International Journal of Science and Research (IJSR)
ISSN: 2319-7064
ResearchGate Impact Factor (2018): 0.28 | SJIF (2018): 7.426

An Artificial System for Prognosis Cancer Cells through Blood Cells Images Using Image Processing

Sonia Wadhwa[1], Dr. Sudhir Kumar Meesala[2]

[1]M. Tech. Research Scholar, Department of CSE, Chouksey Engineering College, Bilaspur (CG), India

[2]Assistant Professor, Department of CSE, Chouksey Enginnering College, Bilaspur (CG), India

Abstract: ***In present scenario, imaging in act an important role throughout the integrated medical process from indicative and find out about diseases through studies. Considering most of the imaging techniques have gone directly digital, with unceasingly increasing perseverance, these medical image processing has to confront many upcoming challenges from broad data measures. In our paper we describe the process of analysing cancer cell and how image processing is helpful and immensely important in medical science. The paper analyse and discover bacteria under blood cells through its rate of growth of bacteria in blood with the help of object recognition technique of image processing by getting the image through microscope. This work presents an precise way of static image processing technique of object recognition for detection and prognosis of cancer cell. This method used for diagnosis of abnormal growth of cells in any body part using blood cell image. This procedure include artificial expert system techniques, such as machine learning, artificial neural network, and fuzzy logic with medical imaging techniques. We subsist blood images as input for our expert system to analyse and detect the classification of growth of abnormal cell through static image processing technique. This paper presents another technique of image processing as pattern recognition for analysis and classification of cancer cells using microscopic blood cells images..The proposed method achieved sensitivity of 80%. specificity of 91.04% and accuracy of 96.4%.***

Keywords: Theurgical procedure, Previous medical imaging techniques, Static image processing technique, Object recognition, Pattern recognition, Machine learning.

1. Introduction

Cancer is the general label for a mass of more that 100 diseases. Despite the fact, cancer comprise different types of diseases, it has been described as a heterogeneous disease expressed by countless different subtypes. Without medication, cancer can cause genuine health dilemma and even hard to survive. A bit previous diagnosis and prognosis of a cancer have become a obligation in cancer research, as it can expedite the consecutive clinical management of person being treated for medical problems. Beforehand analysis and classification of cancer may reduce fatality and depression. These previous approach include medical imaging techniques such as X- ray, ultrasound, magnetic resonance imaging, and computed tomography scan images. These imaging techniques are most crucial approach for decisive diagnosis of human cancer. This work presents an precise way of static image processing technique of object recognition for detection and prognosis of cancer cell. This method used for diagnosis of abnormal growth of cells in any body part using blood cell image. This procedure include artificial expert system techniques, such as machine learning, artificial neural network, and fuzzy logic with medical imaging techniques. The process includes blood cell images, through microscope, and using image colour detection process. The proposed method achieved sensitivity of 80%. specificity of 91.04% and accuracy of 96.4%.

In the above work, we performed coding in java script with the help of tensor flow library for image processing. We have used python rather than java or JavaScript as in JavaScript there are many limitations which is overcome by python. In the same manner, we could use java but in java there comes a problem of transferring or sharing data. That means if we have created this software in java than the major issue is of deportation of software form one system to another. As java is known for “Write Once Run Anywhere” but if will work in same version of java. In the proposed method pattern will be recognised in particular area of the image which is inserted to our software using web camera. One more crutial stage comes, in making of this software, if new blood sample image will be there that time programmer can train the software on the spot. This project is just the prototype for the original one.

2. Literature Survey

Detecting Cancer Cell in dense tissue can be difficult task as this tends to be laborious to find out cancer cell in small part of blood. In this chapter, it encompasses of the review of the previous paper. It consist of objective and the concept used to get to their objective. In one of the review paper presents a comparison among the different classifiers such as Multilayer Perception (MLP), Sequential Minimal Optimization (SMO), Bayesian Logistic Regression (BLR) and k-star by using classification accuracy and error rate based on the percentage split method. The result shows that the best algorithm in WEKA is MLP classifier with an accuracy of 83.333% and kappa statistics is 0.625.

In the next paper aims at early detection of cancer through an automated process to minimize human error and making the process more accurate and hassle-free. In the proposed work, image processing algorithms and artificial neural network have been employed to design an automated process for early stage detection of lung cancer.

One of the paper provides details of different techniques that reveal how hybrid intelligent approaches are applied to different categories of cancer detections and treatments. The three major categories of cancer problems such as breast, liver and brain tumour using cancer data bases are clearly discussed.

Correspondingly, we reviewed around 15 papers to get the technique of cancer detection through image processing techniques. All these techniques are quite expensive and not fruitful for initial detection. This paper enclose a technique for rural area people, who cannot afford such expensive diagnosis procedure.

3. Problem Statement

The basic objectives of the proposed work on "an artificial system for prognosis cancer cells through blood cell images" can be summarized as follows:

To gets the probability of cancer on time before it gets more hazardous. Through this software patient get to know about the disease on time and can be cured on time. Through symptoms, this is stored in its database, patient get to know about disease easily. To develop an efficient software for detecting cancer cells. This work will be helpful for the rural areas, where people have no idea about how to diagnose cancer . This system is efficient enough through work efficiency of its software and less time consumption to get to the result. To develop less error sensitive software. Nowadays, professionals work on blood sample and reach the output which sometimes leads to some miscalculations also. This is what will be reduced with this software. To train the software for new sample of blood. This software is helpful for new input or new blood sample images. It can be trained as easy as possible. To use mathematical concepts previously used MATLAB but in development of this software we used tensor flow library in java script rather than java and python. To develop a software for reliable result. Probability factor is helpful in this work to tell the subject about how much probability of cancer in there blood sample. To make this software easy portable from one system to another. For this we have used python as in python we need not have to worry about same version in the other system also. This software is also useful in detecting depression by using face detection process. By inserting image through web cam we can also detect whether the person is sad or happy. This software is also useful to detect sickling. As for future enhancement if we train this software about the shape of Red blood cells it will detect the sickle cell anaemia with the help of shape detection process.

4. Methodology

This section consists of methodology which will be implemented to reach the above mentioned objective. This software will be explained through flow diagram, to explain the implementation process which will help us to reach the output.

In Image processing, Image acquisition technique will help to grasp image through web camera in the system than it can also store that image form through train factor and it will check those in its database and then show us the result. The probability of suffering through cancer cells will be shown in the output. This software is also helpful in training of any blood sample image on the spot. The blood sample image through microscope of microscopic image of blood will be shown as object to camera of the system, this is under object recognition. It will check whether that image is of blood sample or not. Than other concept of pattern recognition will introduce on the particular area of the image through image enhancement and segmentation. Then it will choose one of the segmented part than it will compare the pattern and the behaviour through stored data in the database. After the process it will tell about the probability of cancer.

4.1 Working Principle

Under this chapter we will discuss about the working principle of the software. It also have an algorithm of this software. After the formation of agglutination, the dynamic images captured and allowed to process in image processing toolbox. This proposed plan will work in the following manner:

4.1.1 Algorithm

Steps to get to the result:

Step1: Input
Read the input image (Ii)
Step2: Object Recognition
If (Ii== Blood Image)
Then{go to step 3}
else{Input New Image}
Step3: Image Enhancement
Check Particular pixel of Image
{If (pixel width == pixel height)
Then Read Image pixel
else (take every pixel height and width same)
Step4: Pattern Recognition
Check pattern through Tensorflow Library
If(Input Image Pattern == Trained model)
Then {Print the Probability Result}
Else {Go to Step2}

4.1.2 Flow Chart

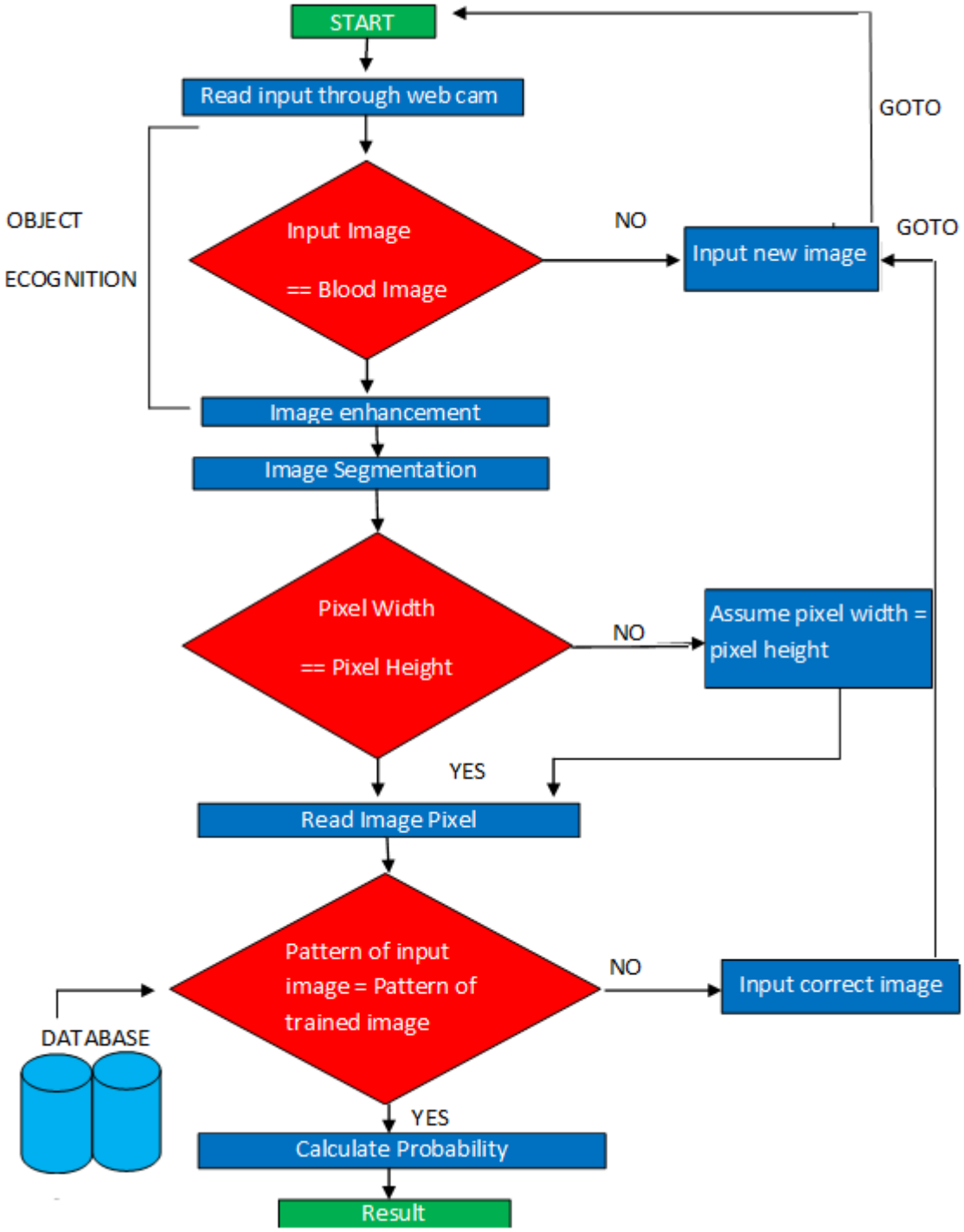

Figure 1: Flow chart of the Mechanism

5. Results and Conclusion

5.1 Result

The research and technology in this area is constantly updating day by day. This work shows us probability of the blood sample. The below mentioned image is pass through pre-processing to obtain the behaviour and the pattern of cancer cell.

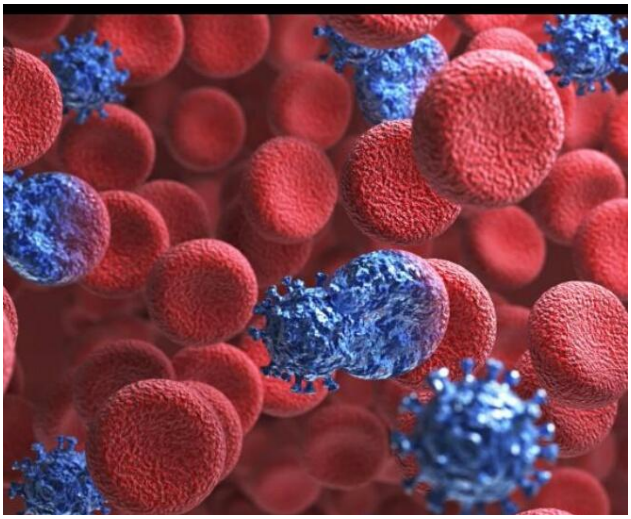

Figure 2: Blood Sample Image

The image is passed through the whole process so that the software give the result accurately. The next figure show how this software works by using this image processing technique.

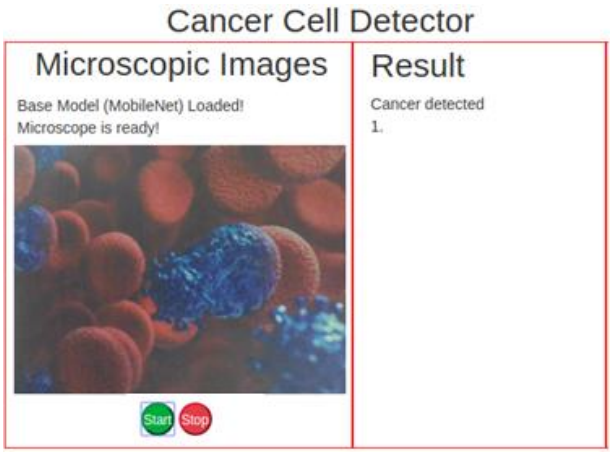

Figure 3: Screenshot of the Cancer Cell Detector

The image is passed through this software will first go through image detection process that is, its a blood sample or not. After this it will enhance and segment the image so that it can read each and every pixel of the image. Then through pattern recognition it will check whether the image having cancer cell or not after counting the ration of the foreign body in the small segment and similarly it will find the same calculation in other segments also and calculate the probability of cancer cell.

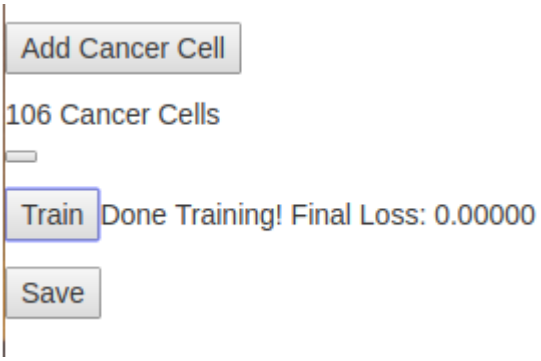

Figure 4: Way to Train Image

Future scope: this work will help in finding sickle cell in the blood and if we train our software with different input images it will easily helpful in medical field.

5.2 Conclusion

Cancer is one of the major cause of death among these days. In the diagnosis process, due to the wide range of features associated to cell abnormalities some of them may be missed or misinterpreted. There is also a number of false positive findings and therefore a lot of unnecessary biopsies may be required. There are many diagnosis algorithms have been developed to give an accurate diagnosis and to reduce the number of cancer cell cells. Through this software it is easy to get the probability of having cancer as it is also not so expensive. Its just we need to train our software in such a way that it can recognize the pattern of cancer cell as well as behaviour of the cell so that it can recognize the probability of cancer easily. This software, we include image processing with the help of python, tensor flow as well as GUI for Graphics form. Python language is tremendously helpful as because of many reasons. Python is efficient enough in compare to other and most of the library is available in it. Python has more community support and tensor flow which is written in python can run CPU as well as GUI, which give more accurate result. These all combine to run this software in easily and accurately. This also clears that it is not so expensive like other diagnosis process are. Cancer being one of the oldest disease and lot of research has been carried out in this field. Cancer is not a single disease rather a collection of multiple diseases thus a single test can not diagnose it. But this software can help people who lives in rural areas, those who do not have that much many for diagnosis of cancer.

References

[1] Beema Akbar, Varun P Gopi, V Suresh Babu “Colon cancer detection based on structural and statistical pattern recognition” IEEE 2015 2nd International Conference on Electronics and Communication Systems (ICECS) INSPEC Accession Number: 15220251 DOI: 10.1109/ECS.2015.7124883

[2] S. Kalaivani, Pramit Chatterjee, Shikhar Juyal, Rishi Gupta “Lung cancer detection using digital image processing and artificial neural networks” 2017 International conference of Electronics, Communication and Aerospace Technology (ICECA) INSPEC Accession Number: 17433048 DOI: 10.1109/ICECA.2017.8212773

[3] Arushi Tetarbe ; Tanupriya Choudhury ; Teoh Teik Toe ; Seema Rawat “Oral cancer detection using data mining tool” 2017 3rd International Conference on Applied and Theoretical Computing and Communication Technology (iCATccT) INSPEC Accession Number: 17858852 DOI: 10.1109/ICATCCT.2017.8389103

[4] Priya Darshini Velusamy ; Porkumaran Karandharaj “Medical image processing schemes for cancer detection: A survey” 2014 International Conference on Green Computing Communication and Electrical Engineering (ICGCCEE) INSPEC Accession Number: 14665933 DOI: 10.1109/ICGCCEE.2014.6922267

[5] Gawade Prathamesh Pratap; R.P. Chauhan "Detection of Lung cancer cells using image processing techniques" 2016 IEEE 1st International Conference on Power Electronics, Intelligent Control and Energy Systems (ICPEICES) INSPEC Accession Number: 16672910 DOI: 10.1109/ICPEICES.2016.7853347
[6] M. Saritha ; B. B. Prakash ; K. Sukesh ; B. Shrinivas "Detection of blood cancer in microscopic images of human blood samples: A review" 2016 International Conference on Electrical, Electronics, and Optimization Techniques (ICEEOT) INSPEC Accession Number: 16487247 DOI: 10.1109/ICEEOT.2016.7754751
[7] Preeti Jagadev, H.G. Virani, "Detection of leukemia and its types using image processing and machine learning" 2017 International Conference on Trends in Electronics and Informatics (ICEI) INSPEC Accession Number: 17564157 DOI: 10.1109/ICOEI.2017.8300983
[8] Mohammed Bilal N Shaikh ; Sachin Deshpande "Computer aided leukemia detection using digital image processing techniques" 2017 2nd IEEE International Conference on Recent Trends in Electronics, Information & Communication Technology (RTEICT) INSPEC Accession Number: 17489746 DOI: 10.1109/RTEICT.2017.8256613
[9] Wassim El Hajj Chehade, Riham Abdel Kader, Ali El-Zaart, "Segmentation of MRI images for brain cancer detection" 2018 International Conference on Information and Communications Technology (ICOIACT) INSPEC Accession Number: 17735721 DOI: 10.1109/ICOIACT.2018.8350721
[10] Miss. Shrutika Santosh Hunnur, Akshata Raut, Swati Kulkarni "Implementation of image processing for detection of brain tumors" 2017 International Conference on Computing Methodologies and Communication (ICCMC) INSPEC Accession Number: 17544904 DOI: 10.1109/ICCMC.2017.8282559
[11] D. Altunbay et al., "Color Graphs for Automated Cancer Diagnosis and Grading", *IEEE Trans. Biomedical Eng.*, vol. 57, no. 3, pp. 665-674, Mar 2010.
[12] Chan Hwang See, Raed A. Abd-Alhameed, Siau Wei Jonis Chung, Dawei Zhou, Hussain Al-Ahmad, and Peter S. Excell "The Design of a Resistively Loaded Bowtie Antenna for Applications in Breast Cancer Detection Systems" IEEE Transactions on antenna and propagation, vol. 60, no. 5, May 2012.
[13] Hisao Asamura, Kari Chansky, John Crowley, Peter Goldstraw, Valerie W. Rusch, Johan F. Vansteenkiste, Hirokazu Watanabe, Yi-Long Wu, Marcin Zielinski, David Ball, Ramon Rami-Porta, "The International Association for the Study of Lung Cancer Lung Cancer Staging Project: Proposals for the Revision of the N Descriptors in the Forthcoming 8th Edition of the TNM Classification for Lung Cancer", *Journal of Thoracic Oncology*, vol. 10, no. 12, pp. 1675-1684, December 2015.
[14] FAUZIAH KASMIN, ANTON SATRIA PRABUWONO, AZIZI ABDULLAH, "DETECTION OF LEUKEMIA IN HUMAN BLOOD SAMPLE BASED ON MICROSCOPIC IMAGES: A STUDY", *Journal of Theoretical and Applied Information Technology*, vol. 46, no. 2, December 2012.
[15] A. Sindhu, S. Meera, "A Survey on Detecting Brain Tumorinmri Images Using Image Processing Techniques", *International Journal of Innovative Research in Computer and Communication Engineering*, vol. 3, no. 1, January 2015.
[16] Himali P. Vaghela, Hardik Modi, Manoj Pandya, M.B. Potdar, "Leukaemia Detection using Digital Image Processing Techniques", *International Journal of Applied Information Systems (IJAIS)*, November 2015.
[17] S Mohapatra, D. Patra, "An ensemble classifier system for early diagnosis of acute lymphoblastic leukemia in blood microscopic images", *Neural Computing and Applications.*, vol. 24, no. 7-8, pp. 1887-1904, 2014.
[18] Rajesh Kumar, "Detection and Classification of Cancer from Microscopic Biopsy Images Using Clinically Significant and Biologically Interpretable Features", *Hindawi Publishing Corporation Journal of Medical Engineering*, vol. 2015, 2015.
[19] M. K. Beyer, C. C. Janvin, J. P. Larsen, D. Aarsland, "An MRI study of patients with Parkinson's disease with mild cognitive impairment and dementia using voxel based morphometry", *J. Neurol. Neurosurg Psychiatry*, vol. 78, no. 3, pp. 254-259, March 2007.
[20] A. Mustaqeem, A. Javed, T. Fatima, "An Efficient Brain Tumor Detection Algorithm Using Watershed & Thresholding Based Segmentation", *International Journal of Image Graphics and Signal Processing*, vol. A, no. 10, pp. 34-39, 2012.