

A MATLAB IMPLEMENTATION ON IMAGE DETECTION TO FIND THE UNWANTED ELEMENTS IN RAW COTTON: REVIEWS

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In textile industry, automatic cotton contamination detection is required for maintaining the cotton fiber quality. The inspection of cotton contaminants is particularly challenging due to the large number of contaminant classes which are characterized by their vagueness and ambiguity based on their characteristics. In the manual process of cotton contamination detection, it is difficult to detect the contaminants due to their unpredictable size, shape, material and position as some of the contaminants get inside the cotton fiber layer and become invisible and some are of same color as cotton fiber. So, automated systems are required that can detect different types of contaminants. This paper presents a various image processing techniques that can be used for detecting contaminants in cotton fiber. Cotton Contamination refers to the presence of foreign material in cotton that affects the quality of cotton fiber. Contamination, even if it is a single foreign fiber, can lead to the downgrading of quality of yarn, fabric or garments or even the total rejection of an entire consignment and is thus a very critical fiber parameter. Contamination makes serious visible effects in the fabric. The quality of cotton, as determined on the basis of its color, 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. This paper investigates the foreign elements from cotton. It has to carry out through the image analysis. This has to develop the process by which the different nature of color has been short out with their position. So each pixel has to be read out through system. If the consecutive pixel find different by their successive pixel then it must be read out by simulation. The ultimate goal is to detect the foreign fiber or elements in cotton using the HSI Approach for automatization process.

Key Area: Image analysis, Histogram, Color Recognition, Edge Detection, Grid Algorithm, HSI Approach to Color.

I. INTRODUCTION

The cotton is one of the most important raw materials in textile industry; it is an important material to the life of the people. Chinese textile is cheap, but its' grade of quality is inferior, there is a big gap compared with other developed countries. Why the quality of textile is inferior in china, because there are a lot of foreign fibers in cotton. Foreign fibers are impurities such as non-hazardous debris or different colors of cotton fibers which is mixed with cotton. (Common foreign fibers, such as Fig 1. In the process of cotton picking or selling, cotton leaves or hairs are easily mixed in the cotton. Meanwhile, bags, rope, sacks and other

chemical products are widely used in cotton production, which easily become foreign fibers mixed with cotton.

Image Characteristics of Foreign Fibers

For clearing foreign fibers in cotton, this needs high requirements about real-time. Also, these requirements need to find the image features which not only could obviously distinguish the cotton fibers and the foreign fibers, but also contain a small amount of data. For the color analysis about the cotton and foreign fibers, the color of the foreign fibers' image is commonly darker than the cotton fibers'. As the color of cotton fibers is usually lighter, but the most of foreign fiber's color is darker. For example, the common foreign fibers in cotton such as Fig 1.



Fig.1 In cotton the original image of a thread

HSI (Hue saturation intensity)

The dimensions of the HSL and HSV geometries simple transformations of the not-perceptually-based RGB model—are not directly related to the photometric color-making attributes of the same names, as defined by scientists such as the CIE or ASTM. Nonetheless, it is worth reviewing those definitions before leaping into the derivation of our models.

II. LITERATURE REVIEWS

Kadir A. Peker and Gökhan Özşarı [1] suggested that Cotton is a very important material used in producing many fabric types. Contaminants from various sources need to be removed from cotton before fibers can be spun into yarn. Contaminants critically affect the quality of the yarn produced; any foreign material may result in unacceptable yarn or fabric, or even cause damage to the production machines. Automatic detection and removal of foreign fibers and contaminants in cotton is an essential technology for the modern textile industry. Various image processing and computer vision techniques have been proposed for the detection of foreign materials in cotton fibers. They describe a detection method using Gaussian mixture models and thresholding based on pixel probabilities.

Ling Ouyang et.al. [2] Advised the Foreign fibers accounted for a small proportion in cotton, but there is serious impact on the quality of textile. Foreign fibers are removed by hand, which is low efficiency. Generally, the methods of fixed threshold are used to identify foreign fibers in cotton, but high speed flow of cotton is easy to result in fluctuations on light, the color of captured images will be changed accordingly, then misidentification possibility will be increased. But the suitable amount of sample libraries are used in the identification algorithm of supervised classification, which eliminate this defect to meet the requirements of accuracy and real-time. In this paper, according to the character of image gray of foreign fibers in cotton, and mathematical model is established. Further, important image features are enhanced by image processing; foreign fibers' characters are drawn. At last, Euclidean distance and k-nearest neighbor classification are adopted in identification algorithm, and finally foreign fibers are identified.

Dongyun Wan et. al. [3] suggested foreign fibers accounted for a small proportion in cotton, but there is serious impact on the quality of textile. Foreign fibers are removed by hand, which is low efficiency. To meet the requirements of accuracy and real-time, the identification of foreign fibers base on machine vision is proposed. The traditional algorithm of identification is generally Complex and large amount of calculation, so real-time is bad. In this paper, according to the character of image gray of foreign fibers and mathematical model is established. Further, important image features are enhanced by image processing; foreign fibers' characters are drawn.

Chengliang Zhang, Xianying Feng, Lei Li and Yaqing Song [4] advised that foreign fibers in cotton have seriously effect on cotton production the quality of cotton products, while image processing algorithms based on machine vision offer an effective measure to deal with the problem. Wavelet is introduced to detecting foreign fibers in cotton as its great potential and excellent feature in signal and image processing. In this paper, the contaminants recognition process is divided into three steps, namely transformation of picture, image processing based on wavelet and image post-processing. On the first step, the format of color image is converted to index from RGB, which is the precondition of wavelet image analysis. A piecewise linear transform model is proposed to enhance the image. Secondly, the best tree analysis structure is calculated contrasting to the initial one. Through optimizing the entropy value, wavelet packet 2-D compresses off about 90% of the original coefficients by deleting the redundant information, while saving 99.13% energy. And image is reconstituted basis on the adjusted wavelet coefficients. In the last part, wiener adaptive filter is employed to smoothing the picture, and then We dichotomize the images after such series of treatments. The effect of the image processing indicated that wavelet packet is an effective method in the foreign fibers inspection combined with some other measures.

Jia DongYao and Ding Tian Huai [5] suggested that The optimal wavelength of near infrared (VIR) for detecting a wide range of foreign fibers in cotton was determined. Also an optimal wavelength imaging system with an image-processing algorithm was developed. Research results showed that the method was effective in detecting foreign fibers, which are currently difficult for sorting.

Chen Yajun, Zhang Erhu and Kang Xiaobing [6] suggested that A method of gas-solid two-phase flow velocity measurement is presented based on double linear CCD camera and image cross-correlation algorithm, and it can be applied to cotton foreign fiber eliminating system. Firstly, gas-solid two phase flow velocity estimation principle is put forward with the double linear CCD camera. Then, aiming to the inaccurate problem of cotton flow velocity measurement using ultrasonic wind speed sensor, and based on the detection system structure, double CCD camera cotton flow velocity measurement scheme is discussed. Lastly, divisional velocity measurement for high-speed cotton flow based on the image cross-correlation algorithm is elaborated. The results showed that this method accurately estimated the velocity of cotton flow in different sub-area, and reduced the cotton fall quantity at each blowing, which proved the validity of the proposed method.

Zhang Qing et. al. [7] suggested raw cotton foreign fibers on line detecting and clearing system is designed by using CCD vision sensor, and it achieves the online detection and removal of foreign fibers of raw cotton before the cotton opening and cleaning process and the model machine is produced. Through experimental verification, the model machine works well, and detection rate of small foreign fiber is up to more than 90%.

Tingting Xie et. al [8] suggested In order to detect foreign body from the complex channel background and cotton layers, a detection method based on RGB space model is presented in this paper. The feature of the standard cotton and the channel background was extract to create a space model of cotton. And then this model was used to process the 24-bit true color images which were captured from a foreign body picking equipment. Simulation results show that this method can overcome the interference caused by the complex channel background and diversity of the foreign fiber in the actual working environment and can detect foreign body effectively.

Objective: To detect the foreign fiber or elements in cotton using the HSI Approach for automatization process.

Proposed Methodology: This paper investigates the foreign elements from cotton. It has to carry out through the image analysis. This paper has to develop the process by which the different nature of color has been short out with their position. So each pixel has to be read out through system. If the consecutive pixel find different by their successive pixel then it must be read out by simulation.

Proposed Technique:HSI Color detection using Grid Detection algorithm has been simulated through MATLAB.

Grid Detection Algorithm

A grid is a common and useful way to organize data. This data format represents values or intensities at discrete grid point locations. Grid detection is the proposed methodology which is the integrated form of Edge Detection and collaborative structured form of pixels. The collaborative form is the representation of similar information unit that has been taken in common sense. It is very similar to cluster that have near values being together in a group.

Steps:

- 1: Collect the test pictures that are coming out by production line.
- 2: Save all pictures in a separate folder.
- 3: Make a clear picture that containing the no foreign elements as a pictures of foreign elements or undesired elements
- 4: Make both of them as a templet file and save it in mat files format,
- 5: Compare the test file with the template file and find the similarities.
- 6: then highlight the suspected portion with in the test pics and note down the simulation time.
- 7: test the same for at least 20 pics and note the time of simulation and find the average.

III. CONCLUSION & FUTURE SCOPE

The proposed technique will find the most accurate solution to find the foreign fiber present in cotton through more than 20 picture of cotton having undesired elements. This outcome will be in picture so it has be concluded in abstraction form and find the analytical probabilistic accuracy through number of test picture through MATLAB Simulation. A large variety of grid methods are available at present, but speed and accuracy of an algorithm are key factors for the online visual inspection system. Hence, in addition to ensuring the segmentation accuracy, algorithms with faster speed are more attractive. Therefore, in most cases the methods of foreign fiber detection are not suitable for using the grid algorithm. However ultraviolet light can make the PE or PP foreign plastic fibers appear colored, under such circumstance, color image is very useful and necessary. It is well established that the human perception of color similarity is poorly modeled by the grid algorithm. More researches about color segmentation will be carried out in the future work.

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