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Detection of Defect in Pharma -Tablets Using Image Processing

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Abstract: **Now a day, people are affected by many diseases. There are certain diseases which cannot be cured without medicine. The production of medicine has increased a lot in recent days. During production there may be damages like breakage, cracks etc. present in the tablets or capsules. Most of the tablets are not advisable to be consumed in broken form. Manual inspection is a very challenging task. Image processing plays a major role in automation of visual inspection. Therefore we propose some ideas to identify the damaged tablets after production. This is a series of process involving image enhancement, thresholding, segmentation, Filtration, pixel calculation, subtraction, de-noising and region based statistic to identify the broken tablets.**

Keywords: **Tablets, Blister, gray image, Image processing.**

I. INTRODUCTION

Image Processing involves techniques and algorithms for processing the digital images. Image processing provides greater contribution to science and technology as the digital images have a greater impact on modern society. Image processing includes many techniques like pattern recognition, feature extraction, template matching and edge detection to process digital images. They help in faster manipulation of digital images. Manual inspection is automated using image processing techniques. Automation of Visual inspection is very important in manufacturing industry for quality assurance of products. In pharmaceutical industry, drugs have to be inspected for defects and anomalies. Drugs with defects are not advisable to be consumed. There may be side effects in consumption of broken drugs. The foil may contain broken tablets or missing capsules. The inspection process has to be effective to detect the foils with defects. The proposed technique detects the foils with broken tablets and to detect the blister of capsules.

II. PROCESS

A morphological operation is used to detect the defects. Image segmentation is done and the input image is filtered to remove the noises thereby making the input image fit for further processing. The image is subtracted by inscribing rectangles with morphological operation. Then the image is subtracted from the original gray image which identifies the broken tablets. Pseudo colouring is done and the pixel of the broken tablet is calculated. The input image undergoes pre-processing. Objects are extracted based on the region based properties. Corners are detected and it is compared with the stored image. If the feature points match in the stored image and the test image capsule is accepted otherwise rejected.

III. SYSTEM ARCHITECTURE

The image is captured by camera and given as input to the system. For tablet, the gray scale image of the input is obtained. Gray Scale image is the conversion of the colour image to monochromatic shades of black to white. The gray scale is enhanced for further processing. Edge detection in digital image marks the regions where the brightness changes sharply. Image enhancement involves removal of noise from the image using thresholding. Conversion of gray scale to binary image is called thresholding. Then the image is filtered using the low pass filter operator called Canny Edge

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detector. Canny edge detection operator is used to obtain each tablets boundary in a blister. Since the image is more noised further dilation is done to completely filter the image. A template image is saved in the system. The template image is the image without defects. The template image undergoes all the process similar to the test image. Then the test image is compared to the template image. The pixels are calculated for the template image and the input image. The pixels are compared, if the template image pixel is greater than the input image pixel then the there is a defect in the blister. The user is provided with the output console with the alert message and the number of pixels.

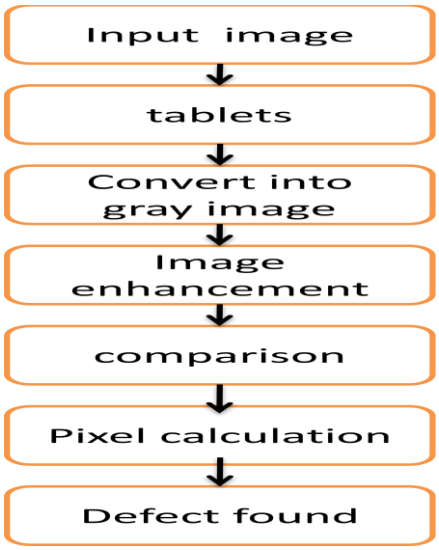

Fig.1: Architecture of the Proposed System.

A. Algorithm for Identifying Defects in Tablets:

Step 1: capture the image of tablet strip as input image.
Step 2: Display the input image.
Step 3: Convert the input image into gray image.
Step 4: Display the converted gray image (Fig 3).
Step 5: Threshold the gray image.
Step 6: Display the threshold image.
Step 7: Filter the image to remove the noises.
Step 8: Display the filtered image.
Step 9: Dilate the filtered image.
Step 10: Display the dilated image.
Step11: The image of the tablet strip without any damage is taken as a template image. The template image undergoes all the pre-processing steps similar to the input image. (As a stored image)
Step 12: Display the template image.
Step 13: Compare the input image and the stored image.
Step 14: Display the compared images.
Step 15: Calculate the number of pixels damaged by comparison with the template image.
Step 16: Display the number of damaged pixels.

Fig.2: input image

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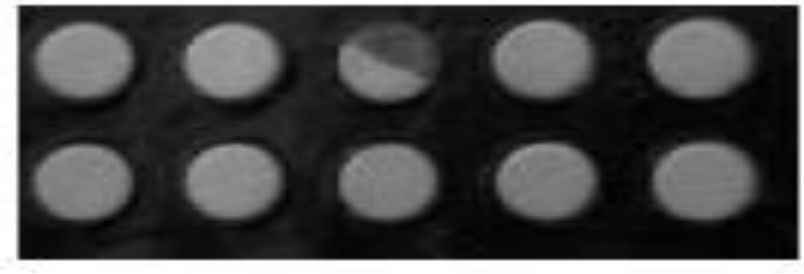

Fig.3: Gray scale Image

Greyscale digital image is an image in which the value of each pixel is a single sample, that is, it carries only intensity information. Images of this sort, also known as black-and-white, are composed exclusively of shades of gray, varying from black at the weakest intensity to white at the strongest

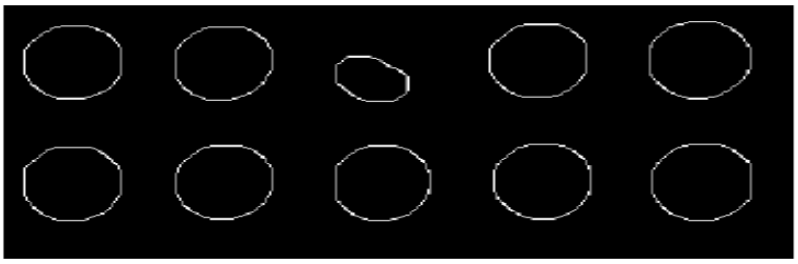

Fig.4: Canny Edge Detection

Canny Edge Detection, The purpose of edge detection in general is to significantly reduce the amount of data in an image, while preserving the structural properties to be used for further image processing.

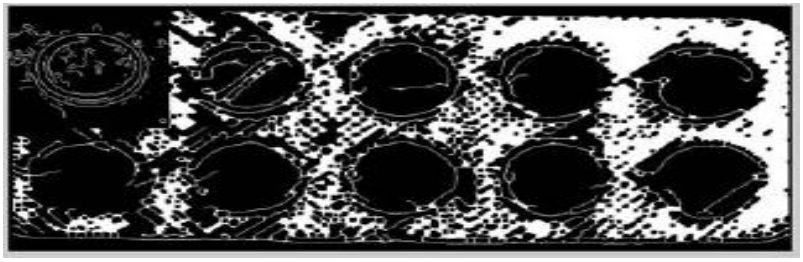

Fig 5: Template matching

Template matching is a technique in digital image processing for finding small parts of an image which match a template image. It can be used in manufacturing as a part of quality control, a way to navigate a mobile robot, or as a way to detect edges in images.

IV. RESULTS

The implemented algorithm was experimented with different types of sample of capsules and tablets. One of the tablet sample (Fig 2) undergoes the steps to find whether there is any defect in the blister. In the process, the input image is converted into gray scale image (Fig 3). The industrial and other noises are filtered from the gray scale image which makes the image fit for further processing. Canny edge detection (Fig 4) operator is used for edge detection to filter the tablets from its background. The template image is stored in the system based on the type of input blisters. The template image undergoes all the pre-processing steps similar to the test image. The template image is of single tablet which is compared to each tablet in the blister. If the shape varies then the package is identified as defective tablet.

V. CONCLUSION

The algorithm proposed in this paper identifies the broken and missing tablets in a blister. This helps in the automation of detection of anomalies using image processing techniques. Image processing involves many techniques to automate the manual inspection process.

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