A COMPREHENSIVE ANALYSIS OF COUNTING OF RED BLOOD CELLS AND WHITE BLOOD CELLS USING DIFFERENT IMAGE PROCESSING TECHNIQUES

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ABSTRACT

 Blood testing is one of the most important clinical examinations. Counting different blood cells is a significant process in a clinical laboratory. Yet, the manual inspection is time-consuming and requires adequate technical knowledge. Therefore, automatic medical diagnosis systems are necessary to help physicians to diagnose diseases in a fast and nonetheless competent way. In this automatic process, Segmentation of white blood cells is one of the most important stages. The nucleus of white blood cells has the most information about the type of white blood cells, thus an exact segmentation seems to be helpful for other stages of automatic recognition of white blood cells. In this paper, we introduced a novel comprehensive Analysis of White Blood Cells by different Segmentation Method using Knowledge Base Learning.

Keywords: MATLAB, Segmentation, Red blood cells, White Blood cells, Feature extraction.

I INTRODUCTION

The blood cell identification and segmentation is a vital the study of blood as a health indicator. A complete blood count is used to determine the state of a person's health based on the contents of the blood in particular WBC's and RBC's. The main problem arises when massive amounts of blood samples are required to be processed by the Medical Laboratory Technicians. The time and skill required for the task limits the speed and accuracy with which the blood sample can be processed. This task will aim to provide user-friendly software based on MATLAB allowing for quick user interaction with a simple tool for the segmentation and identification of different cells from the image.

1.1 Medical Imaging

The Medical Imaging is the visualization of body parts, tissues and organs, for use in clinical diagnosis, treatment and different types of diseases monitoring. Imaging techniques encompass the fields of radiology, nuclear medicine and optical imaging and image-guided intervention.

1.1.1   Red Blood Cells

Red blood cells carry oxygen from a person's lungs to the rest of their body. A depletion of red blood cells may lead to anemia. If it remains untreated it results in dizziness, fatigue, or even more serious diseases. The RBC count determines the total number of red cells in a sample of blood. The red cells, the most numerous of the cellular elements used to carry oxygen to all body parts.
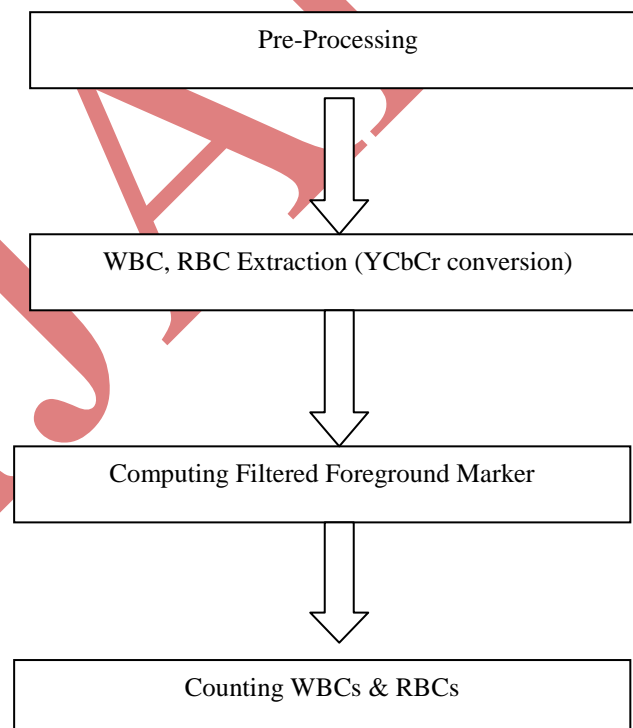
1.1.2   White Blood Cells

White blood cells contain the immune cells that attack and remove viruses and bacteria in a person's body. Low WBC counts may indicate that a person is in danger of infection. High WBC counts might indicate an existing infection, tissue damage, or leukemia.

II METHODLOGY

2.1 Watershed Transform

The watershed transform can be classified as a region-based segmentation approach. The intuitive idea underlying this method comes from geography: it is that of a landscape or topographic relief which is flooded by water, watersheds being the divide lines of the domains of attraction of rain falling over the region.See Fig.1 & Fig.2

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│          Pre-Processing             │
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│  WBC, RBC Extraction (YCbCr conversion) │
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┌─────────────────────────────────────┐
│   Computing Filtered Foreground Marker  │
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┌─────────────────────────────────────┐
│        Counting WBCs & RBCs         │
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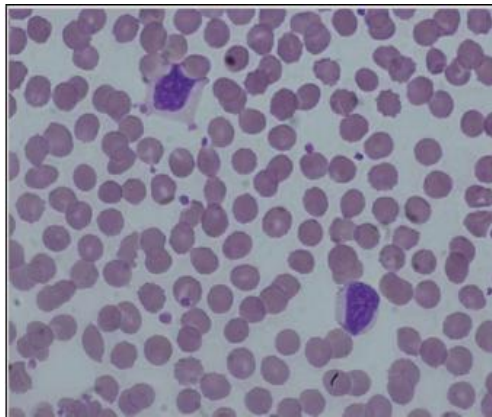**Block Diagram of Watershed Transform**

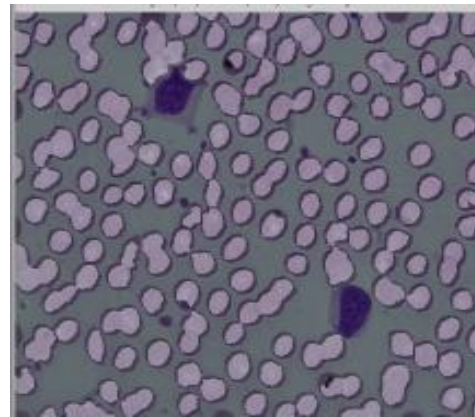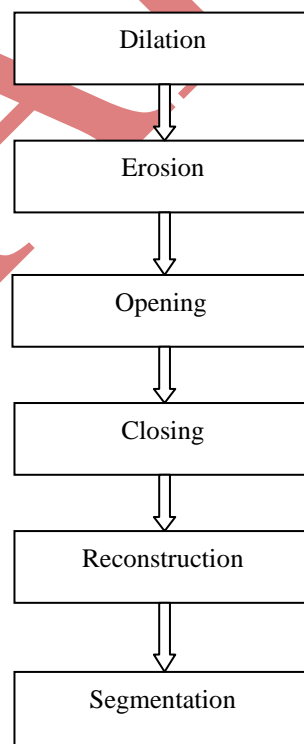**Fig. 1 Original Image**   **Fig. 2 Output Image**

2.2 Morphological Image Processing

Morphology is a wide set of image processing operations that process images based on shapes. Morphological operations apply a structuring element to an input image, creating an output image of the same size. In a morphological operation, the value of pixels in the output image is based on a comparison of the corresponding pixels in the input image with its neighbours. The number of pixels added or removed from the objects in an image depends on the size and shape of the structuring element used to process the image.
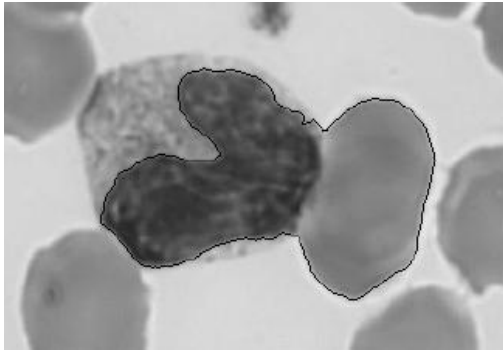

Block Diagram of Morphological Image Processing
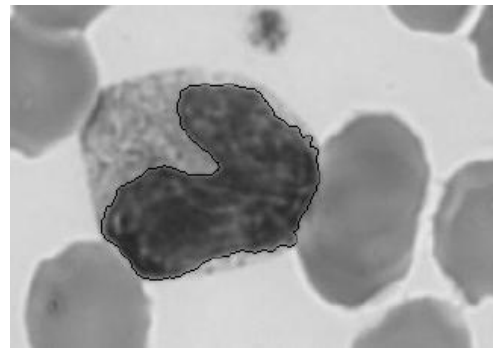
Fig. 3 Original image of Blood   **Fig. 4 Output image of Blood**

III CONCLUSION

The paper has presented the image processing approach to the recognition and classification of the blood cells. The most important points of this approach are: Different features of cells are then extracted from the labeled image. From these features, database is created and with the help of this database, set of test images and watershed technique, classification of various cells in an image has done.

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