

A Review Paper on Detection of Foreign Fibres and Cotton Containments

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Abstract— It is very important to detect the impurities in cotton as in aspect of important aspect of modern industrial manufacturing. It is very difficult to detect the foreign fibres and impurities in cotton due to their unpredictable shape, size, position and material. The major contaminants or impurities found in cotton are glass ,rust, paper ,oil, greese, bird feather ,nylon straps plastic film, nylon, jute, dry cotton , bird feather, glass, paper, metal wires and various foreign fibers like silk, nylon, polypropylene of different colors and some of white color may or may not be of cotton itself. After analyzing cotton contaminants and its characteristics adequately, this paper presents various techniques for detection of white foreign fibers and contaminants from cotton. For machine vision system YCbCr color space has been implemented previously in which performance parameters like speed of detection and time for detection need to be improved and also the problem of detection of white foreign fiber need to be consider, and also work is done by using hue and intensity techniques. So various, automated systems can detect different types of contaminants. So This paper presents a review of various image processing techniques that can be used for detecting contaminants in cotton fiber.

Keywords: foreign impurities, cotton containments and its detection using various techniques.

I INTRODUCTION

Contamination of raw cotton can take place at every step that is from the farm picking stage to the ginning stage., Cotton is also one of the most used natural fibers in existence today, with consumers from all classes and different people wearing and using cotton in a variety of applications . Foreign fibers can also affect the cotton during harvesting, field storage and ginning. The quality of cotton, as determined on the basis of its length, strength, fitness and most of all the degree of contamination, greatly affects its price so better the quality of cotton, higher will be the price and better the position of cotton industry in the market. Once the foreign fibre or impurities enter in the cotton it is very difficult to remove as its spread throughout. An Textile Manufacturers Federation (ITMF) reported that claims due to contamination amounted to between 1.4 – 3.2% of total sales of 100% cotton and cotton blended yarns . A fairly large number of cotton fibers

recognition researches are based on RGB color space and YCbCr color space. However, color information is not well presented and extracted in RGB color space due to its limitations and some deficiencies.

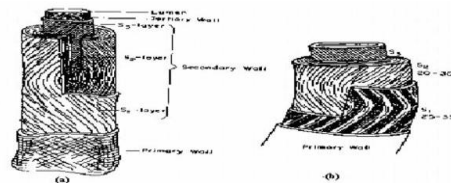
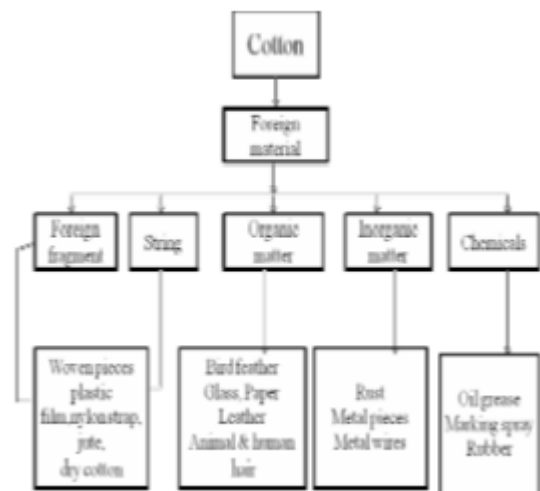


Fig. 3. Schematic Diagram of Cotton Fiber (a) Layered Structure (b) The tubular Orientation of The secondary structure

Various Cotton Containments

The main types of contaminants that affect the quality of cotton fiber are cloth strips, plastic film, jute or hair, polypropylene twine and rubber. Such contaminants have impact on cotton grade and can cause color spots in fabric, thus reduce the textile value of cotton fiber as well. cotton fiber is contaminated with contaminants such as seeds or other cotton-plant matter, and a sticky substance secreted in the cotton by insects ,called "honeydew". Honeydew is the result of infestation of growing cotton by aphids or white-fly. It takes the form of randomly distributed droplets of highly concentrated sugars, causing cotton stickiness. Such contaminants should be removed from the cotton fibers to as great an extent as possible in order to provide a higher quality cotton yarn.



II DETECTION OF COTTON CONTAINMENTS

1. Manual vision system: Manual vision system of detection of cotton contaminants is the oldest method which is used to detect the foreign particles in cotton at small scales. A lot of manual workforce is engaged in the whole process. It is very costly and time consuming process and the accuracy of this system is also very poor.

2. Electro optical model: The electro optical method used for cotton contaminant is based on the High Volume Instrument (HVI). HVI system is suitable for the extensive quality control of all the bales processed in a spinning mill.

3. Gravimetric mechanical model: In this method of detection of cotton contaminants a mechanical model is used. For the vision system and the sorting system synchronized with the movement of cotton on the conveyor, an encoder is installed at the shift of the conveyor and driven by the belt detection, It also increases the hardware cost.

III DETECTION OF COTTON CONTAINMENTS USING IMAGE PROCESSING TECHNIQUES.

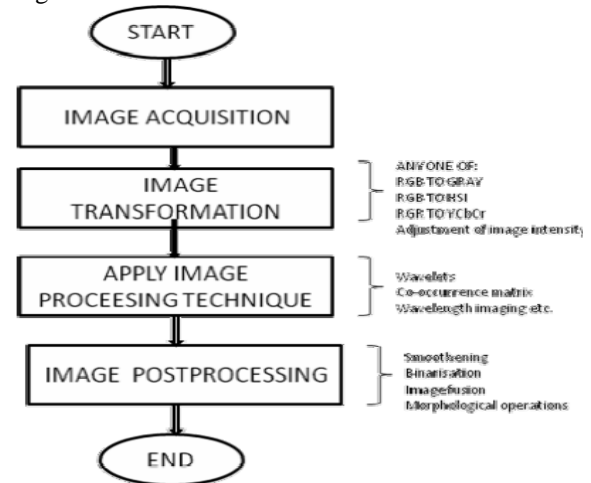
1. Contamination detection using wavelets:

Wavelet is introduced to detect foreign fibers in cotton because it has an excellent features in signal and image processing. It possess the property of shift invariance and can be used for examining cotton fiber images at different scales to detect contaminants. Wavelet analysis can detect many signal characteristics, such as signal trends, signal's high-order discontinuous points and self-similar properties, ignored by other analysis methods. Cheng liang Zhang proposed an approach for detecting contaminants using wavelets.

2. contamination detection based on color space model:

Tingting Xie proposed a method for detection of foreign body in cotton based on RGB space model. A space model of cotton was created by extracting the features of the standard cotton and channel background. The researchers used sampling algorithm and detection algorithm. Sampling algorithm created the cotton space model in RGB space by using the radius of cross-section that extracted the features of the channel background and the standard cotton. Detection algorithm used this model to detect whether the pixel is in the range. The main drawback of this method is that the images were acquired in RGB space which required high bandwidth for each component R,G and B. Dongyun Wang et al proposed a method of detecting foreign bodies but converted the RGB images to gray scale images as the data of gray image is only one-third of RGB image so the algorithm designis simplified. Cheng liang Zhang et al. proposed an approach for detecting contaminants based on YCbCr color space. The advantage is

that it can conduct various advanced algorithms to gray image from luminance. can perform color detection to most colored foreign fibers .



3. Contamination detection using optimal wavelength imaging:

The optimal wavelength imaging is based on finding different wavelengths of cotton and foreign fibers. Jia DongYao used this method for detecting the foreign fibers in cotton .they 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.

IV PERFORMANCE PARAMETRES

1) Time consumption: The time consumption should be less, we will compare our thesis work on the basis of time taken to complete the operation. Time taken at different stages will be calculated in both the color spaces and then we will compare both the color spaces.

2). Ease of operation: The complexities in performing the operation should be less, less the complexity better the performance of the system

3). Performance consistency: The performance level of the system should be consistent; we will check the consistency of the system by applying the algorithm on the different images.

4) Speed of Detection: The speed of detection of the system depends upon the time taken to complete the operation, the lesser the time taken greater will be the speed of the operation.

V CONCLUSION

This paper has provided the review of various foreign fibres and cotton containment in the cotton and cotton containment detection techniques .Researchers till engaged in designing a methodology for detecting containments like nylon and silk so

that numeric quantitatively is also possible previous work is done on cotton containment detection using YDbDR colour space and also by using intensity and hue properties.

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