Classification of Sickle Cell Anemia Image Using Thresholding and GLCM Technique

Nithiya.R a*, Ajith Kumar.M[b], R.Siva Kumar[c], KVSSSS Sairam[d]
Department of Biomedical Engineering ,Agni College of technology,Chennai
a e-mail:nithiya.bme@gmail.com, b e-mail: ajithkumarmathi009@gmail.com,

Abstract

Abstract—. Human blood consists of 3 kinds of major cells: Red vegetative cell (RBC), White vegetative cell (WBC) and platelets. erythrocyte malady could be a cluster of disorders that affects haemoglobin, the molecule in red blood cells that delivers element to cells throughout the body. folks with this disorder have atypical haemoglobin molecules referred to as haemoglobin S, which may distort red blood cells into a reaping hook, or crescent, shape. Signs and symptoms of erythrocyte malady typically begin in infancy. Characteristic options of this disorder embody a coffee variety of red blood cells (anemia), continual infections, and periodic episodes of pain. The severity of symptoms varies from person to person. Some folks have gentle symptoms, whereas others square measure oftentimes hospitalized for a lot of serious complications. To perform the segmentation, this project uses the techniques like inexperienced Plane Extraction, Arithmetic operations, Linear distinction Stretching, bar graph feat and world Thresholding and GLCM is employed for classification. This project describes the results of quick and correct vegetative cell segmentation for anemia of red blood cells.

Keywords—Sickle Cell,Filtering Enhancement,Segmenation,MATLAB

INTRODUCTION

Pathology is that the field of investigation of samples collected from the individual to produce proof for diagnosing within the medical field. It involves the detection of pathogens or harmful foreign particles gift within the sample for providing necessary proof for any treatment of the diseases. A specialist collects the samples and processes it exploitation the laboratory instrumentation to come up with a report based mostly upon the results of the take a look at. of ttimes performed tests like biopsy, take a look at for glucose, etc. conjointly endure constant method. The instrumentation presently accessible with the specialist is that the haemocytometer or the hematology analysers. This instrumentation is large and extremely pricy. albeit they supply cheap accuracy, the price of the instrumentation is thus high that a lot of pathologists move to buy one instrument machine. the matter statement of the project is to outline a system that answers the hurdles gift within the field of pathology. The system particularly focuses on the agricultural components and also the remote village areas were matters is way a lot of acute than within the urban areas. The system ought to manage the price of the presently accessible systems that is refraining the pathologists from approaching these areas and improve the services. Medical laboratories give confirmation of clinical diagnoses, facilitate improved management of diseases, generate essential public health data and with adequate government funding. This task needs plenty of your time and arch operators. quick and cost-efficient production of vegetative cell count is extremely necessary to form higher and cheap diagnosing. it's a vital task to extract morphological data concerning blood cells of a private. one in all the foremost difficult tasks is to increase ancient approaches to segmentation and object classification. in comparison with the manual method, tho' the automatic analyzers provide quick and reliable results relating to the quantity, average size, and variation in size of blood cells, they can't dependably count the abnormal cells, overlapped cells and don't observe cell shapes.
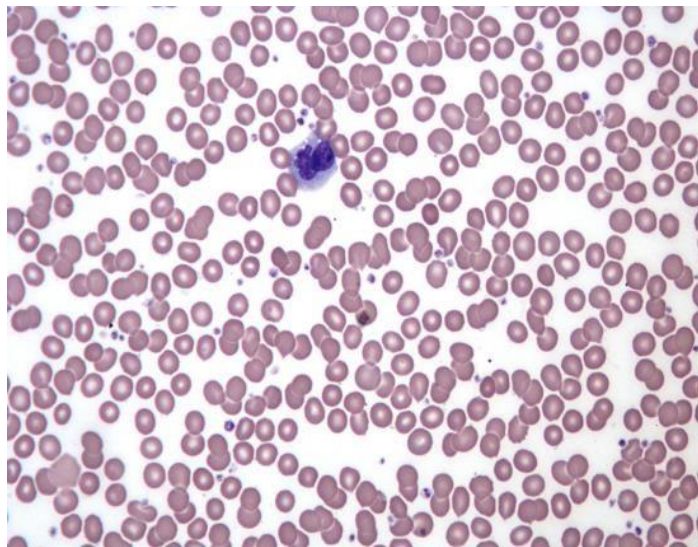
Fig. 1.   Sample Image

LITERATURE SURVEY

In [1] Prof A. Arputha Regina proposed a This makes a necessity to discover and classify the AML mechanically. Premature work is completed by color conversion of the image from RGB to CIELAB color house to form the segmentation technique perform well. In segmentation technique, the wide used technique is K-means formula. K- means is associate degree unattended learning formula supported bunch of comparable behavior of the objects. Feature extraction technique includes the Hausdorff dimension (HD) and native Binary Pattern. Support Vector Machine is employed for classification. The analysis of varied result analysis parameters is analyzed to realize accuracy.

In [2] Dishant Mehta proposes an automatic technique for numeration of red blood cells mistreatment image process techniques. the normal ways of blood analysis involve the manual numeration of blood cells ascertained underneath the magnifier. This technique poses giant dependency on the abilities of the laboratory technician and may cause errors. The machine-driven medical specialty analysers, on the opposite hand, turn out correct results. However, these equipments area unit terribly pricey and troublesome to maneuver once put in. They need trained consultants to control this instrumentation. The proposes technique provides an occasional price and moveable answer for getting the red somatic cell count employing a image process.

In [3] Renuka V Tali This paper reveals most of the segmentation and classification methods of White blood cells (Leukocytes) in microscopic blood smear images. The selection of suitable segmentation technique is a challenging task. The classification technique also depends on success of segmentation. We mainly focus on methods used in segmenting White blood cells and its major types from its RBC' s, Platelets and background.

EXISTING SYSTEN
This existing a method for segmentation, classification and counting cells based on their size of red blood cells. Classifications of cell were done using multi- layer perceptron (MLP). In this project color k-means algorithm is used to segment RBCs from blood smear images. Then, a set of texture, geometrical, and statistical features are extracted from the segmented region.

PROPOSED SYSTEM
The projected image process system consists of following steps a) Filtering b) improvement and c) Detection. a. Filtering: pictures square measure corrupted by noise like salt and pepper noise, impulse noise and Gaussian noise. As there's a trade-off between edge strength and noise reduction, filtering is completed. b. Enhancement: It emphasizes pixels wherever there's a major modification in native intensity values and is typically performed by computing the gradient magnitude. c. Detection: several points in a picture have a nonzero price for the gradient, and not all of those points square measure edges for a specific application. Thresholding is employed for the detection of edge points. This project in the main deals with the sting Detection of reap hook cells gift in RBCs.
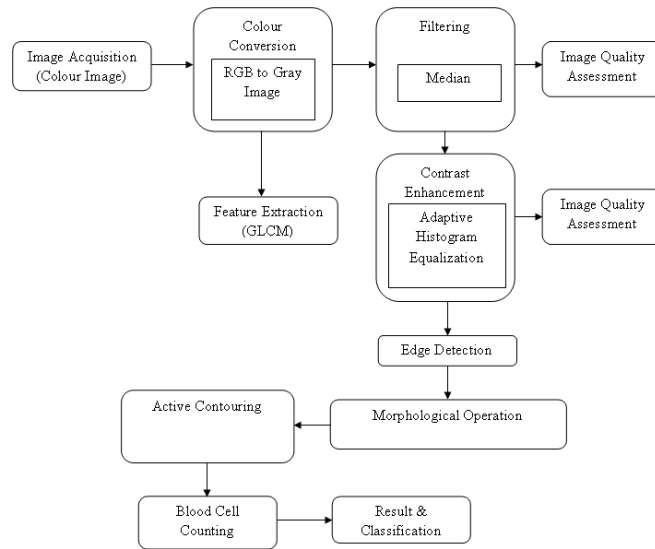
BLOCK DIAGRAM

Fig. 2.   MATLAB UNIT

MODULE DESCRIPTION

A.   Input Image

This name of the model comes from the beginning of the three additive primary colors, red, green and blue. RGB is a dependent color model: different individual devices detect or create a given RGB value differently, since the color (such as phosphors or dyes) and their reaction to the individual Red, Green, and Blue levels vary from user to user, or even in the same device over time. Thus Red Green and Blue value does not define the same color across devices without some kind of color management. To form a color with Red, Green and Blue , three different light beams (one red, one green, and one blue) must be superimposed. Each of the three beams is called a products of that color, and each of them can have an better intensity, from fully off to fully on, in the mixture.
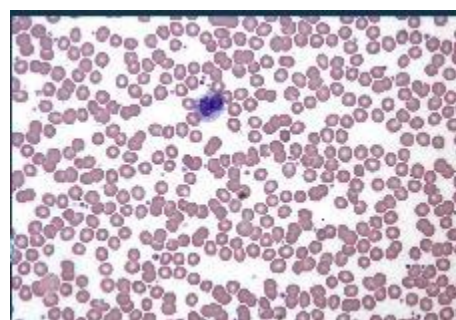

Fig. 3.   Input Image

B.   Gray Image
In photography and computing technology, a grayscale or greyscale digital image is an image conversion types in which the value of each pixel is a single sample, that is, it carries only intensity values information. Images of this sort, also known as black and white, are combined exclusively of shades of gray, varying from black at the lowest intensity to white at the strongest.
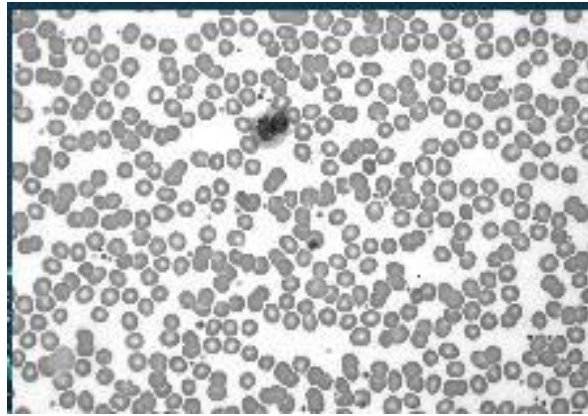
Fig. 4. Gray Image

D. Contrast Enhancement

Contrast Enhancement is a technique or approach in image processing of contrast modification using the image's histogram.Histogram equalization does this by improving spreading out the mostintensity values to clear blur.Adaptive histogram equalization (AHE) is a computer image processing or machine vision technique used to improve contrast in images or signals. It differentiates from other histogram equalization with respect that the method computes several histograms and uses them to spread the non-darkness values of the image.Imadjust method adjusts intensity values.
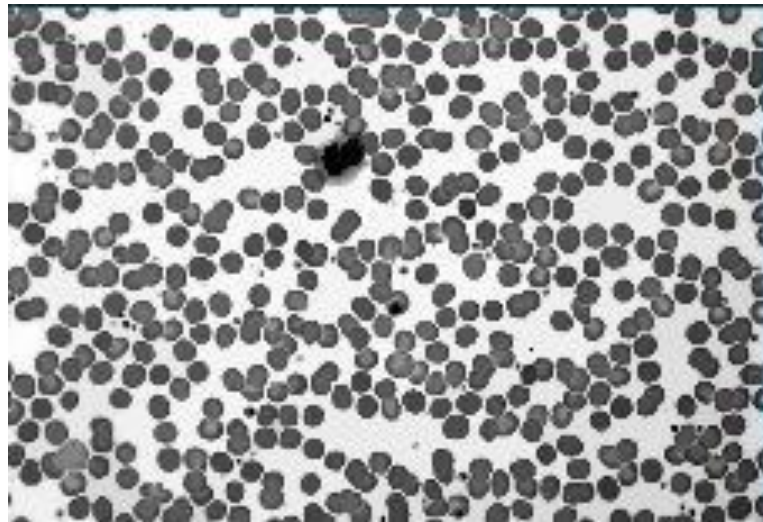

Fig. 6. Adaptive Histogram Equalization

technique that reduces unnecessary components or features from a signal. Filtering is a signal, image or frames processing, the defining feature of active or passive filters being the complete suppression or partial of some aspect of the signal. It is a one of the non-linear digital filtering techniques, often used to remove noise and unwanted distortion from an image or signal. Such noise reduction is a typical processing step to improve the results of edge detection like sobel, canny etc. Median filtering is used in digital image processing analysis to remove noise in original 2D image. It prevents edges while removing noise, also having wide applications in signal and image processing. The main idea of the filter is to run through the signal step by step, replacing each entry with the median of neighboring entries.

Fig. 5. Filter

In deep learning, recognition method or algorithm and in image processing, extraction methods begins from an starting set of measured data and creates feature extracted values (features) intended to be informative. Feature extraction is related to dimensionality reduction based quantitative analysis.

Table 1. Feature Extraction using GLCM

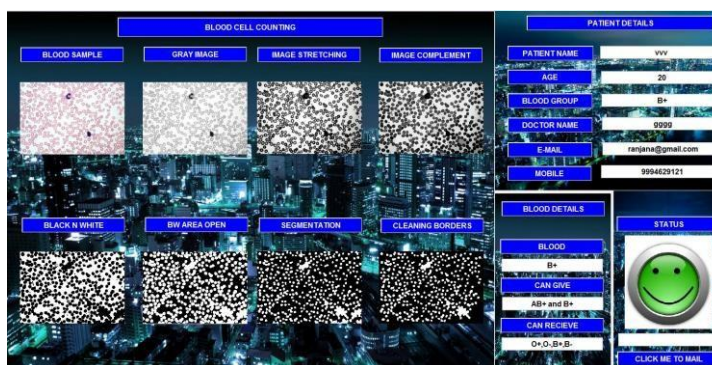| GLCM	
CORRELATION	0.972959
CONTRAST	0.0513824
ENERGY	0.867318
HOMOGENITY	0.995976

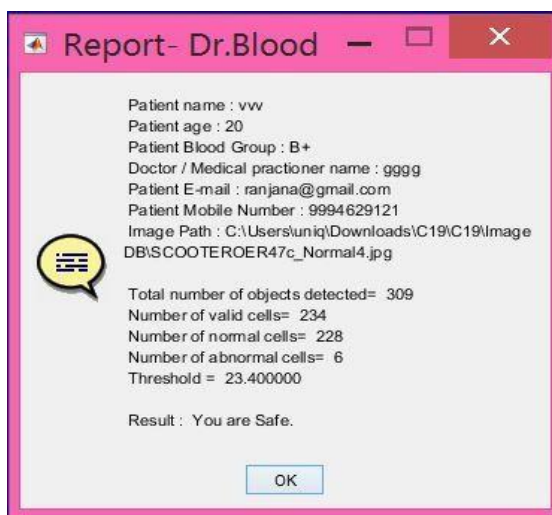## RESULT AND DISCUSSION

Fig. 7. MATLAB unit

Fig. 8. Result

CONCLUSION

This paper described an automated system for fetal and maternal RBC reading in clinical KB test. The system uses a custom-motorized image capturing platform to automatically center a KB slide, collect 120 images (over 60,000 cells), and count/distinguish fetal and maternal RBCs. Spatial-color classification with spectral clustering is proposed to effectively count overlapping cells. Multiple features including cell color, size, shape and contrast variations are used in supervised learning for distinguishing fetal RBCs and maternal ones. Testing

patient KB slides, the automated system quantitatively demonstrated high accuracy in counting and strong correlation with benchmark flow cytometry. Compared to manual technologist reading, the automated system is significantly more efficient and accurate.

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