image processing, Conveyor.*

I. INTRODUCTION

Automation used for decreasing human efforts using complex algorithms. On the other side using complex algorithms increases the cost of the design and the power consumed but it will reduces the manual effort, time consumed and gives more time to work. By using automation, danger can be prevented when working in hazardous places is required. Classification of products is done in many industries. Conveyor is the basic part of the process. The controller used to control the movement of the belt of the conveyer. Joshua Todd Fluke concentrated on designing and implementing a realistic simulation for an automated method of sorting bags and product coming from distribution side of manufacturing plant located in Atlanta, Georgia, USA. Many types of sensors used such as Pressure switch, Magnetic proximity switch….etc. [1]. Amitesha et al. used Arduino Nano microcontroller to control the Conveyor and belt Depending on the Data came from TCS3200 colour sensor the object placed on the belt is being sorted and located to a specific location and then a robot arm attached to the belt pick the object from that location to another [2]. Alvaro et al., [3] suggest another application for the same concept, the garbage classifier. The system uses for elements to separate inorganic components, webcam vision, robotic arm user interface and conveyor belt. The elements are placed on the conveyer belt that moves them up to where the webcam is. The webcam is in charge of when the belt move and stop. Once the thing directly beneath the camera, the system can analyze the image and verify which type of object it's,

and its form to inform the robotic arm the coordinates for picking it up and placing it in an appropriate container. All this can monitored and controlled from a user interface. S.V. Rautu et al. [4] proposed a system controlled by programmable logic controller to sort the objects depending on the color, weight and Type (metal or nonmetal). Two conveyer belts used, each controlled by separate DC motors. The first belt is for placing the products to be analyzed by the load cell, inductive sensor and colour sensor. The other belt also has a colour sensor for the components separated by the load cell and inductive sensor [5].

II. TECHNIQUE OF THE CLASSIFICATION

Many techniques used for classification objects, depends on the type of sensors used, cameras, colouring sensors, or weight. Each kind used for specific application. ***Dameshwari et al.*** used image analysis for detection of mango fruits, this work challenge the task for computer vision to reach near human ability of recognition. The aim of this work is to develop an automated tool, which can identify the defect and the maturity of mango fruit based on weight, shape and colour features digital image analysis [6]. ***Iman et al.*** identified five rice cultivars by mean of developing an image processing method. 36 colour features in RGB, HSI, HSV spaces were extracted from the images after pre-processing operations. This study proved that the image analysis can used to classify the rice cultivars as a new approach using colour feature extraction of bulk grains images instead of single grain images [7]. ***Mayur et al.*** [8] present a work of classifications of agricultural products and especially grading of seed or cereals and its cultivars using image processing. As shown in Fig (1)
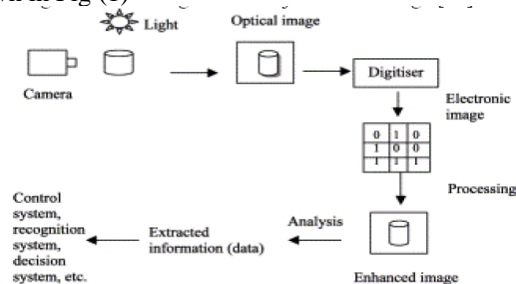

Fig (1)

In this work computer vision and image processing shows that it is effective and peculiar for grading operation for agriculture products. Efficient and accurate algorithms have been produced for grading various products and impurities, but processing speed still fails to reach modern manufacturing and production requirements. Alireza et al. presented a work for classification of wheat cultivars using image processing and artificial neural networks. In this study, classification of 4 Iranian wheat cultivars was follow up using morphological features and artificial neural networks. Combination of image processing was successful in classification of `Gohar` , `Dehsasht` and `Siemareh` wheat cultivars`. The highest classification accuracy was achieved for `Gohar` [9]. Parkash et al. proposed a work to automatically detect and classify plant leaf diseases using image processing techniques, they used three image processing techniques, K-mean clustering, GLCM and BPNN [10]. Swati et al. present a work to select proper fixed size square washer using image processing approach. The entire frame work is based on Arduino and Matlab. An Image of square washer is taken by a camera that placed on the top of a conveyor belt. The image is processed in MATLAB to extract the feature of a washer area. Height, width and the area of hole of a washer is calculated. SVM is implemented for the classification of faulty and non-faulty washers. The classified output is given to an arduino board which will control the rotation of a motor (the motor is connected to the conveyor belt) CW or CCW depending on faulty or non-faulty washer. The status of an LCD was showed on an LCD display [11]
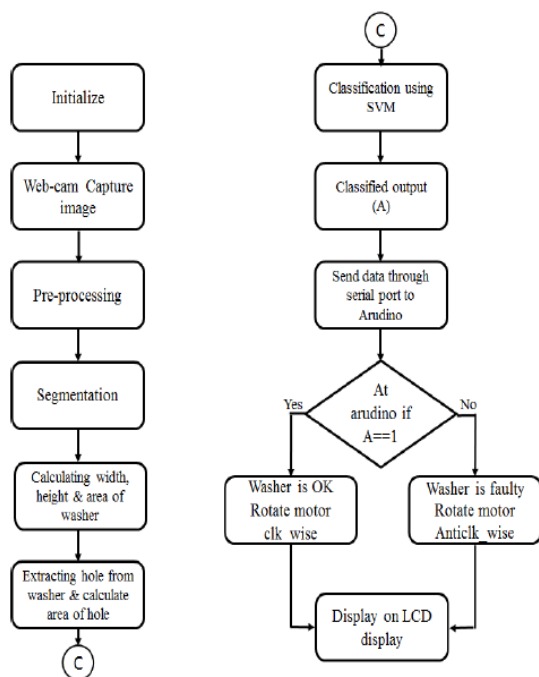
Plant disease classification using image segmentation and SVM technique is a work presented by **Elangovan et al**. for preventing the losses in yield and quantity of the agricultural products. The work discussed various technique to segment the diseased part of the plant, also discussed the classification technique to extract the feature of the infected leaf and the classification of plant disease through SVM classifier [12].

Another research of Fruits quality assessment and classification using image processing is presented by **Khune et al**. this can be used for farmers to describe their products with feature and they can directly communicate with costumers hence, they reduce the time sessions and get more profit instead of using traditional techniques. This technique is used for classify fruits and to find out the quality of fruits [13].

Dharmannagri Vinay Kumar Reddy creates an autonomous robot that can identify objects when placed on a conveyor belt based on a colour sensing and then sort by relocating them to a specific location.
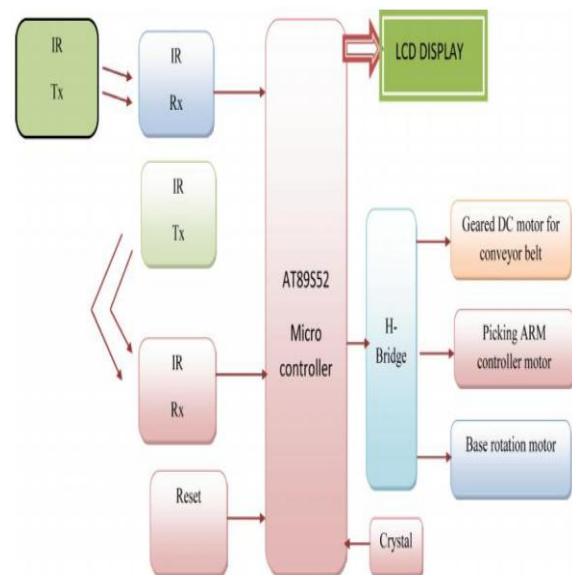

Fig (3) Block Diagram

There are two steps in color sensing parts. Object detection and colour recognition. The sensor is the key component of projects which aids in distinguishing the objects. [14].

Antonio et el. Present a work for classifying tomatoes and lemon using image processing techniques. The proposal of this work is to develop a software that enables the classification system by recognizing fruit shape, volume, and colour and possibly bruise at a unique glance. The software compatible with windows, Linux and Mac\OS. The software allows calculation of Volume, area, averages, border detection, image improvements and morphological operations. In a variety of image archive formats as well as extensions of plugins written in java [15]. **Acy et al.** presented a work of Automatic sorting machine.

Fig (2)

The machine used to sort different type of objects depending on the scanning of the barcode provided on them. The objects or products are put on conveyor system where they are scanned for the particular barcode provided on them, depending on the barcode they are placed on the respective carriers automatically where these carriers dispatched them to the corresponding destinations.
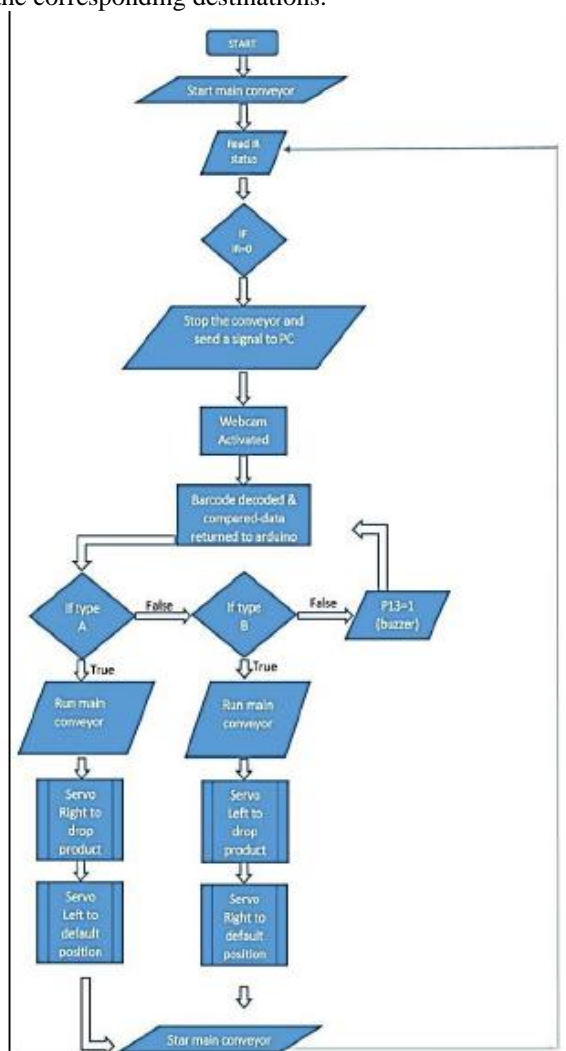

Fig (4) flow chart of the Automatic sorting machine

The products are placed on the main conveyor which moves it forward, once the object cuts the IR sensor the conveyor will stop and the computer will activate the webcam to scan the barcode on the product, after analyzing the barcode, the product will be placed where it is to be drooped is decided[16].

III. CONCLUSION

Classification of products is a very efficient and useful work especially in industries. Since it will reduce the time needed for manual classification. The proposed work for our research is to use image processing to recognize the three basic colors to classify the objects that will be placed on a conveyor controlled by Arduino controller. Two robot arms

that controlled by servo motor at each, will be placed at the end of the conveyor to place the object at its desired location.

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