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RESEARCH ARTICLE

Design and Development of Auto Rejection System by using MATLAB Software

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Abstract— Many industrial applications requires automated rejection system and nowadays traditional rejection systems are less considered or almost removed. So in this paper we represent automated rejection system of any object on the basis of their shape and colour by using MATLAB software. This system uses the concept of image processing. The main aim of this system is to accept the defect free object and reject the defected object. It is used in quality control application to improve the quality of object.

Keywords— Automated Rejection System, Digital Camera, Image Processing, MATLAB

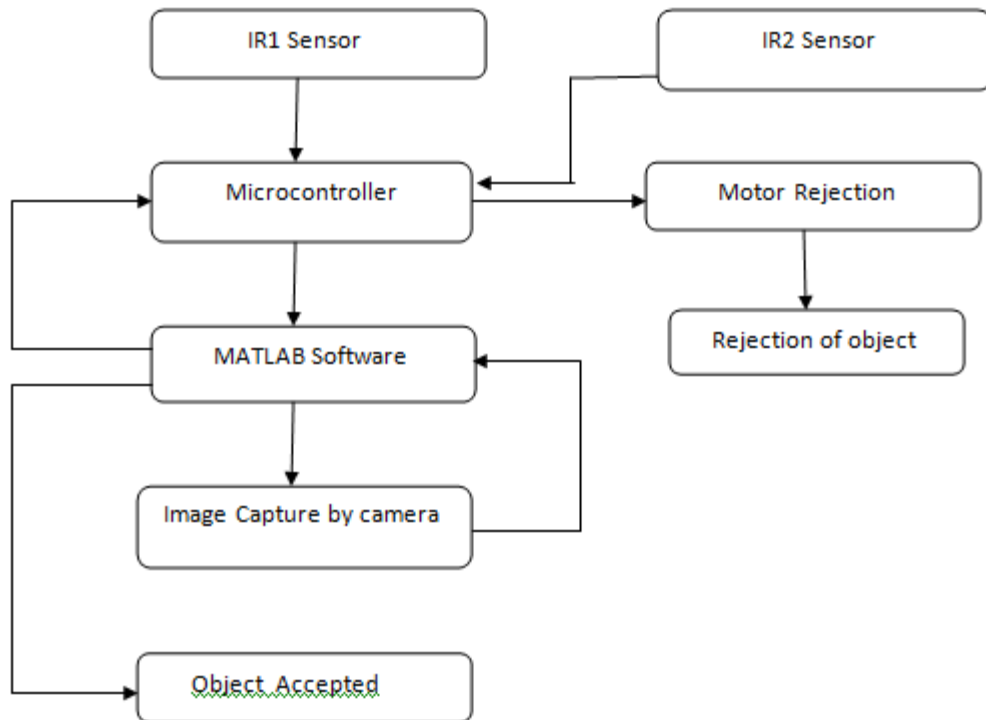
I. INTRODUCTION

Many industrial applications require some automated classification and rejection of items placed on a moving conveyor belt on the basis of their shape and color. A typical process comprises of looking at the items on the conveyor via some type of sensor such as a camera, localizing any single item. In quality control applications, the classification output may be binary as “pass vs. defective”. The rejection vision system adopted in the design is an area scan camera, which works in conjunction with the MATLAB software. The process is controlled via AVR microcontroller, where it controls the image capturing and the defected part rejection mechanism and it detect the two parameter of object like color and shape . Human judgment is influenced by expectations and prior knowledge.

However, it is slow, labourious, costly and inherently unreliable due to its subjective nature. Therefore, traditional visual quality inspection performed by human inspectors has the potential to be replaced by computer vision systems. The increased demands for objectivity, consistency and efficiency have necessitated the introduction of accurate automated inspection systems. These systems employ image processing techniques and can quantitatively characterize shapes and the color of products. Accurate automated inspection and classification can reduce human workloads and labor costs while increasing the throughput. Machine vision has been used to detect the part of efficiency of the systems and take the image of the part which compares it with the standard dimensions given to it through programming language.

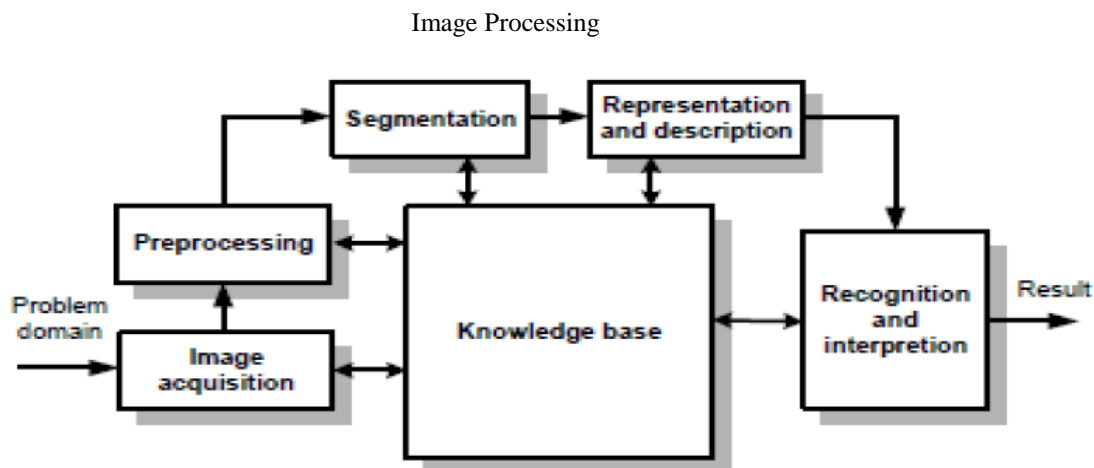
II. SYSTEM DESCRIPTION

Block Diagram:



The system consist of following components :

- Conveyor belt
- 8051 microcontroller
- Digital camera
- IR sensor



Fundamental steps in image processing:

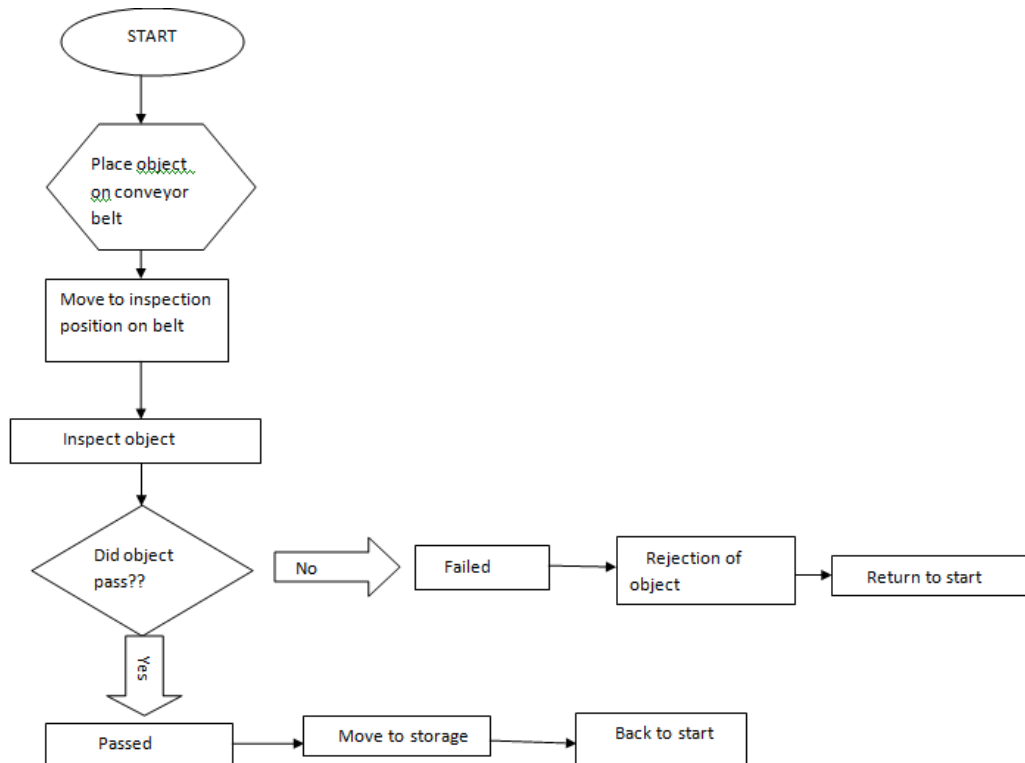
1. Image acquisition: This is the first step of image processing. Digital image is acquired in this step.
2. Image preprocessing: In the second step image is improved in such a way that increase the chances for success of the other processes.
3. Image segmentation: It separates an input image into its constituent parts or objects.
4. Image representation: It converts the input data to a form suitable for computer processing.
5. Image description: In this step features are take out that result in some quantitative information of interest or features that are basic for differentiating one class of objects from another.
6. Image recognition: It assigns a label to an object based on the information provided by its descriptors.
7. Image interpretation: A meaning is assigned to an ensemble of recognized objects in this step

. General code for comparing two images in MATLAB is given below:

```

a = imread('image1.jpg');
b = imread('image2.jpg');
c = corr2(a,b);
if c==1 disp('The images are same')
else disp('the images are not same')
end
  
```

Flow Chart of system:



III. ADVANTAGES

- Flexible as a production change
- Reduce the human effort and increase the speed of system
- Combination of hardware and software it increase system productivity
- Real-time visual processing;
- Minimal special hardware requirements
- New items may be added frequently
- This is advantageous than other papers as this is a portable type of machine which has acceptance and rejection centre placed in a single machine.
- Different types of geometries can be used for image processing.
- This is more advantageous for small scale industries.
- Different types of models or objects can be used as a work piece for testing.

IV. APPLICATIONS

- This approach has been implemented in two applications defective item identification task and a classification task.
- The first development is done for a subcontracting firm producing door parts for auto industry.
- For a remote controller manufacturing line in the TV industry.

- Continuous measurement of cookie and cracker production.
- Food industry.
- Bread and bun inspection.

V. CONCLUSION

In this paper, the proposed design is being developed. This design is advantageous than other papers as this is a portable type of machine which has acceptance and rejection centre placed in a single machine. Different types of geometries can be used for image processing. This design is more advantageous for small scale industries. Different types of models or objects can be used as a workpiece for testing. Here instead of whole incoming camera image detection only interested parameters like shape and color are recognized. Thus the requirement of computational resources for system being flexible and real-time at the same time are reduced. This system has application in quality control.

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