Calculating the Blood Cells Count Using Image Processing and Computer Vision.

K.Kumaran Assistant Professor Department of Information Technology Easwari Engineering College Chennai, India kumaran.me.cse@gmail.com

G.Saranya

Assistant Professor Department of Computer science and Engineering SRM institute of science and technology Chennai, India saranyag@srmist.edu.in

> N.Ananthi Associate Professor Department of Information Technology Easwari Engineering College Chennai, India nandhura@gmail.com

> Rachamalla Mrudula UG scholar Department of Information Technology Easwari Engineering college Chennai,,India rachamallamrudula10@gmail.com

> Sally Thompson UG scholar Department of Information Technology Easwari Engineering College Chennai, India sallythompsun@gmail.com

> Sritarunikha.T UG scholar Department of Information Technology Easwari Engineering College Chennai, India sritarunikhathiyagarajan99@gmail.com

Abstract—The Blood cells white, red and platelets are vitals of the system . These cells help control infections with aggressive bacteriological viruses and germs that invade the body .laboratory tests which are not customary for everyone . the generation of codes that can facilitate the counting of blood cells that produce a correct response through images provides relief from this disadvantageDuring this study, the photographs were treated and an algorithmic blob observation program was accustomed to detecting the disease and differentiating RBC ,WBC and platelets.The automation is accompanied by a graphical program saved with an operating information system to retain user records.The system performance has been statistically defined as correct compared to the manual counting methodology.Therefore, the results demonstrate an associated accuracy of 100% for living substance.

I. INTRODUCTION

Platelets measure square one in each of the blood cells which stops the injury in the body from blood clotting..it will observe if any square measure of the blood vessels is shattered. RBCsIn addition few blood cells which is also necessary in human health by the transport of the recent chemical element all along the body while white blood cells help protect the body against infections.CBC requires blood tests to check the health of the most important parts of the blood that measure square of blood cells. Outcome anomalies based mainly on references from traditional cell counting could indicate an associated degree underlying medical condition that. desires more analysis. Over the past several years., blood count reckoning is ineach of the most researched space of the analysis due to the decreasing accuracy. Hospital laboratories in the Philippines square still measure victimization using standard blood cell calculation methodology. during this research, it utilize pictures of the sample to calculate the amount of cells because analysis in pictures is evolution. Image procedure may be a methodology that requiregesture process to vary thetransform one picture into another of desired image. Image examinationis the extrication of great info of a picture. Consequently, the project doesn't requirepictureprocess solely however survey still. Nowadays, there square measure many variety of images process and survey of corpuscle pictures. nevertheless, hunt of very best precision continues to be in every of researchers' objectives .accompanied by such a big amount of studies, the researchers can gift otherwise of reckoning cellsinto and out of the utilization of learning quantity of algorithmic program in the company of matlab. The learning used color filtratestay particulartone whereas desaturating the final image. this additionally requires picture se to separation to turn the picture into numerous component to spot the cells square measure the types. Blob algorithm acts as necessary during the learning that firstly discover the variations about every gore cells.

II. LITERATURE SURVEY

1.Morphological gathering of blood leucocytes by magnifier pictures. The gathering and moreover the incorporate of white platelets in research pictures permits the in vivo examination of a fair shift of critical haematic pathologies (i.e., from presence of illnesses to leukemia).

Nowadays, the morphological cell portrayal is by and large made by comfortable with overseers. Such a methodology presents shocking

Downsides: slowness and it presents a not standardized accuracy since it depends upon the director's abilities and shortcoming. Solely few attemptsof fragmented/full machine-controlled structures maintained picture getting ready systems ar favoring recorded as a hard copy and that they ar still at perspective stage. This paper presents a methodology to accomplish a customized area and gathering of leucocytes by magnifier concealing pictures. The projected system driving individuates inside the blood picture the leucocytes from the others platelets, by then it eliminates morphological records lastly itclassifies the leucocytes by a neural classifier in WBC, Eosinophil,Lymphocyte, white blood corpuscle and neutrophile.

2. Recognizing evidence in Peripheral Blood magnifier pictures. The essential ID of exceptional lymphocytic leukemia results in patients will remarkably improve the likelihood of recovery.

Nowadays the cancer} affliction may be known by means of modified express tests like cytology and Immunophenotyping and morphological cell gathering made by private with chairmen knowing blood/marrow magnifier pictures. Those techniques don't have all the earmarks of being encased into colossal screening programs and are applied just if ordinary signs gives off an impression of being in standard blood assessment. The cytology and Immunophenotyping indicative systems are as of now by and large notable for their exceptional accuracy with importance the strategy of blood corpuscle discernment that presents undesirable

Disadvantages: gradualness and it presents a not normalized exactness since it relies upon the administrator's capacities and exhaustion. Then again, the morphological examination basically needs an image not a blood test and accordingly is proper for modest and far off indicative frameworks. The gave paper shows the adequacy of partner degree programmed morphological method to recognize the Acute disease of the blood by fringe blood magnifier pictures. The projected framework first and foremost individuates inside the blood picture the leucocytes from the others platelets, at that point it chooses the white cell cells (the ones curious about intense leukemia), it assesses morphological lists from those cells and finally it characterizes the presence of the malignant growth.

3.Detection of malignant growth in human blood test in minuscule pictures:

Right now, recognizing verification of blood issues is through visual examination of moment pictures of platelets. From the distinctive evidence of blood issues, it will achieve course of action of bound diseases related with blood. This paper depicts a starter examination of developing a recognizable proof of harmful development varieties abuse minuscule blood test pictures. Examining through pictures is awesomely critical as from pictures, contaminations may be perceived and broke down at before stage. Starting there, further exercises like prevalent, insight and hindrance of sicknesses may be done. Pictures are used as they're negligible exertion and don't need exorbitant testing and science lab supplies. The structure can have down to earth insight in white platelets contamination, leukemia. The system can use

decisions in tiny pictures and break down changes on surface, estimation, concealing and applied number related assessment. Changes in these decisions are used as a classifier input. A composing review has been done and Reinforcement Learning is projected to orchestrate kinds of sickness. A touch discussion regarding issues stressed by researchers conjointly has been readied.

4.Leukocyte division and grouping in blood-smear pictures

The identification and order of leukocytes in blood smear pictures might be a standard assignment in determination. during this paper we tend to blessing a completely machine-controlled way to deal with platelet division that is durable concerning cell look and picture quality. an assortment of choices is utilized to clarify cellular material and core properties. Pairwise SVM arrangement is utilized to segregate between totally unique cell assortments. investigation on an assortment of 1166 pictures (13 classes) brought about ninety fifth right divisions and seventy fifth to 99 right order (with reject alternative).

5. Fuzzy primarily based Blood Image Segmentation for machine-controlled cancer Detection.

Intense lymphocytic leukemia (ALL) ar a lot of hematologic pathologic cycle of youth that is described by a curiously large scope of natural liquid impacts inside the circulatory system. ALL makes around 80th of youth malignancy and it generally happen inside individuals of 3-7. The vague idea of the signs and manifestations of ALL commonly brings about wrong assignment. Demonstrative disarray is moreover open on account of impersonation of similar signs by elective issues. Cautious minute assessment of stained blood smear or bone marrow suction is that the exclusively because of compelling finding of disease. Strategies like noticeable radiation set up mating (FISH), immunophenotyping, cytology examination and cytochemistry additionally are used for explicit malignant growth identification. the prerequisite for robotization of malignant growth location emerges since the higher than explicit tests ar time extraordinary and costly. Morphological examination of blood slides ar impacted by factors like hematologists skill and weariness, prompting non normalized reports. a periodic cost and prudent goal is to utilize picture investigation for quantitative assessment of stained blood minuscule pictures for malignancy identification. A fluffy essentially based 2 phase shading division methodology is utilized for isolating leukocytes or white platelets (WBC) from elective blood parts. Discriminative alternatives for example core structure, surface ar utilized for definite location of malignant growth. inside the blessing paper 2 novel structure choices i.e., Hausdorff Dimension and shape mark is implemented for characterizing a white corpuscle organelle. Backing Vector Machine (SVM) is utilized for characterization. a total of 108 blood smear pictures were considered for highlight extraction and last execution examination is substantial with the aftereffects of a subject matter expert.

6.PC helped segregation among dangerous lymphomos and malignancy abuse immunophenotyping keen picture stores

The way toward segregating among pathologies including fringe blood, bone marrow, and lymph organ has truly started with abstract morphological appraisal of cell materials saw misuse light-weight research. The refined noticeable varieties showed by some threatening lymphomas

and malignancy, be that as it may, produce to a major scope of bogus negatives all through minuscule examination by clinical technologists. we have built up a dispersed, clinical call support worldview for trademark among medication malignancies. The framework comprises of 2 significant parts, a disseminated telemicroscopy framework partner degreed a smart picture store. The crossover framework grants individuals settled at unique clinical and investigation destinations to cooperate in intuitive counsel and to get PC helped call support. Programming, written in JAVA, grants essential clients to manage the example stage, target focal point, lightweight levels, and focal point of an automated magnifier distantly while a computerized delineation of the example is ceaselessly communicated to all or any meeting members. Essential client standing might be passed as a token. The framework alternatives shared graphical pointers,text electronic correspondence capacity, and programmed the executives. Web indexes for the data empower one to precisely build up and recover pictures, analyze, and related clinical information on cases from a "highest quality level" data that show phantom and spacial profiles that ar most practically like a given inquiry picture. The framework proposes the principal without a doubt assignment upheld greater part rationale of the recovered cases. The framework was acclimated separate among 3 lymphoproliferative problems and sound cells. The framework gave the appropriate grouping in extra than 83 of the cases examined. Situation execution was assessed misuse thorough applied number related appraisal and by correlation with human onlookers.

7.New call support instrument for therapy force elective in youth intense lymphocytic leukemia.

Intense lymphocytic leukemia (ALL), the chief basic disease in adolescence, has its therapy adjusted by the risk of backslide. partner degree pertinent assessment of this danger is that the most indispensable issue for the meaning of treatment procedure. during this paper, we tend to develop a substitution call support instrument to improve therapy force elective in youth ALL.Our technique was applied to a major accomplice of Brazilian children with ALL, the greater part of the cases treated inside the most recent DEcade inside the 2 principle University Hospitals of metropolitan focus de Janeiro. Some {intrinsically|perse|assuch|in partner degreed of itself} troubles of this dataset present a combination of difficulties, among those the prerequisite of a right selection of choices, clinical and laboratorial information. we tend to apply a shared data based strategy for this reason and a Neural Network to appraise the threat. Among the backslid patients, 98.2% would are known as shaky by the projected system. The projected strategy showed significantly higher outcomes contrasted with the BFM95, a wide utilized order convention.

8.Boolean Derivatives With Application Detection for Imaging Systems.

This paper presents a substitution origination of Boolean subordinates as afusion of fractional subsidiaries of Boolean capacities (PDBFs). 3 practical calculations for the computation of PDBFs ar gave. it's shown that Boolean work subordinates ar accommodating for the applying of recognizing the situation of edge pixels in paired pictures. a comparative origination is reached out to the occasion of a newedge identification rule for grayscale pictures, that yields serious outcomes, contrasted and those of antiquated procedures. also, a substitution live is acquainted with precisely affirm the boundary esteems utilized in the thresholding bit of the

binarization methodology. Through PC recreations, exhibits of Boolean subsidiaries and furthermore the viability of the gave edge location rule, contrasted and antiquated edge identification calculations, ar shown misuse numerous counterfeit and common check pictures. to make quantitative correlations, 2 quantitative estimates ar utilized: one upheld the recuperation of the underlying picture from the yield edge map and furthermore the Pratt's figure of benefit.

III .PROPOSED SYSTEM

A. Overview

In planned system we have a tendency to use easy Blob Detector, because the name implies, is predicated on a rather easy algorithmic program represented below. The algorithmic program is constrained by boundaries (appeared in challenging underneath) and has the ensuing advances. Look over right down to insightful the boundaries region unit set.

Thresholding: Convert the inventory pictures to numerous paired pictures by thresholding the stock picture with limits starting at the min edge. These edges region unit increased by the threshold Step until simple lay edge. Accordingly the underlying limit is that the min edge, the second is minThreshold + edge step, the third is minThreshold + 2x edge step, etc.

Gathering: In each paired picture, associated white pixels territory unit grouped along. We should choice these twofold masses.

Blending: The focuses of the double masses inside the paired pictures region unit processed, and masses put closer than minDistBetweenBlobs region unit coordinated.

Focus and Radius Calculation: The focuses and radii of the new coordinated masses territory unit figured and came.

Blood test Acquisition:

In this technique, the slides territory unit clean with maturation liquor abuse cotton. The fingers region unit clean with maturation liquor and region unit pricked with the help of Lancets. The blood drop is conceived onto the slide, smeared with Associate in Nursingother clean glass slide with a point of 45 degrees tendency. Right now the slide is whole for drying for 5 minutes. Leishman's stain is applied preposterous blood and solid to the side for drying. The stained slide is then washed with twofold water to dispose of the overflow stain .Nikon E 100 is utilized for acquiring the tiny pictures. Changes region unit made to actuate the reasonable pictures. Nikon 21 part Camera is utilized to get the photos with the help of right lighting and better changes.

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a. Overall System Architecture



Fig 1:System Architecture

METHODOLOGIES:

Picture Acquisition:

The principal phase of any vision framework is that the picture obtaining stage.Image securing in picture interaction might be comprehensively talking laid out on the grounds that the activity of recovering an image from some stockpile, regularly an equipment based inventory, along these lines it could be saw regardless of cycles had the opportunity to happen later on. Playacting picture securing in picture measure is frequently the essential advance inside the advancement grouping thus of, without an image, no interaction is achievable. The picture that is nonheritable is absolutely natural and is that the consequences of regardless of equipment was wont to create it, which might be significant in certain fields to have a uniform gauge from that to figure. One in every one of the sorts of picture securing in picture measure is perceived as timeframe picture acquisition.This ordinarily includes recovering pictures from a stockpile that is naturally catching pictures.Real-time picture procurement makes a flood of documents that might be consequently prepared.

Haar wavelet Process:

The primary DWT was imaginary by Hungarian man of science AlfrédHaar. For AN information diagrammatical by a posting of numbers, the Haar riffle redesign could likewise be considered to attempt up input esteems, putting away the Distinction and spending the add. This strategy is enduring recursively, matching up the totals to supply future scale, that prompts contrasts and a last add. The Haar riffle is also the awesome Conceivable riffle. The specialized benefit of the Haar riffle is of signs with unexpected changes, such as watching of hardware disappointment in machines.

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Fig 5: Sub band illustration in Haarwavelet

The Haar riffle's mother wavelet operate is represented as

$$\psi(t) = \begin{cases} 1 & 0 \le t < \frac{1}{2}, \\ -1 & \frac{1}{2} \le t < 1, \\ 0 & \text{otherwise.} \end{cases}$$

Its scaling function $\phi(t)$ can be described as

$$\phi(t) = \begin{cases} 1 & 0 \le t < 1, \\ 0 & \text{otherwise.} \end{cases}$$



Figure 10: AML Sub bands for Haar ripple methodology

Daubechies Wavelet Process:

The Daubechies wavelets, upheld crafted by Ingrid Daubechies, territory unit a group of ripplings measure a particular wavelet rebuild and portrayed by a biggest assortment of evaporating minutes for a couple of given help. With each undulating style of this classification, there's a scaling perform (called the daddy wavelet) that creates partner degree symmetrical multiresolution investigation.

The Daubechies D4 rebuild has four undulating and scaling perform coefficients. The scaling perform coefficients territory unit

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$$h_0 = \frac{1 + \sqrt{3}}{4\sqrt{2}}$$
$$h_1 = \frac{3 + \sqrt{3}}{4\sqrt{2}}$$
$$h_2 = \frac{3 - \sqrt{3}}{4\sqrt{2}}$$
$$h_3 = \frac{1 - \sqrt{3}}{4\sqrt{2}}$$

Fig 6 :AML Sub bands for Haar ripple methodology

Each Iteration within the riffle rework step calculates a scaling perform worth and a riffle perform worth. The index i is incremented by 2 with every iteration, and new scaling and riffle perform values square measure calculated.



Fig7: AML Sub bands for Daubechies riffle methodology

Features Extraction Process:

Feature Extraction starts from A fundamental course of action of assessed information and gathers derived qualities (features) planned to be edifying, non abundance, working with the going with learning and hypothesis adventures, now and again achieving higher human understandings. Feature extraction is related to spatiality decline. At the point when the information record to an algorithmic program is basically too beast to at any point be taken care of And it's suspected to be abundance (for instance a similar mensuration in each foot and meters, or the bluntness of pictures given as pixels), by then it will be improved into a lessened game plan of options (in like manner named decisions vector). This system is called incorporate extraction. The isolated options ar expected to contain the critical information from the information archive, so the foreordained task will be performed by misuse this diminished diagram rather than the all out initial information. Feature extraction incorporates decreasing the measure of resources expected to explain a bigger than regular game plan of information. When playing examination of front line information one among the chief issues begins from the proportion of components concerned. Examination with an inquisitively enormous extent of components commonly needs a bigger than normal measure of memory and computation power or a request algorithmic program that over fits the preparation test and summarizes insufficiently to new models. Feature extraction may be a general term for frameworks of building combos of the components to impel around these issues however at this point depicting the information with enough precision. For example; with AN eight dull level picture portrayal and a vector t that contemplates just one neighbour, we may find; Entropy, Energy, Contrast, coefficient of association and Homogeneity.

Training Process: Neural Network:

The essential phony nerve cell was made in 1943 by the neurophysiologist Warren McCulloch and in this manner the expert Bruno Walter Pits. A man-made Neural Network (ANN) is accomplice degree informatics perspective That is amazed by the procedure regular tactile frameworks, like the frontal cortex, methodology information. The crucial piece of this perspective is that the novel Construction of the data cycle structure. It's made out of an inquisitively enormous extent of incredibly interconnected cycle fragments (neurons) filling in as one to decide unequivocal issues. ANNs, like individuals, learn by Model. Accomplice degree ANN is proposed for a particular application, like plan affirmation or information request, through a learning strategy. Learning in normal structures incorporates changes to the colligation affiliations that exist between the neurons. Neural associations, with their exceptional ability to get which suggests from current or mixed up information, may be wont to isolate models and Identify designs that square measure too advanced to be in any way in any capacity perceived by either individuals or elective PC techniques. A readied neural association may be considered As accomplice certificate "ace" inside the class of data it's been given to explore. This master will by then be wont to offer projections given new things of interest and reaction "envision a situation where" requests



Fig 8

SOFTWARE DESCRIPTION MATLAB

MATLAB may be a dominating language for specialized processing. It joins computation, mental picture, And programming in an easy to-use setting any spot issues and plans ar imparted in recognizable documentation. Regular uses include:

- science and computation
- rule improvement
- Modeling, diversion, and prototyping
- data assessment, examination, and mental picture

- Scientific and planning outlines
- Application progression, alongside graphical PC program building

MATLAB is A savvy structure whose essential data part is A show that doesn't need orientating. This licenses you to unravel a couple of particular preparing issues, particularly those with Network and vector subtleties, in an actually some portion of the time it'd excessive form a program in an amazingly scalar no intelligent language like C or arithmetical language.

The name MATLAB addresses system lab.

MATLAB was at first made to supply expedient induction to system PC code made by the LINPACK and EISPACK comes. Today, MATLAB uses PC code made by the LAPACK and ARPACK comes, that along address the reformist in PC code for network estimation.

MATLAB has created over a proportion of years with commitment from a couple of customers. .In school conditions, it is the quality instructional exercise gadget for almost immediately and advanced courses in calculating, planning, and science. In business, MATLAB is that the gadget of different for high-proficiency examination, improvement, and assessment.

MATLAB decisions a gathering of utilization express Arrangements implied as tool compartments. Imperative to most customers of MATLAB, tool compartments enable you to find and apply specific development. Tool compartments ar thorough groupings of MATLAB limits (M-records) that stretch the MATLAB setting to unravel express Classes of issues. Zones inside which toolboxsar accessible embrace signal cycle, the heads systems, neural associations, mathematical reasoning, wavelets, propagation, and stores of others.

The MATLAB System

The MATLAB structure involves 5 crucial parts:

Progression setting. This is every now and again the course of action of instruments and workplaces that help you use MATLAB limits and reports. A couple of those instruments ar graphical UIs. It fuses the MATLAB work region and Order Window, a request history, and projects for audit work with, the space, records, and besides the pursuit way.

The MATLAB mathematical association Library. This is oftentimes a goliath assortment of methodology computations starting from simple limits like add, sine, cosine, and jumbled math, to extra refined limits like structure turn around, network eigenvalues, Bessel limits, and quick Fourier changes. The MATLAB Language. This is much of the time an obvious level system/group language with the load up stream enunciations, limits, data structures, input/yield, and thing arranged programming choices. It permits each "programming inside the little" to apace make fast and chaotic nonessential ventures, and "programming inside the gigantic" to shape all out colossal and tangled Application programs.

Handle Graphics[®]. This is oftentimes the MATLAB representations system. It fuses obvious level requests for two-dimensional and three-dimensional data mental picture, picture cycle, exuberance, and presentation delineations. It besides consolidates low-level requests that enable you to thoroughly change the Appearance of outlines what's more on structure all out graphical

UIs on your MATLAB applications. The MATLAB program Interface (API). This is routinely a library that enables you to record C and numerical language programs that move with MATLAB. It embrace workplaces for calling plans from MATLAB (dynamic associating), calling MATLAB as a framework engine MAT-record Perusing and creating MAT-records.

EXPERIMENTAL RESULTS

Results of a particular a part of the important image representing the microscopic image of crystals square measure bestowed in Figure. Image segmentation exploitation ripple remodel is ready to discover most of imagesegments even if the matter of fault category boundaries will arise in some cases.







IV.CONCLUSION

The paper presents image segmentation and classification mistreatment moving ridge rework. it's attainable to summarize that the moving ridge rework give several prospects of detection of image section options due to its multiresolution properties and also the chance to decide on totally different moving ridge functions (Haar wavelets and Daubechies wavelet) applicable for a given drawback likewise. Segments boundary signals were used for image classification despite the fact that there it's attainable to use 2 dimensional moving ridge rework for detection ofpatterns of individual segments texture, too.Methods mentioned within the paper are applied to analysis of shapes of microscopic pictures of crystals. Similar strategies may be employed in different applications in a very wide selection of knowledge domain issues oftexture analysis together with medical specialty imaging, process of satellite pictures, communications and remote earth observations.

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