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Computer Vision Based Approach For Sorting Of Fasteners

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Abstract- The main aim of this project is to sort different types of fasteners by using a computer vision system. Sorting of various types of fasteners can be carried out using image processing techniques. Real time images are feeded to a system and image processing is to be done by using OpenCV. This image processing technique is applied for the image uploaded, and appropriate processing is done. By using Watershed Algorithm, it is easy in separating different objects in an image. We can also use webcam focused on the products in the sorter in order to perform image processing. Image processing involves feature extraction and object detection techniques to identify the different types of fasteners. The sorter is fed with this processed information which enables easier segregation and sorting of the fasteners.

Keywords – Watershed Algorithm, OpenCV, Extraction, Object detection, Image processing, Fasteners

I. INTRODUCTION

Fasteners are utilized in the development of a good variety of common things. If you've got completed any final year project, you've got most definitely used fasteners to assist within the completion of the task. The fasteners play a major role in each component we are using in our day to day life; we're addicted to the role that high-quality fasteners will play within the lives of each owner and professionals.

A fastener, usually referred to as a fastening, could be a piece of hardware that automatically connects or affixes two or a lot of things. Fasteners square measure normally utilized to construct non-permanent junctions, which may be removed or destroyed while not inflicting damages to the connected parts.

II. OBJECT DETECTION

Object Detection is the method of finding and recognizing real-world object instances like automotive, bike, TV, flowers, and humans out of an pictures or videos. Object detection technique enables you to perceive the small print of a picture or a video because it permits for the popularity, localization, and detection of multiple objects inside a picture. It is sometimes utilized in applications like image retrieval, security, police investigation, and advanced driver
assistance systems (ADAS).

Object Detection is done through many ways:

- Feature Based Object Detection
- Viola Jones Object Detection
- SVM Classifications with HOG Features
- Deep Learning Object Detection

Object detection from video is an important task in video surveillance applications these days. The object detection approach is used to find and cluster pixels of needed objects in video sequences. The detection of an item in a video sequence is critical in a variety of applications, including video surveillance. Pre-processing, segmentation, foreground and background extraction, and feature extraction can all be used to find objects in a video stream. Humans are quite good at detecting and recognizing objects in digital images. The human visual system is quick and accurate, and it can handle complex tasks like detecting many objects with little effort.

III. Proposed Algorithm

3.1. FLOW CHART:

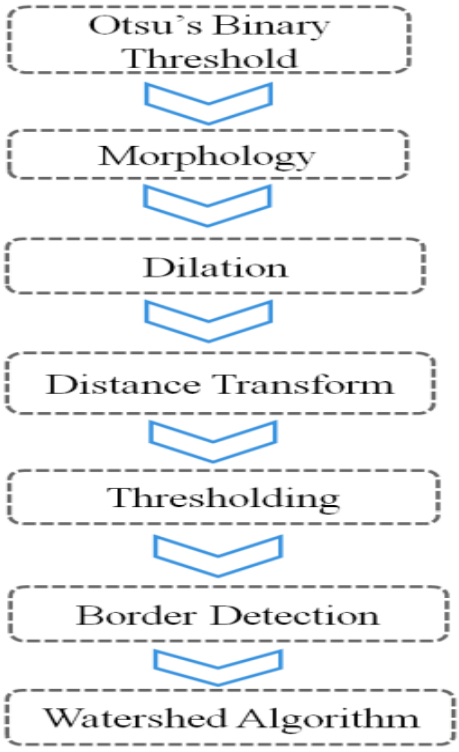

Figure 1. Flow chart

3.2 .Otsu' s Binary Threshold:

Otsu's approach, named after Nobuyuki Otsu, is used to do automatic image thresholding in computer vision and image processing. In its most basic version, the technique returns a single intensity threshold that splits pixels into two classes: foreground and background.

3.3. Morphology

Morphology refers to a group of image processing methods that work with images depending on their forms. The value of each pixel in the output image is determined by comparing the matching pixel in the input image with its neighbors in a morphological operation.

3.4. Dilation

The Morphological procedure of dilation is used to enhance the features of an image. A dilated image and a two-dimensional structuring element are required as inputs for dilation as a function. Dilation can be used for a variety of purposes, but it is most typically employed to emphasis aspects in an image that might otherwise be overlooked.

3.5. Distance Transform

A distance transformation turns a binary digital image with feature and non-feature pixels into an image with all non-feature pixels having the same value as the distance to the nearest feature pixel. 5.1.5 Thresholding Thresholding is a common segmentation technique for distinguishing an object from its surroundings. Thresholding is the process of comparing each pixel value in a picture (pixel intensity) to a predetermined threshold.

This divides all the pixels of the input image into 2 groups:

- Pixels having intensity values lower than the threshold. 28
- Pixels having intensity values greater than the threshold.

3.6. Border Detection

The process of recognizing and localizing prominent borders between items in a scene is known as boundary detection. Edge detection and boundary detection are similar, but not identical. Edge detection is a typical computer vision task that seeks out brightness discontinuities. Edge detection is commonly thought of as a low-level feature extraction procedure that operates under the assumption of optimal edge models (such as step and ridge edges). Boundary detection, on the other hand, is typically seen as a mid-level method for determining the boundaries of (and between) objects in scenes, with close linkages to both grouping/segmentation and object form.

3.7. Watershed Algorithm

The watershed is a classical algorithm used for segmentation, that is, for separating different objects in an image. Starting from user-defined markers, the watershed algorithm treats pixels values as a local topography (elevation). The algorithm floods basins from the markers until basins attributed to different markers meet on watershed lines. In many cases, markers are chosen as local minima of the image, from which basins are flooded.

IV. Experiment and Result

The test set for this evaluation experiment watermark image randomly selected from the internet. Matlab 7.0 software platform is use to perform the experiment. The PC for experiment is equipped with an Intel P4 2.4GHz Personal laptop and 2GB memory. The proposed scheme is tested using ordinarily image processing. From the simulation of the experiment results, we can draw to the conclusion that this method is robust to many kinds of watermark images.

Figure 2. Input Image

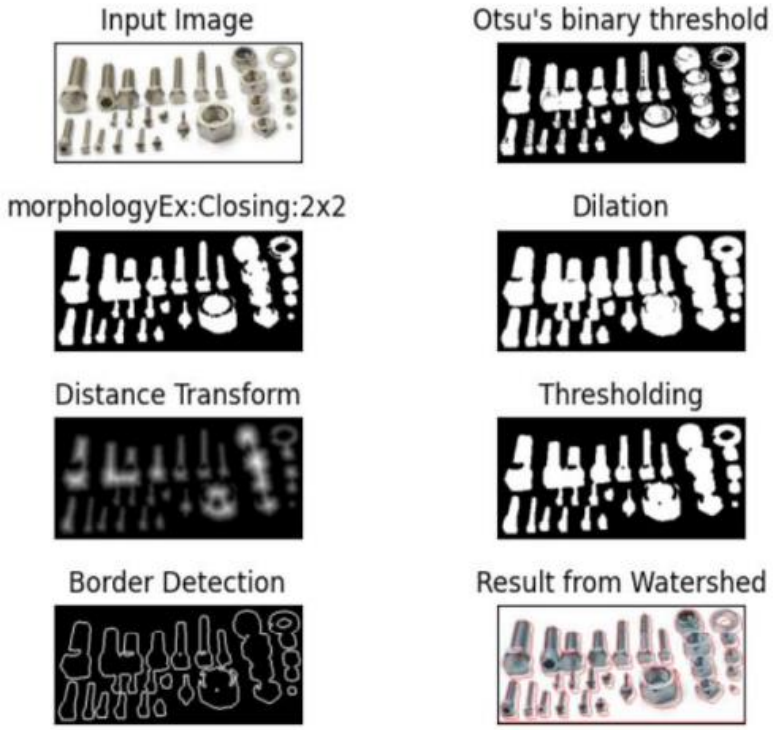

Figure 3. Output Image

Figure 4. Input Image

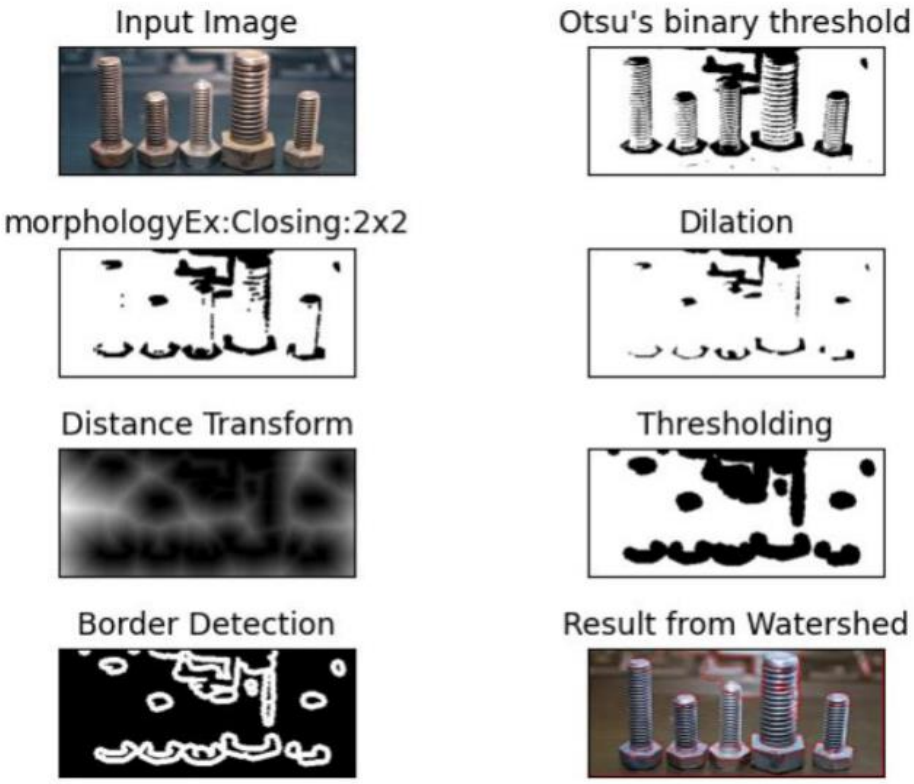

Figure 5.Output Image

V.CONCLUSION

Sorting fasteners using image processing techniques are used to classify different size fasteners based on a variety of characteristics. So, manual sorting may be a time and energy intensive process. It has been reported to be a complex and global problem. Hence in this project computer vision based approach for sorting of fasteners was developed to sort different types of fasteners just by implementing image processing techniques.

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