A THEORETICAL APPROACH FOR QUALITATIVE ANALYSIS OF CRAYON PACKETS USING IMAGE PROCESSING TECHNIQUES

Roshan Suvaris[1], S Sathyanarayana[2] and Chitra Londhe[3]

Abstract-   Packaging makes a great role in protecting the products or materials. It is the important process where a time comes to identify the material inside the packet as well as quality of the product inside the packet. One of the image processing technique is used here to detect the fault in the crayons that is broken crayons, cracks or damaged crayon in the packet that is quality of the crayons are checked. Here we take the image of the crayons packet using camera and those are checked to check the defects. Image processing is being used to find the defects in the crayons. Image processing algorithms like pattern recognition and edge detection are used in order to get the qualified images. In this paper we have proposed a model using sobel edge detection to find the defects in the crayons.

Keywords - Image processing, Edge detection.

I.INTRODUCTION

A Crayons is a stick of colored wax, charcoal, chalk or other material used for writing and drawing. These are used in order to increase the knowledge of the children. So there is a usage of crayons and color pencils. Now a days more and more people purchase the crayons for their children and production of crayons are also increased just because of more sale. While purchasing the product the user see the quality of the product that is whether crayons arebroken etc. so when packing is done we see missing of two or more crayons or sometimes some crayons may be broken, that is cracks may be there in crayons. If there is any broken crayons are present in the packet it may ruin the brands image. Industrial processes often use humans to check the quality. It is a time consuming process because the crayons are produced in large quantity. These technique are often less accurate and decrease the time of production. Several researches have been working in the field of qualitative fault analysis using several improving technologies or developed algorithms such as:[1] Finding number of missing crayons in a crayon packet. When it runs on theconveyer belt, a camera is used to capture images of crayons packets and the captured images are processed using lab view platform. Image processing algorithms like edge detection,pattern recognition and center of mass is used to compute the quantified data of the image acquired and then neural network

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[1] *Aloysius Institute of Management and Information Technology (AIMIT) St Aloysius College (Autonomous) Mangalore, Karnataka, India*
[2] *First Grade Women's College Mysore, Karnataka.*
[3] *Aloysius Institute of Management and Information Technology (AIMIT) St Aloysius College (Autonomous) Mangalore, Karnataka, India*

algorithms are applied to find the faulty packets. One can find the cracks in paintings using edge detection method.[2]The algorithm is composed of two parts, first part is image processing and the second part is image classification.In the first part cracks are distinguished from background images using filtering,subtraction and morphological methods and in the second step the existence of cracks are identified.[3]Glasses are used in many materials. If the quality of the glass is poor then it will effects the manufacturing industry.Inspecting large glasses manually is a tedious task and it is time consuming. So automation and inspection using image processing is done to check the defects in the glass, so in this different glass defects and the possible automated solutions are received.[4]Crack detection is also important in infrastructure.Automatic crack detection with classification methods are used for subway tunnel safety monitoring.With the help of complementary metal oxide semiconductor industrial cameras,the images of the tunnel surfaces are captured and stored.Segmentation is applied to take the cracked parts from the captured grayscale images.Then histogram land shape descriptor is applied which describes the spatial shape difference between cracks and other objects.[5]Ancient paintings are cultural heritage for a country,so it should be preserved. Cracking is the most common deteriorations found in old painting that should be restored.This paper presents different approaches applied for restoration of old paintings.[6]Quality control in the field of ceramic tile manufacturing is hard and intensive labor work.So image processing and morphological techniques are used to find the surface defects.Image processing and morphological operation techniques are applied before the packing operation to improve the homogeneity of batches received by final users.

II.PROBLEM STATEMENT

A set of crayons is beingmanufactured and packed .The random packets are considered for clustering which may contain different quantity as well as colors. While manufacturingcrayons may be damaged or broken. This is not found by the manufacturers as well the customers. When it reaches to the customer as they don't have any idea about the product, this will create a bad impression about the company or manufacturers and this may lead a bad name for the company and it may lose the customers. The products are manufactured and once the crayons are inserted into the particular slot it should be checked for the quality and this is done while packing the crayons automatically.Some crayons may be broken or crayons may contain cracks in them.Here we should check whether the crayons are broken or crashed by the proper techniques using image processing algorithms.This paper mainly focuses on the detection of the broken crayons.

The objectives of the proposed algorithm are-

i.   Capture the image for the crayon packet that doesn't have any damaged crayon.
ii.   Generate the grey scale image and then generate the edgy image for the same.
iii.   Capture the image of the crayons packet in the production line.
iv.   Apply the image processing technique such as edge detection algorithms to generate the image.
v.   Subtract the new edgy image with the original image (image with edges but no cracks).
vi.   If the cracks are found in the new image, find the cracked crayons and location of the crayon.
vii.   Remove the packet from the production line.
viii. Repeat the steps three to seven for other packets on the production line.

III.THEORITICAL APPROACH

Crayon packets should be packed with proper crayons which are not broken or with cracks. If the contains damaged crayons then it will give a bad impression to the customers. Fig 1 represents a proper crayon packet without any defects and Fig 2 represents a packet which contains broken crayon it should be detected.

Figure 1: crayon packet

Figure 2: Packet with broken crayon

A crayon packets are consider for testing and crayons are checked for defects. Any defects are found thenthat crayon is being replaced with the new one. In this, first image of the non-defected crayon packet has to be taken, once the image is generated it should be converted to grey scale. Once the grey scale image has been generated edge detection algorithm such as sobel or perwitt or horizontal and vertical algorithms should be applied to generate the edgy image for the non-defected crayon packet, which is the original packet which is used for the comparison with other edgy crayon packet images. The result image contains only the side edges of the crayons and there is no broken or crashed crayons and hence generates the original image.

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Data Set (a)

In the next step, image of the crayon packet which has to be checked are taken and it is converted to grey scale image and using any edge detection algorithm such as sobel or perwitt edgy image is generated. Once the image is generated the technique called smoothing is applied to smooth the image. Smoothing is based on a single value representing the image such as the average value of the image or the median value.

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Data Set (b)

The newly generated edgy image and original image are taken for consideration and subtraction operation is being performed on these images. The subtraction of image will generate the cracks and is highlighted in the resulting images. If the result images has no defects then it will generate the normal image that is without any edges. So using these technique on can easily find out the cracks or broken crayons in the packet and the packet itself rejected or one can replace the cracked or broken crayon with the new undamaged crayon.

Data Set (a) – Data Set (b) =Resultant Data Set

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Resultant Data Set

IV.CONCLUSION AND FUTURE ENHANCEMENT

The objective of the proposed work is to design a non-contact technique for clustering to check whether any crayon is being damaged or not before it is packed fully. If anyone crayon is being damaged also, itcan be detected using this technique and the packet is being rejected or the damaged crayons can be replaced. Using this technique one can easily identify the damages of cracks in the crayons and makes the work easier as it could be needed in processing line to check the defects and can speed up the process. It is just a theoretical approach, implementation is a future enhancement. It can be implemented using MATLAB.

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