STUDY DIFFERENT TYPES OF CELLS AND DETECTION BASED ON WHITE BLOOD CELL / LEUKOCYTES IN LEUKEMIA DETECTION

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Abstract— **Automatic advance of leukemia detection is planned. A physical technique of LEUKEMIA DETECTION, specialist checks microscopic images. Leukemia detection is generates in the bone marrow. Lengthy and time taking process which depends on human's ability and not having accuracy. Each bone contains a thin material inside is known bone marrow. The components of erythrocytes and leucocytes and platelets. Basically Leukemia is detected only by analyzing the white blood cells. Focused only on WBC, Leukemia Detection system analyses the microscopic image and conquer these Drawbacks. In this paper we describe a system for medical data processing that mainly uses support vector machine and genetic algorithms. Its provides the consequences achieved by processing dissimilar data including databases of children with learning system damage. Blood images of the good pixel quality are obtained. The noise is removed from the image using filter. Identify the white blood cell. To extract the features from the processing image. Basically find out the features of the nucleus of myelocytes and lymphocytes. Feature Extraction is the processing of converting the image into data.**

Keywords— **Leukemia Detection, medical Image registration and rigid registration algorithm**

I. INTRODUCTION

Data mining is a procedure that usages a variety of information analysis tools to find out patterns and relationships in data that may remain used to the make valid predictions. The first and Second logical step in data withdrawal is to define the data — summarize its arithmetical qualities (such as incomes and normal deviations), visually review it, and expression for possibly meaningful links between variables (such as values that often occur together). As highlighted in the unit on THE INFORMATION MINING PROCEDURE, gathering, traveling and selecting the right data are critically important. Data withdrawal is a tool, not a delighted pointer.
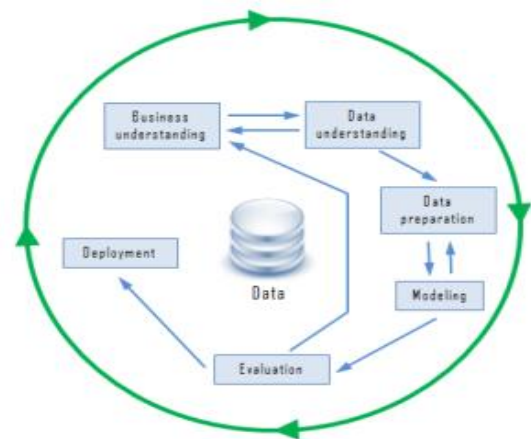

Fig. 1. Data mining technique

This won't sit in your record inspecting what occurs and send you e-mail to become your kindness when it understands a stimulating pattern. It doesn't eliminate the need to know your business, to comprehend your information, or to appreciate investigative approaches. Data mining assists business analysts with finding patterns &relations in the information — it does not express you the value of the patterns to the organization. Additionally, the designs exposed by information mining necessity be confirmed in the real world.[1]

II. LEUKEMIA DETECTION

Most plasma cells shaped since the cells in the bone marrow named stem cells. Bone marrow is a soft material originates in the central of every bone. Stem cells will establish and develop some sympathetic of plasma cells. Each blood type has their own function. Plasma mechanisms contain of:

a.) Red plasma cells (erythrocytes) - transmit oxygen to tissues and back to the lungs with carbon dioxide.

b.) White lifeblood cells (leukocytes) - Defensive the organism from infection. There are several types of white lifeblood cells.

c) Platelets – assistances blood coagulation to control blood loss.

d) Plasma - The fluid in blood containing melted ions wanted for cell purpose and contains of sodium, hydrogen, potassium, chloride, magnesium and iron.

When lifeblood cells are from the past or injury, the cells will expire and new cells will replace it.[2]The early and fast identification of the leukemia kind, importantly helps in given that the suit a bleaction for the specific kind. Its discovery surprises with a complete blood count (CBC). If there are irregularities in this count, enduring should achieve bone marrow biopsy.

Consequently, education of morphological bone marrow and outlying blood photograph analysis is done to confirm the presence of leukemic cells. In instruction to classify the irregular cells in their specific types and subtype of leukemia, an expert operative will experiential certain cells under a bright microscopy observing for the abnormalities presented in the nucleus or cytoplasm of the cells. This organization is very significant to regulate which action should be assumed to the patient. Though, this examination agonizes from sluggishness& it offerings a not consistent accuracy then it depends on the worker's competences and weariness. Consequently, this paper gifts a fast and effective segmentation procedure for blast images which is actual helpful for refining the hematological process and accelerating diagnosis of leukemia diseases [3]

III. CATEGORY OF LEUKEMIA

Leukemia's are known as for how rapidly the disease develops and gets worse.

a) **Acute:** Acute leukemia typically grows quickly. The amount of leukemia cells growths rapidly, and these abnormal cells don't do the work of usual white lifeblood cells. A bone marrow examination may express a high level of leukemia cells and low levels of normal blood cells. Persons with severe leukemia might feel actual weary, bruise effortlessly, and get contagions often.

b) **Chronic:** Long-lasting leukemia typically develops gradually. The leukemia cells work almost as well as normal white blood cells. People might not sensation sickening at first, and the first symbol of illness may be abnormal results on a routine blood test. For example, a lifeblood test might show a extraordinary level of leukemia cells. If not treated, the leukemia cells might later troop out usual blood cells.
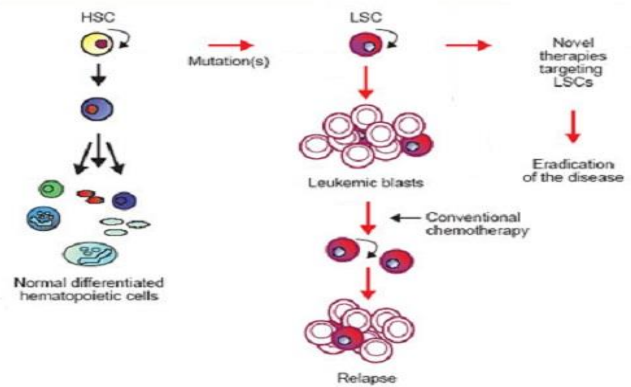

Fig. 2. Leukemia cancer

IV. RELATED WORK

An automated detection and classification of leucocytes by microscope color images. The planned scheme firstly individuates in the blood picture the leucocytes since the others lifeblood cells, formerly it excerpts morphological directories and lastly it categorizes the Leucocytes finished a neural classifier in Lymphocyte, Basophil, Eosinophil, Monocyte and Neutrophil.[4]An image processing technique for automatic counting the number of blasts current in the transparency of leukemia. In involuntary process, the division method for white blood cell (WBC) is one of most crucial phases. Segmentation founded on HSV (Capacity Hue, and Value) shade planetary will be used in instruction to eradicate the white lifeblood cells (WBC) from the contextual. A humble morphological operative such as corrosion plays position role particularly for the overlapping cells. The experimental results show that the planned scheme has providing the highest regular accuracy of 97.8% for counting both ALL and AML cases.[5] a new public dataset of blood samples, specifically intended for the assessment and the contrast of procedures for segmentation and organization. For each image in the dataset, the organization of the cells is assumed, as well as explicit set of figures of qualities to fairly associate the presentations of different algorithms.

This inventiveness aims to suggestion a new test instrument to the spitting image processing and pattern matching communities, conventional to inspirational new teachings in this significant field of research.[6] For feature point detection, a 3D SIFT key point sensor is functional to determine assessment reference opinions in liver vessel areas of reference images. For corresponding opinion localization, a 3D stage individual association method is applied to match reference points and their corresponding points. Coldness among the reference opinions and the communications can be used to estimate image registration errors. Through the planned method, users could evaluate dissimilar registration algorithms using their own image data automatically.[7] A

measurable microscopic method toward the judgment of lymphoblast's (malignant) since lymphocytes (normal) in discolored blood slur and bone marrow examples and to contribution in the development of a computer-aided screening of ALL. Automatic detection of lymphoblast's is consummate using image segmentation feature extraction, and organization ended light microscopic images of marked blood films. Accurate and authentic diagnosis of ALL is obtained with the use of better subdivision methodology, protuberant features ,and a collaborative classifier, easing rapid screening of patients. Untried results are got and associate dover the available image data set. It is observed that an ensemble of classifiers leads to 99 % accuracy in comparison with other standard classifiers, i.e., naive Bayesian (NB) radial basis functional network (RBFN),multi-layer perceptron (MLP), K-nearest(closest) neighbor (KNN), and support vector machines (SVM).[8]

V.   TYPES OF BLOOD CELLS

1) **Red blood cells**: carry oxygen from the lungs to all additional tissues of the form and income carbon dioxide back to the lungs to be removed.

2) **White blood cells**: help the body fight infections. Here are several kinds of white lifeblood cells, but the key categories are:
   • Lymphocytes
   • Granulocytes
   • Monocytes

3) **Platelets**: are really smithereens that break off since certain bone marrow cells. Platelets help stop flow by persevering hovels in lifeblood vessels caused by cuts or bruises.[9]

VI.   WHY WE DETECT LEUKEMIA IN BLOOD CELLS?

Leukemia is a blood cancer that could be noticed concluded the examination of WBCs or leukocytes. Leukemia can be of two types: acute and chronic. Rendering to the French-American-British (FAB) organization prototypical, acute leukemia is classified into dualistic sub-kinds: acute lymphoblastic leukemia (ALL) and acute myeloid leukemia (AML).[10] Leukemia is a general term that includes different cancers that happen in the bone marrow, which is accountable for providing blood cells.

• The cells formed in the bone marrow include: white lifeblood cells that fights contamination; red blood cells, which transport oxygen through the form; and platelets, who assistance through lifeblood clotting.

• The white compartments might be granulocytes, which are typically complicated with prevention of bacterial

infections, before lymphoid cells (together T and B), who manufacture a role in fighting infections.

•Leukemia's are characterized by the irregular, uncontrolled development of blood-forming cells. Exact Types

• The different types of leukemia's are classified rendering to the distance of the sickness, the amount of blood cells in the blood, and the specific type of blood cell involved.

• The four key categories of leukemia are:

1. Chronic lymphocytic leukemia (CLL)
2. Acute lymphoblastic leukemia (ALL)
3. Chronic myelogenous leukemia (CML)
4. Acute myelogenous leukemia (AML)

• Acute leukemia's can occur at any age and the disease growth is quick.
• Chronic leukemia's typically occur in adults and the sickness growth tends to be slower than for acute leukemia's. [11]

VII.   CONCLUSION

The rudimentary aim of the current effort is the ALL slide image sub division shadowed by feature withdrawals. We mainly measured shape features like area, perimeter, eccentricity, form factor etc. presents different methods to accurately measure cells properties in microscope blood film images .Provides major advantage especially to hematologists as it can provide total count of white blood cells that present in the leukemia slides in an automatic way so that they do not have to count manually as they used to. This will provide a faster solution and effective way for white blood cell counting where it can reduce the burden of the conventional way of counting. Thus, this will speed up the process of early detection of the leukemia disease. Early detection of positive case of leukemia can be arranged to undergo further test to confirm the disease so that early cure for the disease can be administered.

VIII.   REFERENCE

[1]   S. Mohapatra, S. S. Samanta, D. Patra, and S. Satpathi, "Fuzzy based blood image segmentation for automated leukemia detection," *2011 Int. Conf. Devices Commun. ICDeCom 2011 - Proc.*, 2011.

[2]   K. Fauziah, S. P. Anton, and A. Abdullah, "Detection of leukemia in human blood sample based on microscopic images: A study," *J. Theor. Appl. Inf. Technol.*, vol. 46, no. 2, pp. 579–586, 2012.

[3]   A. P. D. Mishra, Shailesh J, "Detection of Leukemia in Human Blood," *Int. J. Res. Electron.*, vol. 2, no. c,

pp. 10–14, 2014.

[4]   M. Saritha, "Detection of Blood Cancer in Microscopic Images of Human Blood Samples : A Review," 2016.

[5]   V. Piuri and F. Scotti, "Morphological classification of blood leucocytes by microscope images," *2004 IEEE Int. Conf. onComputational Intell. Meas. Syst. Appl. 2004. CIMSA.*, no. July, pp. 103–108, 2004.

[6]   N. Hazwani, A. Halim, M. Y. Mashor, and R. Hassan, "Automatic Blasts Counting for Acute Leukemia Based on Blood," *Int. J. Res. Rev. Comput. Sci.*, vol. 2, no. 4, pp. 971–976, 2011.

[7]   R. D. Labati, V. Piuri, and F. Scotti, "All-IDB: The acute lymphoblastic leukemia image database for image processing," *2011 18th IEEE Int. Conf. Image Process.*, pp. 2045–2048, 2011.

[8]   Z. Li, T. Kurihara, K. Matsuzaki, and T. Irie, "LNCS 7601 - Evaluation of Medical Image Registration by Using 3D SIFT and Phase-Only Correlation," pp. 255–264, 2012.

[9]   S. Mohapatra, D. Patra, and S. Satpathy, "An ensemble classifier system for early diagnosis of acute lymphoblastic leukemia in blood microscopic images," *Neural Comput. Appl.*, vol. 24, no. 7–8, pp. 1887–1904, 2014.

[10]   L. Putzu and C. Di Ruberto, "White Blood Cells Identification and Classification from Leukemic Blood Image," *Proc. IWBBIO Int. Work ...*, pp. 18–20, 2013.

[11]   V. A. Pullarkat, S. T. Pullarkat, D. C. Calverley, and R. K. Brynes, "Mast cell disease associated with acute myeloid leukemia: detection of a new c-kit mutation Asp816His," *Am.J.Hematol.*, vol. 65, no. 4, pp. 307–309, 2000.