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IDENTIFICATION OF BLOOD GROUP BY USING IMAGE PROCESSING TECHNIQUES

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ABSTRACT
The blood enlightens us regarding the health. It conveys critical substances, for example, supply of oxygen to different parts of our body. Subsequently recognition and classification of blood is crucial. The blood of human includes the Red platelet, White Blood Cells, Platelets and Plasma. Usual procedures are utilized by lab specialists to check cells of blood. In any of these cases, this strategy is so tedious; it consumes additional time and prompts the wrong results as a result of human errors. So during Blood transfusion accurate determination of blood type is very importance during emergency situation so in this method a fast, accurate and robust blood group judgement is given by using image processing techniques.

Keywords:
ABO blood group , segmentation, threshold, feature extraction.

INTRODUCTION

Blood group identification plays a vital role in transfusion of blood. It is directly or indirectly related to the patient's survival, in this recent year with the application of image processing technology by research they have found that there is a need of automatic recognition system based on machine vision technology in the field of identifying blood group**.** In ABO blood group system the classification of human blood is based on the inherited properties of red blood cells as determined by the presence or absence of the antigens A and B, which are carried on the surface of the red cells. Persons may thus have type A, type B, type O, or type AB blood. The A, B, and O blood groups were first identified by Austrian immunologist Landsteiner in 1901. Detailed survey has been made by the researcher to develop the efficient algorithm for detecting the blood group under the various illumination conditions. From the existing technique it is identified that more research has to be made for the better identification and prediction. Misguided results of blood group are directly or indirectly concerned to the human body condition. Many researchers present many methods and algorithms to find out the correct blood group some have given accurate results and some method has been failed. This paper gives the introduction, literature review, work flow, algorithm, results and conclusion.

LITERATURE REVIEW

Haihong lin [1] proposed a novel approach to detect blood group using Raman spectroscopy based on Fourier transform .in this method PCA method is used to evaluate the sample data and its quality characteristics so as to identify the sample and provide experimental data for the application of Raman spectroscopy combined with PCA in blood identification and control. The disadvantages of this method are combination of Raman spectroscopy and stoichiometry analysis in PCA couldn't properly distinguish A, B and O samples due to exceed in the range of Fourier transform value.

Sandip.D.Sahane[2] proposed a novel approach to provide an easy and fast means of identification of blood group using IR sensors. The light from the pulsating IR LED is passed through the blood sample and the transmitted light is detected, conditioned, and is converted into voltage signal. The variation in the intensity of the received signal due to the absorption of blood for different blood group is translated into corresponding voltage changes, to classify the blood group. The disadvantages of this method are the sensation produced by the IR sensors may sometimes be not correct. There is a drawback of using LED is that color and contrast from various viewing angles are inconsistent.

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Abubhakar yamin[3] Detection of blood group in disaster or remote area where experts is unavailable is challenging task to do. In this method there are 3 methodologies to identify blood group detection they are image acquisition, image pre-processing and segmentation, detection of blood group. Image acquisition Slides contains blood sample mixed with antiserum. The image is loaded in proposed system in MATLAB for further processing. Pre-processing: includes resizing of the image to bring it into a specific format. Segmentation: by using information of region starting and ending coordinates we can easily crop the region of interest. Blood group detection: we are detecting blood group by calculating the density of white pixel of each segmented region. The disadvantages of this method it takes much time to perform the place worker to capture picture in the microscope and then to identify the blood group.

Mr.Sudhir.G.Panpatte[4] proposed a novel approach to detect the blood group by using image processing technology. The aim of this system is to provide result within the theshorest possible time with precision and accuracy along with storage of results the disadvantage of this process is in this system it has disadvantages of requiring 30min which is excessive especially in emergency situation.

Neha srivathsa[5] proposed a novel approach to detect the blood group of a person using a smart phone by identifying the blood group of a person in low cost mobile phone using image processing technique. the disadvantages of this method is the morphological image processing algorithms which is used misclassified the AB positive to AB which lead to conclude that a further fine tuning of heuristics is required.

Di Wu,Ming Zhang[6] proposed a novel approach on the adaptive detection of blood vessels in retinal images. This method is based on the adaptive contrast enhancement, feature extraction, and tracing. Feature extraction is done by using Gabor filter responses. The disadvantages of this process are mainly affected on the adaptive detection of blood vessels in retinal images. Here most false detection are due to incorrectly identified initial tracing points where the filter response analysis method need to increase its false positive rate value significantly to achieve the same goals.

Gerda J.Edelman[7] proposed a novel approach on the practical implementation of blood stain age estimation using spectroscopy, the measured age of blood stains can lead to a more realistic reconstruction of the timeline of events this method is the world's first implementation in practice of a method for determining the age of blood stains. The disadvantages of this method is traditional collection of blood stains with moistened cotton swabs will alter their chemical composition. Further research is needed to find a collection procedure which does not influence the results of the age estimation.

Amol Dhande[8] proposed a novel approach on identification of blood group by using image processing technology using special technique of image processing like detection of background and cluster detection, the final blood group is detected on the basis of number of clusters and feature detection of the image. Disadvantages of this system are more chances of human errors are possible, only experts can tell the blood type by seeing at the agglutination process.

Wei Xiong[9] proposed a novel approach on automatic area classification in peripheral blood smears in this system integrated algorithm is used for area classification and quality. Here both cell spreading and cell clumping in terms of individual clumps and the occurrence probabilities of the group of clumps over the images are considered. The disadvantages of this process are observed in decreasing performance when more data are tested decrease is not significant especially for class G where g is the area on the axis of the image.

Palli padmini[10] proposed a novel method for identification of correlation between blood relation using speech signals. MFCC [mel frequency cepstral coefficients] has been used for extracting the features of input speech signal, along with the vector quantization through modified k-means LBG (linde, buzo and gray) algorithm are implemented for reorganization of speech signal the disadvantages of this process is from the experimental analysis low correlation of speech samples of blood relation was observed.

METHODOLOGY

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In this system, blood samples are obtained via image acquisition module under uniform white illumination after centrifugation and oscillation. As the first step, ROI is extracted by making use of Hough transform. The image is smoothened by application of denoising filters on which edges are extracted. Performing Hough transform on this pre-processed image is going to extract circular shapes in the image. These circular shapes are the region of interests (ROIs) fig 1 for further processing.

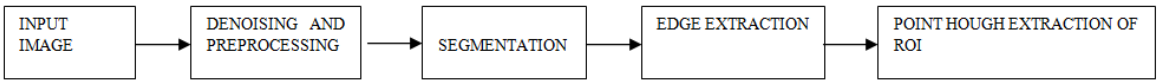

Fig.1. Regions of Interest (ROI) extractions.

In the next step, on the Region of Interest, green components of the RGB image are extracted. This is because green channel contains maximum information out of the 3 channels. On this extracted image data, a thresholding is applied, for thresholding Otsu algorithm is used which is helps in separating background and foreground with the help of a maximum variance threshold. Now the object can be segmented using Niblack threshold using a rectangular window for nuclear shape is sliding. Further, small objects are eliminated using a morphological operation. Then whole filling is performed on the processed image which is going to result in the final image form. Now, statistical measurements such as min, max, mean, variance etc are measured on the final image form. Using the statistical information such as standard deviation, we will now be able to predict the blood types of the sample image as shown in the flow diagram below fig 2.

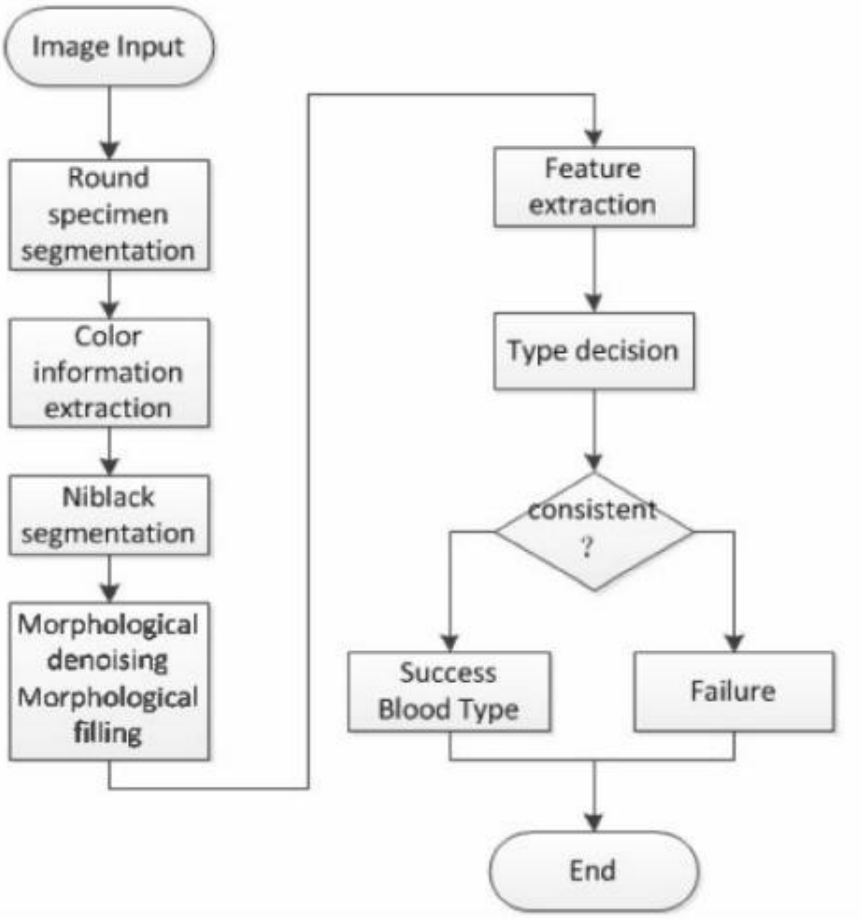

Fig 2 flow chart of detecting the blood group of a person

ALGORITHM

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Input: Image.
Output: Results determining the blood group of a person.
Step 1: Read the image.
Step 2: Round specimen segmentation is done and finding the region of interest by using hough transform.
Step 3: Color image extraction is done, green component of the image is taken hence it has high wave length and apply otsu algorithm.
Step 4: Performing Niblack thresholding to know the value of each pixel.
Step 5: The processes of morphological denoising and filling is done on input image.
Step 6: By using standard deviation value predict the blood type of the input image.

RESULTS AND DISCUSSION

In this section, output of the experimental results is discussed. Various image processing techniques like segmentation, color image extraction, Niblack thresholding, morphological denoising and filling are used. By using the standard deviation value the blood type of the input image is determined. This method is 90% accurate.

EXPERIMENTAL RESULTS

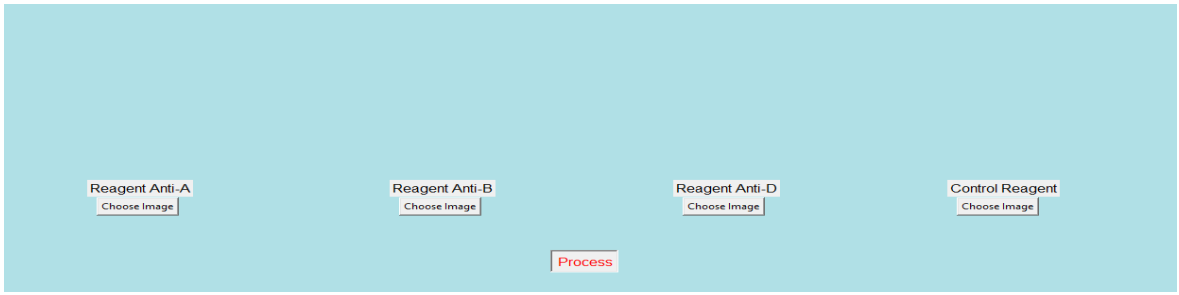

Fig.3 output terminal for predicting the blood group of a person.

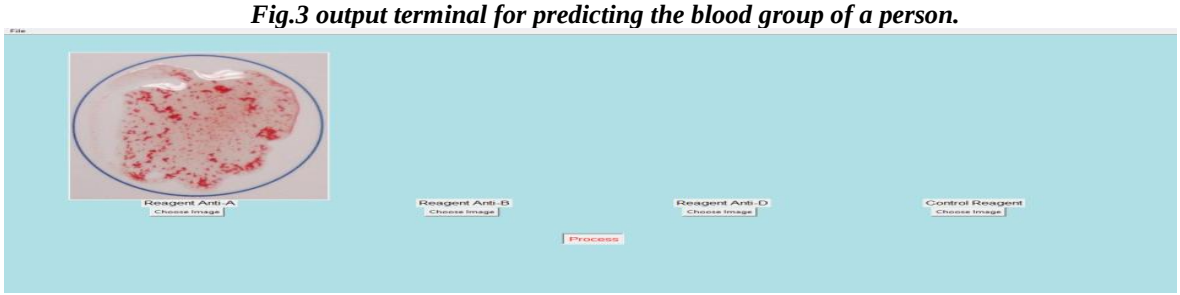

Fig .4 selecting the reagent antigen A.

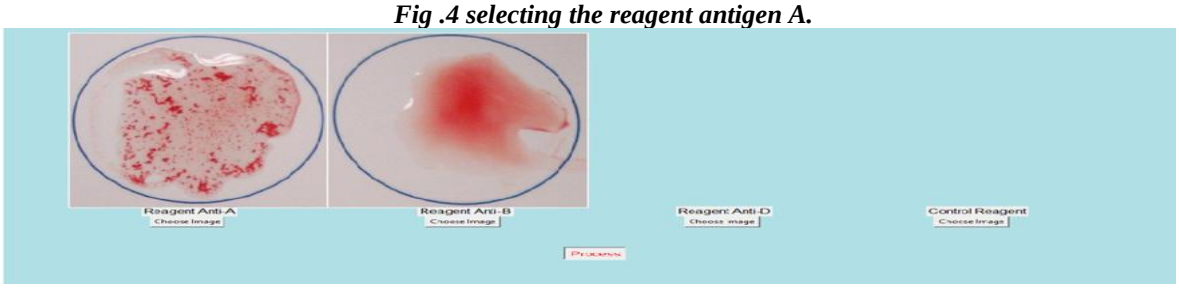

Fig .5 selecting the reagent antigen B

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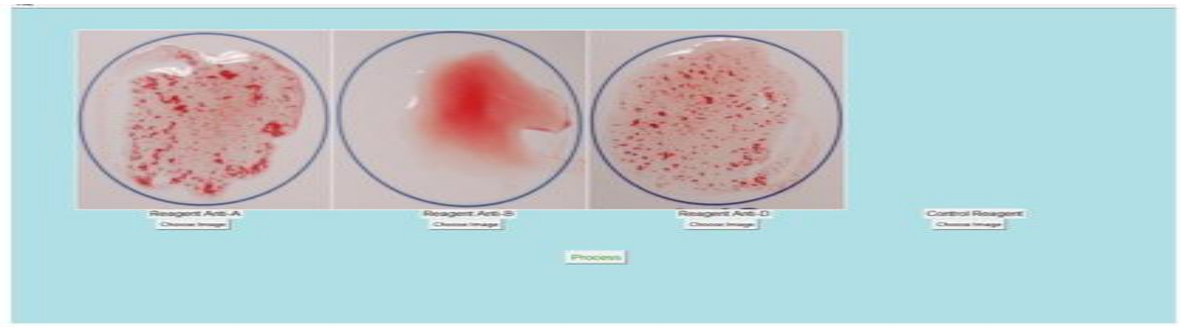

Fig .6 selecting reagent Antigen D

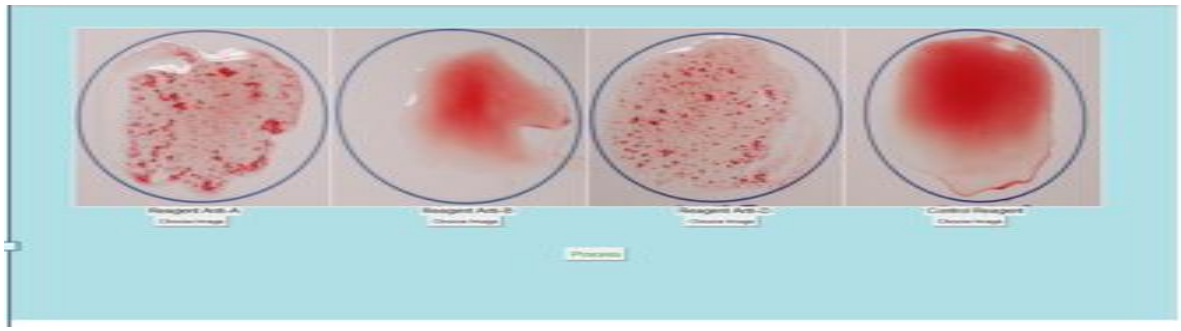

Fig.7 selecting the control reagent.

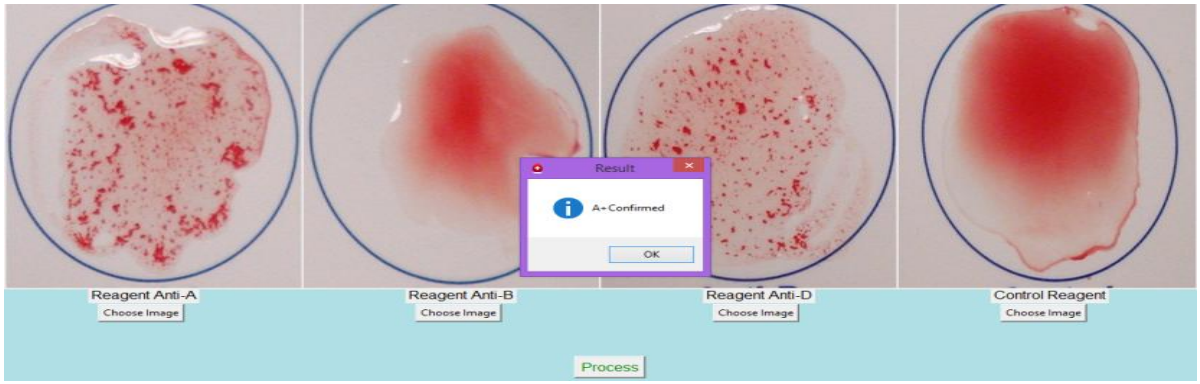

Fig 8.conformation of A +ve blood group in a person.

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CONCLUSION

The efficient method of detecting the blood of the person is introduced in this paper. This paper briefly describes the image processing techniques like segmentation; color image extraction, Niblack thresholding, morphological denoising and filling methods. In the literature survey various authors have implemented various methods and achieved different goal in identifying the blood group. It is to conclude that the main purpose of this method is to give an new idea of detecting the blood group of the person in the place where there is scanty of laboratory in the outer reaches so that they can make use of this advance techniques in the emergency situations and also to lend a hand in the medical field by this advance skill, This area requires advance research to improve the performance for improved results.

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