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A Review on Automatic Detection Method Of Leukaemia By Using Segmentation Method

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ABSTRACT— Morphological medical diagnosis of the bloodstream and bone marrow smear beneath the microscope is a crucial preliminary part of the diagnosis of severe leukaemia. The features and differential counts of the cells furnish beneficial information to the consultant to verify the diagnosis and get started treatment, increasing the opportunity of survival of the individual thus. Manual diagnosis procedures tend to be tedious, labour intensive and frustrating. A computerised system might help accelerating the morphological medical diagnosis process. The proposed approach contains gradient magnitude, thresholding, morphological functions and watershed transform to execute cells segmentation. 50 pictures from subtypes M2, M5 and M6 had been used to check the proposed approach and the effect showed that the technique were able to obtain qualitatively very good segmentation outcomes. The segmentation reliability for the tested impression is 94.5% as the overage accuracies for the various other subtypes are 94.58%, 95.06% and 95.65% respectively.

KEYWORDS- 1], HSV color Transform [2], Extract Saturation Component [3], Fuzzy C-means clustering on HSV transformed Image [4], Gradient Based Watershed Transformation etc.

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I. INTRODUCTION

Leukemia is a malignant disease or tumors of the blood vessels. It is seen as a an abnormal accumulation of white blood cells (leukocytes) and its own precursors which disable its function of fighting infection. You will find two types of serious leukemia: Acute Myeloid Leukemia (AML) and Acute Lymphoid Leukemia (ALL). The difference between your two types of leukemia will depend on the event of the condition. AML occurs on the myeloid type of the blood skin cells. Alternatively, ALL is seen as a the unnecessary lymphoblast in the bone marrow.

Early treatment and diagnosis gives assuring passport of recovery to the patient afflicted with leukemia, provided the individual responds well to the procedure. A complete bloodstream matter (CBC) test will first be performed on patient who present with symptoms linking to leukemia [10]. The task includes differential and total matter of white bloodstream skin cells within the peripheral blood vessels. Furthermore, morphological, immunophenotyping and cytogenetic study of blasts extracted from the bone marrow will be the standard diagnosis procedure [5]. Very skilled resources are had a need to research this classification and abnormalities. The procedure can be tedious, time expensive and intensive.

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Image enlargement and segmentation are in the first level of image control, and is recognized as the most important for successful feature classification and removal of leukemia in second option level. The automated image processing analysis presents significant difficulties due to: the complex contents of a graphic, consisting different classes cells; impact of image quality by the brightness and staining inconsistencies; clustered cells and blur boundary between nucleus and cytoplasm oftentimes

II. LITERATURE SURVEY

A lot of methods have been launched for the potency of white blood vessels cell segmentation: multispectral imaging research strategy [1], histogram equalization and threshold [2], k-means clustering, dynamic curves and Snake algorithm [3], watershed transform [4], and so many more.

Watershed segmentation became a favourite tool for different applications that want image segmentation, such as machine inspection, aerial image understanding, medical image examination, and video subject segmentation [5]. The watershed segmentation offers some advantages: it is a straightforward user-friendly method, fast and can be parallelized and it produces a complete department of the image in segregated regions, avoiding the need for almost any contours joining [6] thus. Its significant drawbacks include over-segmentation and sensitivity to noise.

III. PROBLEM DEFINITION

Image Acquisition

Image Acquisition Bone marrow images acquisition was done at the University Sains Malaysia Hospital. All the smears were tained with Wright's staining method. This stain is commonly used in blood morphology as it provides satisfactory stain quality and necessary information for morphological diagnosis [5]. Acquiring the preferred region in the slide is utmost element, with high resolution, clarity, accuracy and fair brightness, as the segmented cells will be used for feature extraction and classification process. Fig. 1 shows the sample of subtype M5 AML image.

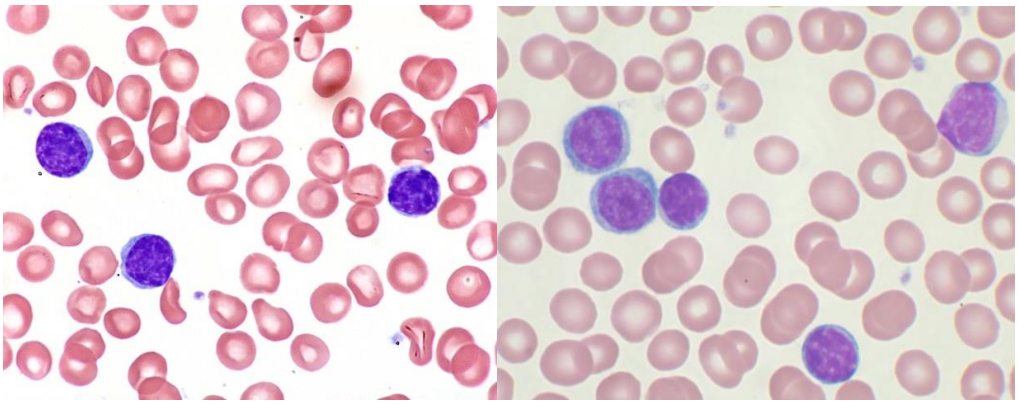

Fig.1 Original Images of Blood Cell of Leukemia Disease.

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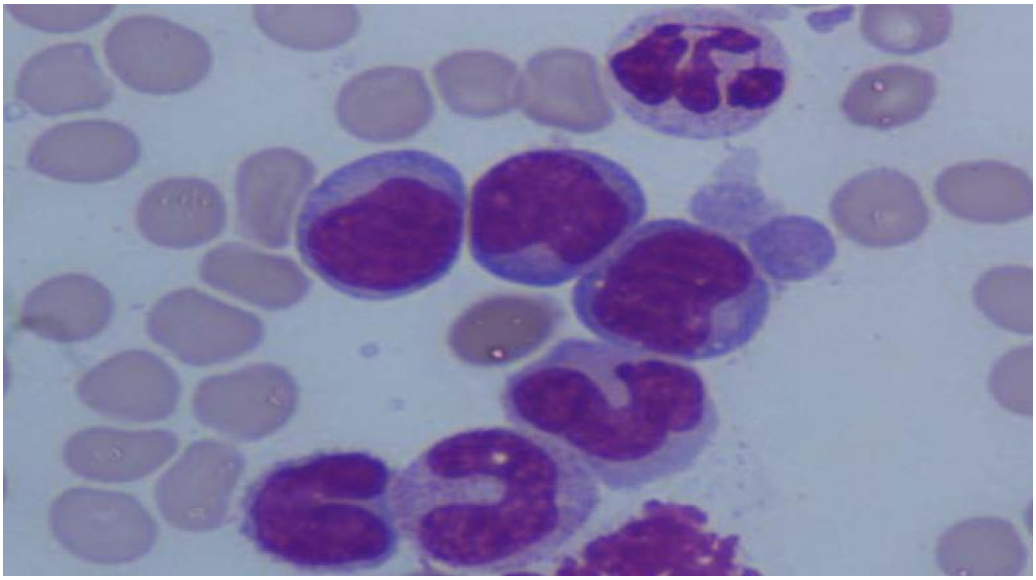

Fig 2. Sample of type M5 AML image

The purpose of segmenting the image is to find sub-images that contain only one leukocyte or blast cell and eliminate the background. This step is divided into three steps.

1) Mark the leukocytes and blast cells as foreground objects.

2) Eliminate the background objects (red blood cells and platelet).

3) Apply watershed transform to separate connected cells.

IV. PROPOSED ALGORITHM

Leukaemia is a malignant cancers or disease of the bloodstream. The task includes total and differential count up of white blood vessels skin cells within the peripheral blood vessels. Furthermore, morphological, cytogenetic and immune-phenotyping study of blasts from the bone marrow will be the standard prognosis method. Very skilled resources are had a need to study this abnormalities and classification. The procedure can be tedious, time expensive and intensive.

Image segmentation and augmentation are in the first level of image control, and is recognized as the most important for successful feature classification and removal of leukaemia in last mentioned level. The automated image processing analysis presents significant difficulties due to: the complex contents of a graphic, consisting different classes cells; effect of image quality by the lighting and staining inconsistencies; clustered cells and blur boundary between nucleus and cytoplasm oftentimes.

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These techniques by themselves not provide a significant segmentation rate, that is why it is best to develop something which is hybridize with certain segmentation techniques to be able to achieve an improved segmentation rate in overall method. As a new approach we are going to develop a system consists of techniques like fuzzy c-means clustering, gradient founded watershed transform and primary pre-processing done through HSV shade transform. The comprehensive flow graph is mentioned within the next page.

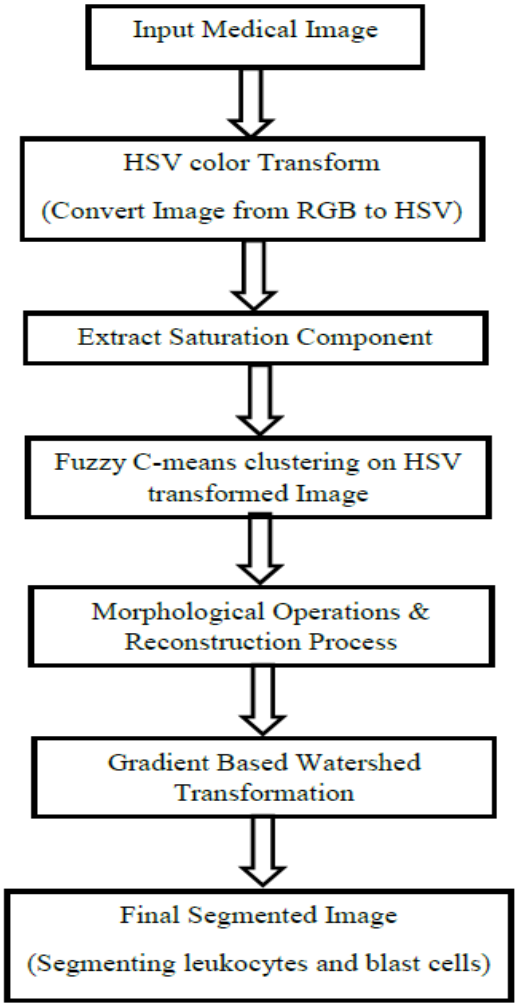

Fig 3. Flowchart of Proposed System

Efficiency Parameters Calculation in terms of:

- Segmentation Rate
- Segmentation Accuracy
- Statical Parameters
- Region Properties

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V. EXPECTED RESULTS

1. Diagnosis and treatment gives assuring passport of recovery to the patient affected with leukaemia.
2. A complete blood count (CBC) test will first be performed on patient who present with symptoms linking to leukaemia.
3. Total and differential count of white blood cells present in the peripheral blood.
4. Morphological, immune-phenotyping and cytogenetic examination of blasts obtained from the bone marrow are the standard diagnosis procedure.
5. Multispectral imaging analysis technique.
6. Histogram equalization and threshold.
7. K-means clustering, active contours and Snake algorithm.
8. Gradient Based Watershed transform.

VI. CONCLUSION

A method was described by this paper for segmenting leukocytes and blast cells using morphological businesses and watershed segmentation. The watershed segmentation algorithm provides additional capacities to lessen over-segmentation, preserve edges shape, sub and size top features of the objects. Results enhance the computational efficiency of the algorithm, correlating thresholding and watershed segmentation to provide enough information of the segmented cells for feature classification and extraction. The drawback of the proposed method may be the incomplete localization of the cells of interest including then nucleus and cytoplasm all together.

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