

Fabric Fault Detection Using Digital Image Processing

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Abstract: This paper helps to detect the fault in fabric. For the good quality of fabric the inspection of fabric is very important .The faults in fabric causes poor quality in fabric. This may affects the economical growth of the Industry. The old methods which are used for fault detection such as Human Visual Inspection, Regular Band based Methodology, Gabor Wavelet Filter Methodology etc which are time consuming &stressful. So to reduce time and stress the new method introduced is Automatic Fabric fault inspection .Due to this method, at the time of manufacturing itself we get high quality fabric it implies the high speed of production.The detection of local fabric defects is one of the most problems in computer vision.For this problem the solution is that at the time of manufacturing fabric in textile the faults present on fabric are identified by MATLAB software using some Image Processing techniques. Image Processing is very helpful because all the techniques applied on the faulty image is useful to acquire fault free image.

Keywords: *Patterned fabric inspection, Quality control, Image processing, MATLAB R2010a, Gray image, Histogram technique, binary image conversion, Feature Extraction, edge detection*

I. INTRODUCTION:

In textile industry, fabric defect detection plays an important role in the quality control. Defect detection or inspection is a process identifying and locating defects. A fabric defect is a result of the manufacturing process. The textile industry is very concerned with quality. It is desirable to produce the highest quality goods in the shortest period of time possible. Quality inspection is an important aspect of industrial manufacturing. The quality of the fabric can be improved by decreasing defects in the fabric. Fabric Defects Fabric texture refers to the feel of the fabric. It is rough, velvety, smooth, soft, silky, lustrous, etc. The different textures of the fabric depend upon the types of weaves used. Textures are given to all types of fabrics, cotton, silk, wool, leather, and also to linen. Textile Fabric materials are used to prepare different categories and types of Fabric products in the textile industry. Natural fabric and synthetic fabric are the two different classifications of textile fabric. Synthetic fabrics are fairly new and have evolved with the continuous growth in textile industry.

In a fabric faults can occur due to: machine faults, hole, color bleeding, yarn problems, scratch, poor finishing, dirt spot, excessive stretching, crack point.



Image.1 Float

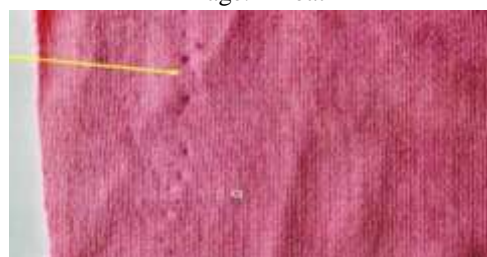


Image.2 Pin marks



Image.3Stain



Image.4 Slub



Image.5 Ladder



Image.6 Hole

II. METHODOLOGY:

Image preprocessing plays the important role in it. The input image provided to the system will be the real time image and will be compared with the database available with the system.

The steps involved in this process are as follows:-

1. Image capturing
2. RGB to Gray conversion
3. Histogram & Histogram Equalization
5. Binary Conversion
6. Edge Detection
7. Feature Extraction

III. IMAGE ACQUISITION:

In this process the camera is used to take the picture from the area of interest. The acquired image is saved then and is helpful for the further process. The acquired image is then proposed to the MATLAB software in which the image is stored for the further processing.

IV. IMAGE PREPROCESSING:

The image preprocessing deals with the image processing operations such as gray conversion, histogram,

histogram equalization, binary conversion, feature extraction-edge & boundary feature etc.

V. PARAMETERS:

5.1 BASIC IMAGE PROCESSING OPERATIONS:

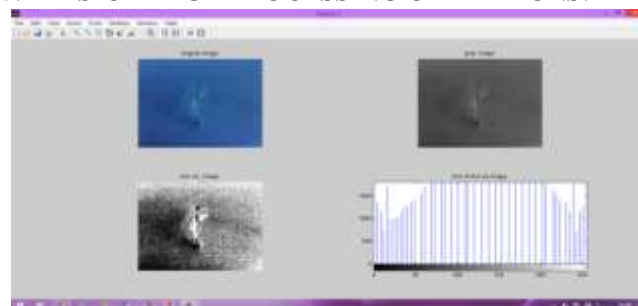


Fig1. Output of basic image processing operations

5.2. SIZE:

To detect the edge of the fabric we can use edge detection techniques such as

- i) Sobel
- ii) Canny
- iii) Prewitt

From these techniques we use canny edge detection, since it provides an edge detection operator that uses a multi-stage algorithm to detect a wide range of edges in images.

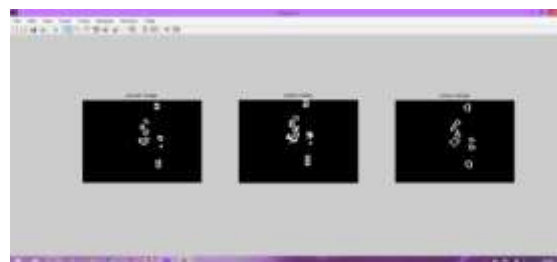


Fig2. Output of edge detection techniques

VI. ALGORITHM:

This above fig. represents the block diagram of the system in which the work of system can be easily understood. Here we applied various MATLAB operations on image which is stored in database, after performing the preprocessing the detected image gives to a controlling system.

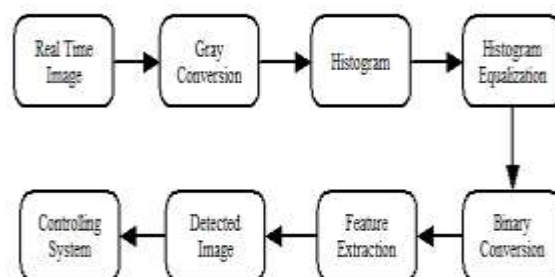


Fig 3: Block Diagram of system

VII. ADVANTAGES:

- By applying this process it is easy to identify faults on fabric image.
- Gives high accuracy compared to old methods.
- This process is less time consuming.
- It also reduces the manpower.

VIII. LIMITATIONS:

- It needs skill workers to observations.
- Fault can be occur in software.
- This project cannot be implemented in general; it can be only implementing in industries.
- If power cut occurs the time for system restart is more because of this the fault detection cannot be possible.

IX. FUTURE SCOPE:

- In textile industry we can detect the fault in real image & can be remove the fault by using advanced control system.
- In textile industry fault can be detected through wireless in consent people.
- In this paper we use MATLAB software but in future can be used new software like SCILAB, Virtual LAB & Computer Vision.

X. CONCLUSION:

It is easy to identify faults on fabric images & process by using this method. The manual textile quality control usually goes over the human eye inspection. Human visual inspection is tedious, tiring & fatiguing task, involving observation, attention & experience to detect correctly the fault occurrence. This system is capable of detecting fabrics defects with more accuracy & efficiency.

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