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Smokestack Fabric Defects Detection

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ABSTRACT- Quality inspection is an important aspect of modern industrial manufacturing. In textile industry Production, automate fabric inspection is important for maintain the fabric quality. For a long time the fabric defects inspection process is still carried out with human visual inspection, and thus, insufficient and costly. Therefore, Smokestack fabric defect inspection is required to reduce the cost and time waste caused by defects. The development of fully automated web inspection system requires robust and efficient fabric defect detection algorithms. The detection of local fabric defects is one of the most intriguing problems in computer vision. Texture analysis plays an important role in the automated visual inspection of texture images to detect their defects. Various approaches for fabric defect detection have been proposed in past and the purpose of this paper is to categorize and describe these algorithms.

Index Terms: Fabric Defect, Defect Classification,MATLAB,smokestack

I. Introduction

The textile industry, as with any industry today, is very concerned with quality. It is desirable to produce the highest quality goods in the shortest amount of time possible. Fabric faults or defects are responsible for nearly 85% of the defects found by the garment industry[6]. Manufacturers recover only 45 to 65 % of their profits from seconds or off-quality goods. In this paper a fabric faulty part is taken for analysis from textiles. It is imperative, therefore, to detect, to identify, and to prevent these defects from reoccurring. There is

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a growing realization and need for an automated woven fabric inspection system in the textile industry. All faults present on fabrics such as hole, scratch, dirt spot, fly, crack point, color bleeding etc. In this paper we analyze the faults using image processing technique. Hence the efficiency is also reduced in this process. Image processing techniques will help to production increase in fabric industry; it will also increase the quality of product. They have to detect small detail that can be located in wide area that is moving through their visual field. For this process we have use MATLAB 7.10 in imageprocessing toolbox. The high cost, along with other disadvantages of human visual inspectionhas led to the development of on-line machine vision systems that are capable of performing inspection tasks automaticallyFabric defectsIt is imperative to detect, to identify and to prevent these defects from reoccurring. There are many kinds of fabric defects[11]. Much of them are caused by machine malfunctions and havethe orientation along pick direction (broken pick yarns or missing pick yarns), they tend to be long and narrow. Other defects are caused by faulty yarns or machine spoils. Recently, the fault detection is done manually after a sufficient amount of fabric has been produced, removed from the production machine and then batched into larger rolls and then sent to the inspection frame.An optimal solution for this would be to automatically inspect from the fabric as it is being produced and to alert the maintenance personnel when the machine needs attention to preventproduction of defects or to change process parameters [12].This is done by identifying the faults in fabric using the image processing techniques and then based on the dimension of the faults; the fabric is classified and accordingly then graded. Some of the commonly occurring fabric defects are:

Fig.1 Yarn Defects & Weaving Defects

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The digital analysis of two-dimensional images of fabric is based on processing the image acquirement, with the use of a computer. The image is described by a two-dimensional matrix of real or imaginary numbers presented by a definite number of bytes. The system of digital image processing may be presented schematically as shown in Figure below. The method used in this paper is processed using MATLAB with image processing toolbox. The toolbox supports a wide range of image processing operations, including: open image file, add noise to intensity image, 2-D median filtering and adaptive filtering, Image analysis and enhancement, Color Image decomposition into RGB Channels, Image histogram, Image segmentation, signal plotting and etc. The given Algorithm shows the general flow of the Various Modules of Mat lab Software: Capture Image Textile fabric surface image is acquired by using a CCD camera from top of the surface from a distance adjusted so as to get the best possible view of the surface[11]. The image formats are .gif, .Jpeg, and.png. In this paper we used color images (RGB images) and separated into their components (Red, Green, and Blue). Gray Image Conversion RGB color image is converted into gray image .A grayscale image usually requires that each pixel be stored as a value between 0 - 255(Byte), where the value represents the shade of gray of the pixel. The number of gray levels is an integer power of 2(L=2k).

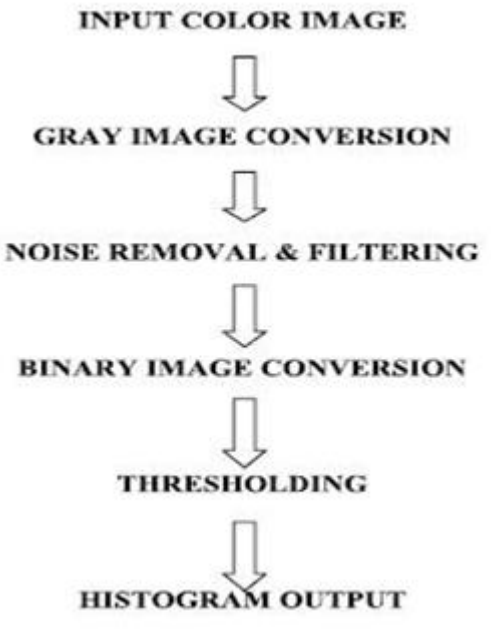

Fig.2. The System of Digital Image Processing

Noise Removal & Filtering

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Whenever an image is converted from one form to another many types of noise can be present in the image. Here we use the Adaptive filtering to reduce stationary noise. It filters an intensity image that has been degraded by constant power additive noise. It uses pixel wise adaptive wiener method based on statistics estimated from a local neighborhood of each pixel.

Thresholding

Thresholding is a process of converting a gray scale input image to a bi-level image by using an optimal threshold. The purpose of thresholding is to extract those pixels from some image which represent an object (such as graphs, maps). Though the information is binary the pixels represent a range of intensities. Here adaptive thresholding is used. In adaptive thresholding, different threshold values for different local areas are used to represents the objects.

Histogram Equalization

Histogram is a representation of the distribution of coloring an image and it represents the number of pixels that have colors in each of a fixed list of color ranges. Histogram equalization is a method for stretching the contrast by uniformly distribution the gray values enhances the quality of an image useful when the mage is intended for viewing.

V. Results

Following test image of a detected image has been used for defect identification. The image has been exposed to histogram equalization algorithm for thresholding. The thresholding image is brought under noise removal program, where the uneven weaving is detected as spots shown in fig.3.

VI. Conclusion

The Fabric Defect detection and location identification in the normal fabrics defines the faults by this method[11]. This method classifies 85% of defect in fabric and locates the defect in the normal fabric at an acceptable rate and provides 80% classification accuracy. In the binary output image local defects appear segmented from the background. One of the most important advantages of the method is that it is multipurpose without requiring any adjustment. The versatility of the method has

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been demonstrated not only by its applicability to different regular textures but also, for a given texture, the method allows to detect a variety of defects.

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