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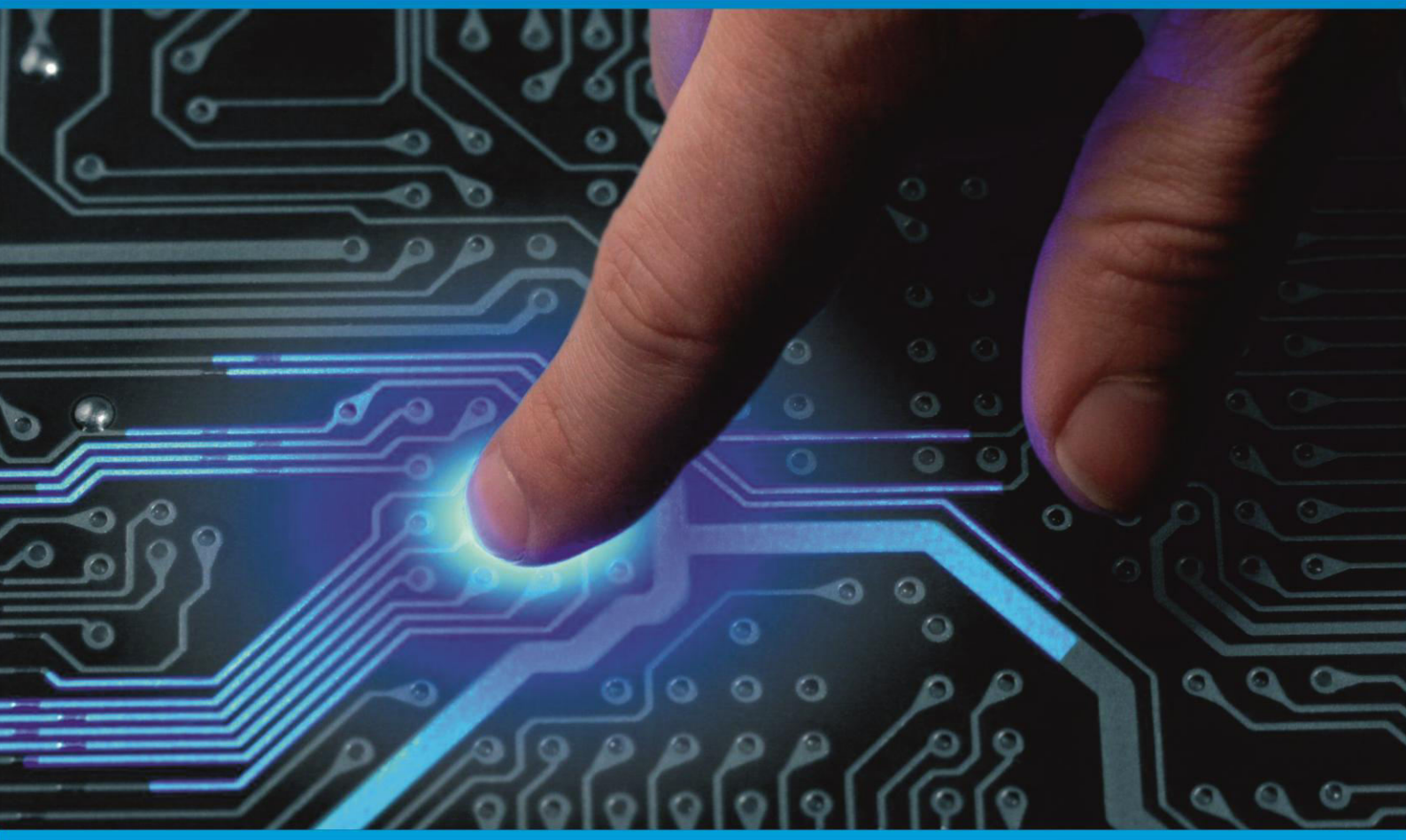

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Automated Detection of Cancer Diseases from White Blood Cells Using IoT

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ABSTRACT: Computerized analysis of white platelets tumor maladies such as Leukemia and Myeloma is a testing biomedical investigate point. Early detection plays a serious role for averting complications in patient's health. Blood smear pictures are proficient and genuine wellspring of knowledge in extraction of features just in case of an event of cancer growth discovery. In appraisal of cancer growth discovery like leukemia cancer image, feature extraction and reduction must be done effectively. Blood cancer can be diagnosed manually by Bone marrow biopsy, Lymph node biopsy and Lumbar puncture. Manual detection of white blood cancer cells can cause misdiagnosis and high computation time which will even cost the patient's life. Hence, automatic detection is used for detection in less time and reduced misdiagnosis rates. In this paper, we've briefly reviewed, surveyed and analyzed the prevailing algorithms and methodologies used for detecting blood cancer.

KEYWORDS: Image processing, white blood cells, CNN classification, IOT.

I. INTRODUCTION

In this system health condition will be automatically updated to the internet for analysis by using image processing and MATLAB process. The previous existing system is done by manual methods but in this system, we are using CNN classification for detecting the type of cancer cells through image processing. Using MATLAB in Mixed signal processing platform the information are stored and the type of cancer is displayed in LCD and updated in IOT. The main purpose is to develop an automatic arrangement, which segments and classifies microscopic blood images from cancer and non-cancer people. The three types of blood cancer are leukemia, lymphoma and myeloma. Computerized analysis of white platelets tumor ailment such as, Leukemia and Myeloma is a testing biomedical look into point. Discovering those diseases within the early stages highly affects the treatment period. In addition, some of the diseases' sub-types are really confusing to the Doctors. Nowadays, there's an excellent tendency for diagnostic pathology to heavily believe automated systems which may aid within the diagnosis. White blood cells cancer diseases; Leukemia and Myeloma, threaten people's life nowadays. Leukemia is found when the bone marrow produces abnormal white blood cells, which don't function properly. It may be either acute or chronic.

II. RELATED WORK

Some studies have done a lot of enhancement technique of image quality in recent years. One of them has been done by using contrast stretching technique. Contrast stretching is employed to enhance the method of diagnosis of leukemia images, thus providing additional information on the cytoplasm and nucleus cell. Research on the improvement of image quality among others has been done by using median filter. Median filter could provide a smoother appearance by retaining the edge detail of the object. At the stage of identification of medical object, one among the important stages is segmentation. Segmentation aims to separate the part of the cell body consisting of nucleus and cytoplasm. The thresholding method can also be used for segmentation. On the opposite hand, another technique use color as a medium for object separation by using K-Means. Besides these two methods, watershed distance transform can also be wont to perform separation of stacked cells. Feature extraction has an important role in the classification technique as the stage performed after the segmentation process.Features are used as input values that represent the circularity are very influential in determining the characteristics of the thing. It is proved by a maximum accuracy, value of 95.70%. Other features such as area, ratio of nucleus, recognize objects with an average accuracy of 89.68%. In addition to these four features, color features like mean and standard deviation of RGB colors can also be applied. The classification stage of objects supported features has been done by using supervised classification techniques with support vector machine.

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III. EXISTING SYSTEM

In this system the blood samples were detected using manual methods that is with the periodic inspection of blood sample using microscope. Each cell was segmented and observed. A sample threshold value was calculated for the normal cells previously. The cells which exceeded this sample threshold value of the traditional cell were considered as defective cells. The different categories of WBC cancers were assigned with a reference value. The defective cells were compared with the reference cancer cells. The threshold value of the sample nearest to each of the cancer cells value were featured together and were assigned to which type of the cancer it belonged to. In this system only, monitor.

IV. PROPOSED SYSTEM

Generally, the more dreadful the disease is, the more time is taken for the diagnosis. Due to the patients waiting time, the chance of death is highly increased.Hence it is necessary to diagnose a disease in less time with more accuracy. Diseases such as Cancer, Ebola, Hepatitis and Corona take a lot time for detection. While these diseases should be treated immediately. Pathological tests are expensive and are sometimes not affordable to the patients. Hence, the blood reports must be detected automatically in less time and should be cost effective. Thus, this approach deals with the automatic detection of white blood cells cancer diseases with less time and more accuracy using image processing with the help of MATLAB software.

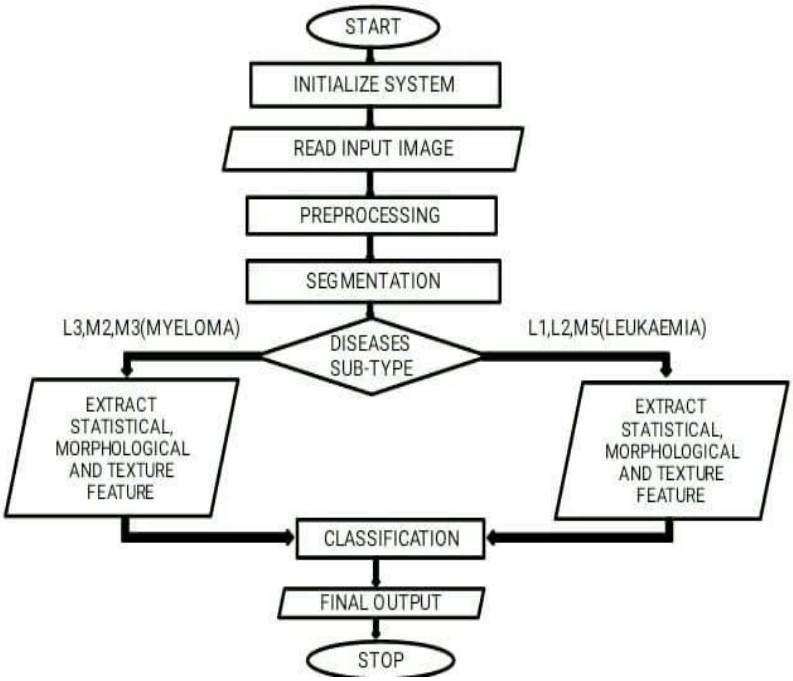

Fig: 4.1 Flow chart for image

STEPS:

- Start the process.
- Initialize the system. Run and read the input image.
- Pre-processing step is used to remove unwanted noises by using log-gabor filter andthe output of log-gabor filter is given to segmentation process.
- Segmentation process is convert input image into gray image (Black and white image) and using CWT (continuous wavelet transform) to generate superpixel image.
- Diseases subtype is identify whether it is leukaemia(L1,L2,M5) or myelom(L3,M2, M3)based upon the segmentation output.
- Feature extraction process is based on GLCM approach (gray-level co-occurrence matrix) to extracting statistical textures features,Consider the relationships among three or more pixels and extract the edges of input image.
- Classification is based on CNN algorithm (convolutional neural network).
- Final output is displayed.
- Stop the process.

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In our proposed system we will implements all are automation. In this system health condition will be automatically updated to the internet for analysis by using image processing and MATLAB process. The previous existing system is done by manual methods but in this system, we are using CNN classification for detecting the type of cancer cells through image processing. In this system we will include both monitor and control by using Mixed signal processing. Using MATLAB in Mixed signal processing platform the information are stored and the type of cancer is displayed in LCD and updated in IOT.

IV. METHODOLOGY

The system has implemented using the mixed signal-processing platform. White blood cancer cells are detected by image processing with predefined set of parameters. The image processing is automatically done through the computer itself using following steps such as pre-processing, segmentation, featureextraction, Classification and console.MSP is connected to temperature sensor, heart beat sensor, buzzer and LCD for automated detection of white blood cells cancer diseases updated in IoT.

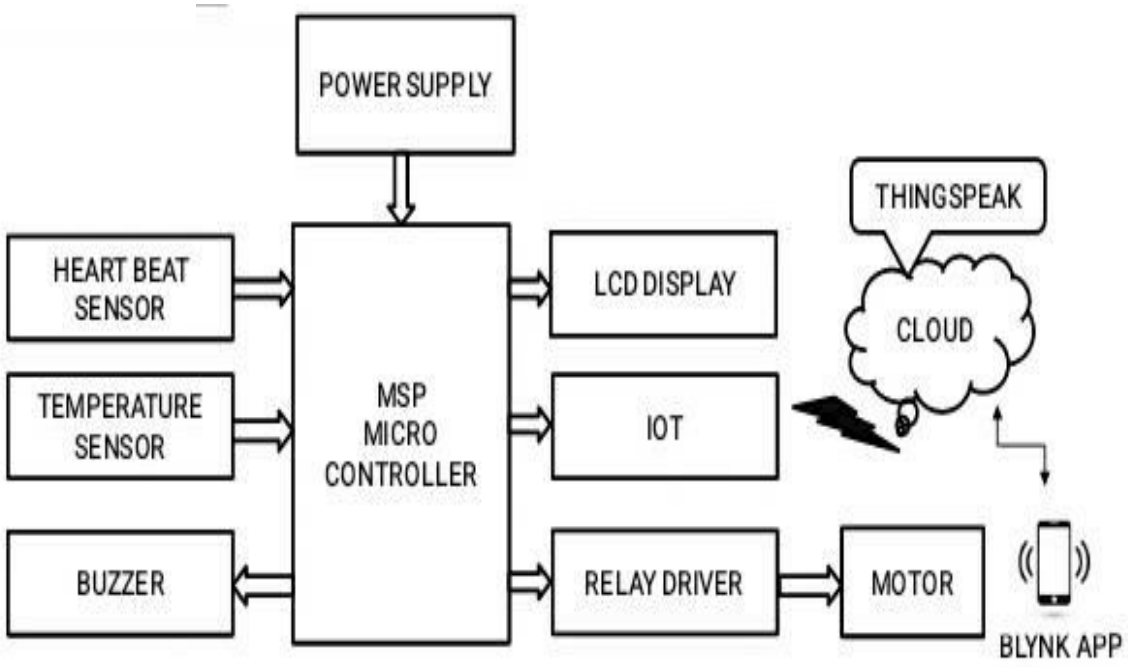

Fig: 5.1 Block diagram of proposed system

Temperature and heartbeat of the patient can be monitored by heart rate sensor and temperature sensor.The power supply given to the MSP of about 12Volt.The MSP acts as a microcontroller through which the MATLAB program is loaded. The program sends the start and stop command to the computer for executing image processing technique Based on the image processing which type of cancer disease whether it is Leukaemia or Myeloma will be revealed using CNN classification. The alarm will be produced using buzzer if any temperature and heartbeat value increased. The type of cancer is displayed in LCD.

All the information's are monitored and stored in Internet of Things (IOT).In this case any difficult situation patients health condition is critical but doctor is not present in hospital our system-updated information is very useful to prescribe any injection to infuse that patients in this process also automatically done.Patient temperature and heartbeat is automatically updated through IOT.Doctor will visible by using blynk app and control switches also available for this app.

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V. IMAGE PROCESSING

Image Processing − It focuses on image manipulation. Image processing may be a method to perform some operations on a picture, to urge an enhanced image or to extract some useful information from it. It is a kind of signal processing during which input is a picture and output could also be image or characteristics/features related to that image.

- Importing the image via image acquisition tools.
- Analyzing and manipulating the image.
- Output in which result can be altered image or report that is based on image analysis.

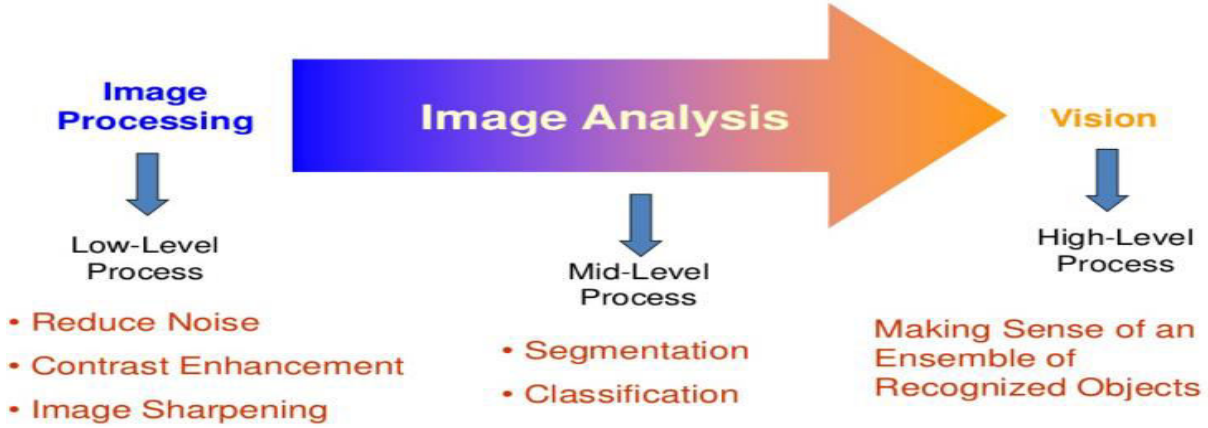

Fig:6.1 Image processing processes

Image Acquisition:

Acquisition might be as simple as being given a picture that's already in digital form

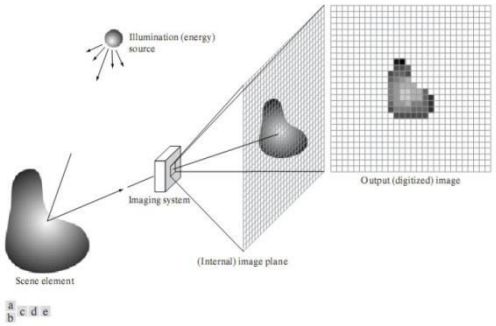

Fig:6.2 Input image

The pre-processing step is used for removing the unwanted noise effects from the sample image.It is primarily necessary to remove the noise from the image so as to proceed the next step. The noise is filtered by using the log gabor filter.

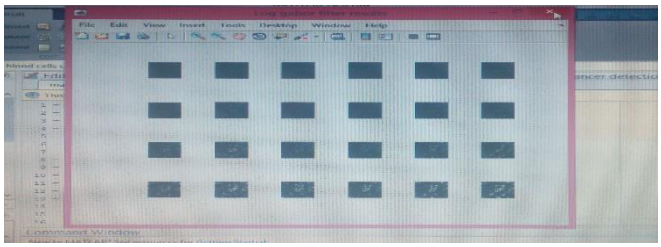

Fig:6.3 Filtered output

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This process involves selecting the region of interest in the image.This describes the area which comprises the blood cells. Continuous wavelet transform is applied and not much of the image segmentation is needed because the applied transform looks only for the circular objects in the image.

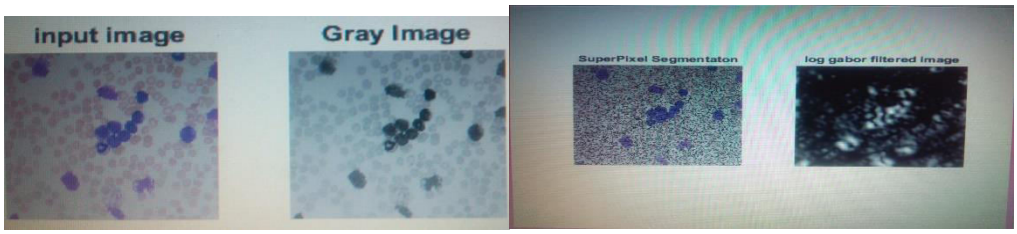


Fig:6.4 Segmentation output

Feature extraction is used to reduce the dimensionality of the image in image processing and pattern recognition. Generally, when the input given for the process is too large it cannot be processed. Hence this step helps to reduce the representation of the features of the input image.

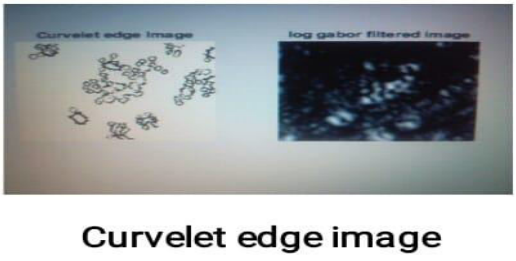
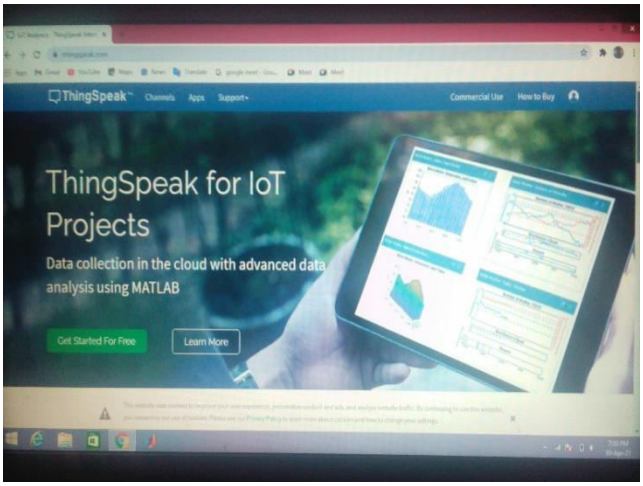
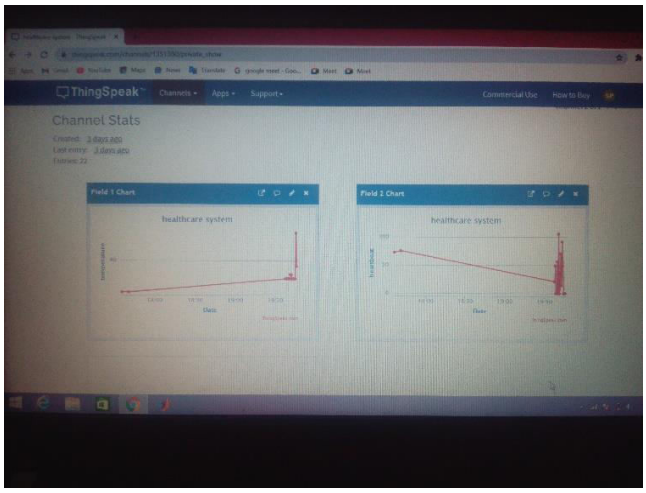


Fig:6.5 Curve let wave image

VI. RESULTS AND DISCUSSION





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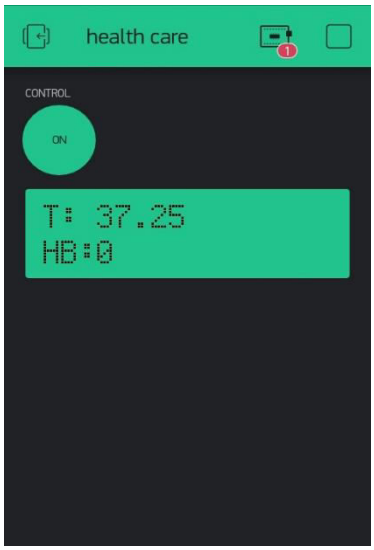

Fig:7.1Thingspeak Platform **Fig:7.2Output of Thingspeak**

By using this method, the cancer cells are identified even at laboratories with limited human resources. The processing steps are less hence skilled labour is not required.IoT allows for the accurate collection of data, automated workflows and minimised waste, but most importantly it reduces the risk of error. **Decreased costs** with iot, patient monitoring are often wiped out real-time, drastically lowering the necessity for doctors going out and making visits.

VII. CONCLUSION AND FUTURE WORK

In this paper, the detection and counting of white blood cell cancer is done.The sample image is processed by image processing technique.CNN classification is used to compare and detect cancer in images.The automatic detection on white blood cancer cells possesses various challenges. The automated system should correctly identify the intended objective at the earliest .The accuracy of the automated system greatly depends on sort of segmentation algorithm employed, the feature to be extracted and therefore the methodology incorporated. Thispaper overcomes the drawbacks of previous existing system in a successful manner still it has few drawbacks. These drawbacks of obtaining the results for only the trained images have to be overcome in near future so that the detection of cancers of various kinds can be implemented by this method. By using this paper as a reference advance technology for cancer detection can be researched and the future advancement in the field of biomedical can be obtained.

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