

COTTON CONTAMINANTS AUTOMATIC IDENTIFICATION TECHNIQUES

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Abstract :- To maintain the quality of cotton fibers has become very important and challenging aspect in modern industrial manufacturing. Cotton contaminants present in the fabric not only deteriorate the quality and appearance of fabric or garment but can also lead to total rejection of the entire consignment. Most of the textile industry is in need of automatic cotton contaminants detection to increase productivity. This paper proposed the various automated system based on image processing that can be used for detecting contaminants in cotton fibers where comparison of different color spaces like HSI, YCbCr and gray images are used for extracting cotton contaminants..

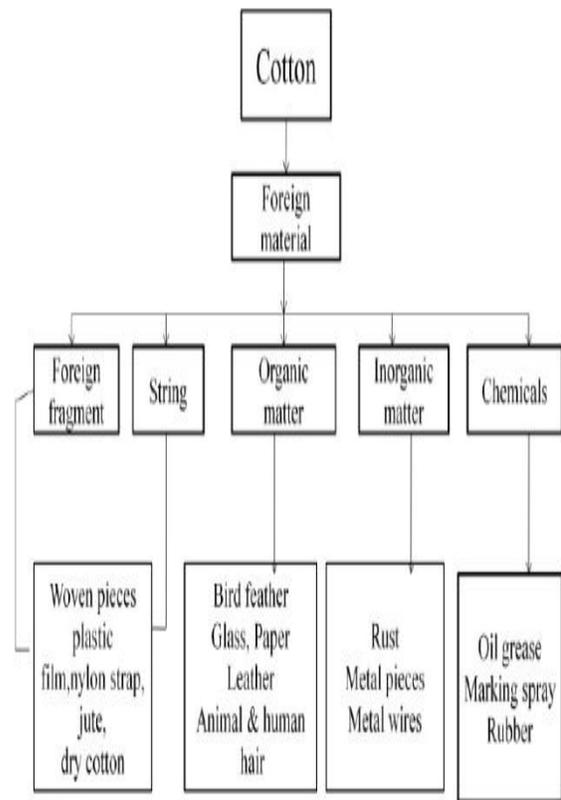
1. Introduction:

As we all know that prevention is always better than cure so it is more desirable to not generate contamination than to have to clean it at different stages of processing. To fulfill this task, all concerned industries have to work together. According to recent survey it is estimated that Indian cottons are among the most contaminated cottons in the world

so producing yarns of world class quality from Indian cotton is a greater challenge.

NATURE OF CONTAMINATION

Cotton contaminants refer to the foreign fibers that degrade quality of cotton. The main categories of cotton fiber are cloth strips, bird feathers, animal or human hair and chemicals such as oil grease and rubber. The different types of contaminants are as shown in table: 1.1.



2. Image processing techniques for detecting contaminants

Contaminants can be easily detected and removed by visual inspection because the contaminants generally have different color than the white cotton. The main drawback of this method are high investment involved in labor training ,time taken for processing and other human related issues.

In this paper, the foreign fibers recognition process includes picture transformation, processing of images based on wavelet and image post processing. And the work should be done in every aspect.

The foreign fibers of cotton recognition process contains three parts that includes picture transformations, image processing based on wavelet and image post-processing. Because wavelet is the only tool that deals with the index image, the format of color image is converted to index from RGB image and thus we form a linear transform image to adjust the image histogram.

The processing procedures of foreign fibers detection is shown in Fig. 2.1.

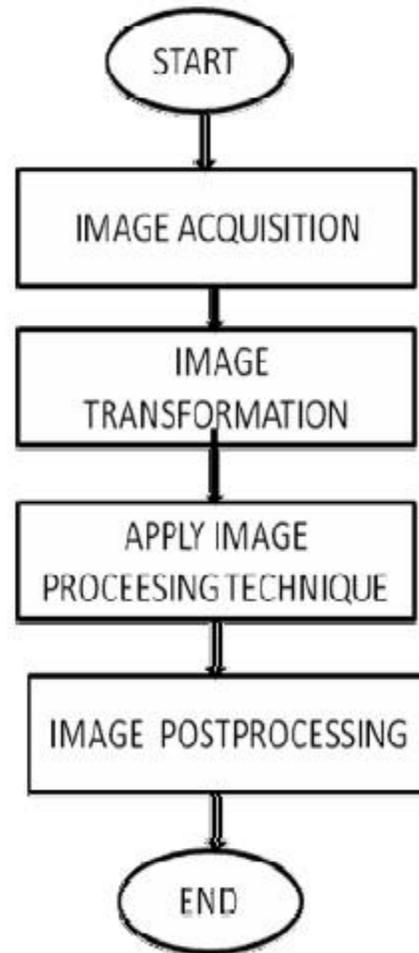


Fig 2.1 General flowchart for detecting contaminants.

A. Contamination detection using x-ray micro tomographic image analysis:

X-ray micro tomographic systems uses computer vision algorithms to detect and to classify the cotton contaminants with high resolution and accuracy. This technique created to develop multiple copies of the object of interest which is then reconstructed by computer to obtain cross-sectional slices.

These slices are then collected together to produce 3D view of internal and external structural details.

B. Contamination detection using co-occurrence matrix features:

Texture is neighborhood property therefore spatial interactions among neighborhood pixels have been used for characterization of textures. The researchers designed a rotating filter based on contextual information to remove the unwanted edges and locate the coordinates of impurities. These features can be classified into three types namely smoothness, Correlation, Homogeneity Statistics.

C. Contamination detection using wavelets:

Wavelet is defined to detect foreign fibers in cotton as it has great potential and excellent features in signal and image processing. The multiscale wavelet representation poses the property of property of shift invariance and can be used for examining cotton fiber images at different scales to detect contaminants. Wavelet analysis can define many signal characteristics such as signal points, signal's discontinuous points and similar properties ignored by other analysis methods.

D. contamination detection based on color space model:

Tingting Xie proposed a RGB space model method for detection of foreign particles present in cotton. Researcher created the space sample of cotton by extracting the features of the standard cotton and channel background. For this they used the sampling algorithm and detection algorithm. Sampling algorithm creates the cotton space sample in RGB space by using the radius of cross-section that extracts the features of the channel background and the standard cotton. Detection algorithm used this model to detect whether the pixel is in the proper range or not range. The advantage is that it can perform different advanced algorithms to gray images and also can conduct color detection method to most colored foreign fibers and extract the chrominance information of the various images directly.

E. Contamination detection using optimal wavelength imaging:

The optimal wavelength imaging is based on findings of different wavelengths of cotton and foreign fibers and based on these values the foreign fibers are differentiated from that of cotton fiber. In this method for detecting the foreign fibers in cotton researcher used near infrared(NIR) imaging for detecting a wide range of foreign fibers in cotton and also developed an optimal wavelength

imaging system with an image-processing algorithm.

Conclusion:

In this paper the researchers highlights in brief of various types and categories of cotton contaminants and provides a review on the comparative analysis for cotton contaminant detection techniques. Thus more research and advance techniques in real time automated vision technology will definitely help to resolve the serious issue of cotton contaminants in textile industry.

References:

- [1]. R. N. Narkhedkar, S. S. Lavate, Cotton contamination removal systems in june 2011.
- [2]. Zhenwei Su, Gui Yun Tian, and Chunhua Gao, —A machine vision system for on-line removal of contaminants in wool, *Mechatronics*, 2006, pp. 243-24.
- [3] Lin Ning and Sha Tao, “Foreign cotton fiber detection based on digital image processing”, Nanjing, April 2012.
- [4] Pooja Mehta, “Detection of foreign fibers present in cotton”, 2011 International Conference on signal processing systems, IEEE.
- [5] Yi Zhao and Chunxian Fu, “The application of machine vision technology in

clearing foreign fibers”, *Automation & Instrumentation*, 2008, no3, pp1-4

[6] Changzhi Ren, “Study of foreign fibers inspection based on machine vision”, 2006.