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BLOOD CELLS COUNT USING DEEP LEARNING (RESNET-50)

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Abstract: The Complete Blood cells count has an important role in medical diagnosis to check common fitness conditions. Blood cells are traditionally counted using Hemocytometer with laboratory compounds and chemical compounds. It is so time consuming. In this paper, we propose a deep learning neural network based architecture to accurately detect and count various types of blood cells (RBCs, WBCs, Platelets,etc). The Convolutional Neural Network is used for classification and ResNet is used for feature extraction and improving the accuracy of blood cells counting. ResNet algorithm gives about 99% accuracy which is very good .

Index Terms- Blood cells, ResNet, Deep learning, Convolutional Neural Networks, blood cell count, machine learning, image classification, image processing, blood cells detection.

I. INTRODUCTION

The CBC (Complete Blood cell Count) is a very important test. In the human body, there are Three types of blood cells. They are Red Blood Cells (RBC), White Blood Cells (WBC), and platelets. The normal count of RBC in men is 4.0 to 5.9 x 1012/L, and in women, it is 3.8 to 5.2 x 1012/L and also known as erythrocytes. The whole count of W BC in the human body is just 1%, and also known as leukocytes. Platelets are also known as thrombocytes. RBCs help to provide the Oxygen to tissues in the body. WBCs are helps in fight with infections across in the body.

We know that in today's world the image and object detection is very easy with the use of Machine Learning and Deep Learning. Firstly we will pre-process the blood sample image dataset then train this data using ResNet architecture which improves the accuracy Up to 99% .Here we will use a Convolutional Neural Network is used for classification purpose.

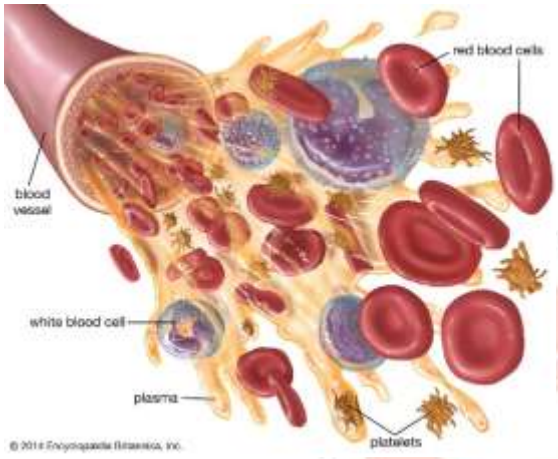

Fig.1.1 Blood cells

II. PROBLEM STATEMENT

Develop a deep learning model to automate blood cell counting, enhancing speed, accuracy, and efficiency in clinical diagnostics.

III. OBJECTIVES

- Automatic blood cells counting: For manually blood cells counting using the Hemocytometer there is need of human.
- Improve the Accuracy :As we know that the existing process has the chances of human errors. So by using deep learning techniques we try to increase the accuracy.
- Improve the Speed : As we know CBC is very important test there is need of quick results . Using deep learning we will increase the speed of CBC.

IV. PROPOSED SYSTEM

A proposed system for a Blood Cells Counting will be the combination of Convolutional Neural Network and Residual Network (ResNet-50) with 50 layers Which is very deep network which improves the accuracy of the blood cells counting mechanism.

Here first need to upload the blood sample image. Then in Deep Learning Process the image gets pre-process and extract the features from the blood sample image using ResNet model then evaluate the model based on accuracy, precision, recall etc. Apply the Logic at high accuracy and generate the result.

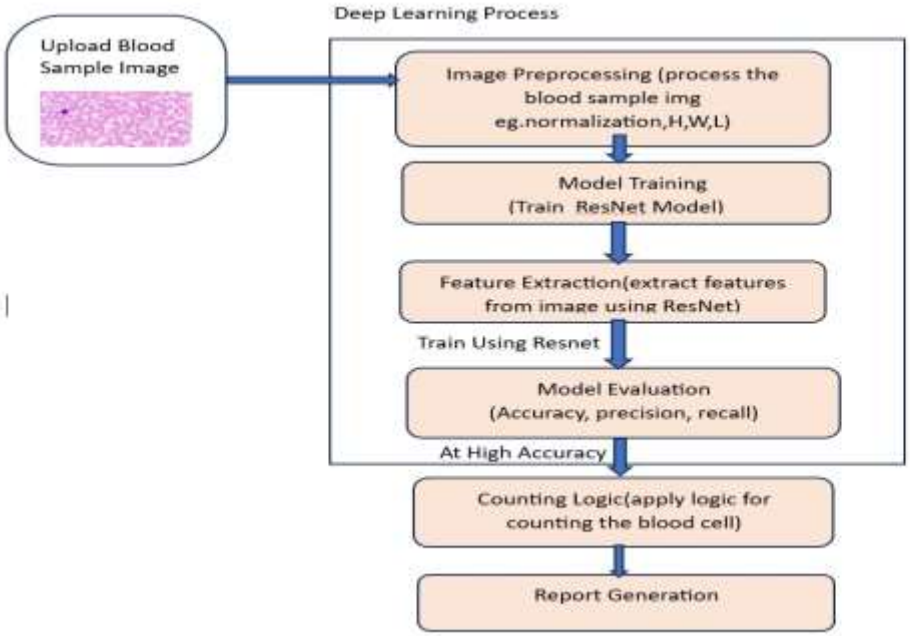

Fig.4.1 Proposed system

V. DATASET

A blood samples dataset from Kaggle [Blood Cell Images] is used, which contains 12,500 blood cell images in jpeg Format along with cell type designations in the csv format. There are over 3000 photos for each of the major cells. It Includes a second dataset, "dataset 2," which includes 2,500 Images (JPEG) and four more subtype labels (CSV). RsNet-50 technique is used employing this dataset. CNN model is Used for reading the image.

VI. METHODOLOGY

Data pre-processing is an important step in blood cells counting mechanism. Data pre-processing contains the following steps:

6.1.1.Data Cleaning:

In data cleaning the missing data and noisy data will be handled.

6.1.2.Data Integration:

In data integration the data will be combined.

6.1.3.Data Transformation:

Data transformation contains (ELT) extract, load, transform. Here Data normalisation and scaling is performed.

5.1.4.Data Reduction:

Data aggregation and data dimensions reduction gets performed.

5.2.ResNet-50:

5.2.1.ResNet-50 Architecture:

ResNet-50 contains 50 layers in the model. By using the Convolutional block, ID block, Batch normalisation, Max Pooling , Average Pooling, Flattening and FC.The Conv block contains a batch normalisation and ReLu. The flattened feature vector F is passed Through one or more fully connected (dense) layers to predict the blood cell counts.

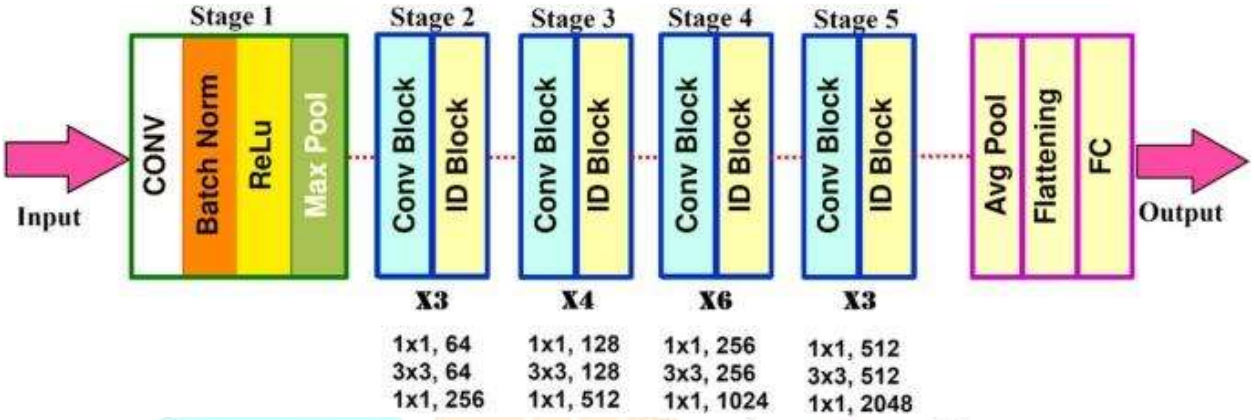

Fig.5.1 ResNet-50 Architecture

VII. CONCLUSION

Develop a deep learning model for automating blood cell counting, significantly improving speed, accuracy, and efficiency in clinical diagnostics. By leveraging advanced architectures like ResNet, the model enhances diagnostic capabilities, reducing human error and enabling quicker patient assessments for better healthcare outcomes.

VIII.REFERENCES

1. Allaparthi HemaSri,Mopuru Devi Sreenidhi, " Detection of RBCs, WBCs, Platelets Count in Blood Sample by using Deep Learning"
2. Mohamed Elmanna , Ahed lsafty , Yomna Ahmed b , Muhammad Rushdi, Ahemed Morsy, " Deep Learning Segmentation and Classificationof Red BloodbCells Using a Large Multi-Scanner Dataset "
3. Lee, S.-J.; Chen, P.-Y.; Lin,J.-W, " Complete Blood Cell Detection and Counting Based on Deep Neural Networks
4. Alam, M. M., & Islam, M. T. (2019). Machine learning approach of Automatic identification and counting of blood cells. Healthcare technology Letters, 6(4), 103-108.
5. Novia, L. U., Alipo-on, J. R. T., Escobar, F. I. F., Tan, M. J. T., Karim, H. A., & AlDahoul, N. (2023). White Blood Cell Classification of Porcine Blood Smear Images. In IAPR Workshop on Artificial Neural Networks in Pattern Recognition (pp. 156-168). Springer, Cham.
6. Alhazmi, L. (2022). Detection of WBC, RBC, and Platelets in Blood Samples Using Deep Learning. BioMed Research International, 2022.
7. Bramantya, A. A., Fatichah, C., & Suciati, N. DETECTION AND CLASSIFICATION OF RED BLOOD CELLS ABNORMALITY USING FASTER R-CNN AND GRAPH CONVOLUTIONAL NETWORKS.
8. Lee, S. J., Chen, P. Y., & Lin, J. W. (2022). Complete Blood Cell Detection and Counting Based on Deep Neural Networks. Applied Sciences, 12(16), 8140.
9. Rahaman, M., Ali, M., Hossen, M., Nayer, M., Ahmed, K., & Bui, F. M. (2022). DCBC_DeepL: Detection and Counting of Blood Cells Employing Deep Learning and YOLOv5 Model. In International Conference on Artificial Intelligence and Data Science (pp. 203-214). Springer, Cham

10. Safuan, S. N. M., Tomari, M. R. M., & Zakaria, W. N. W. (2022). Cross Validation Analysis of Convolutional Neural Network Variants with Various White Blood Cells Datasets for the Classification Task. International Journal of Online & Biomedical Engineering, 18(2).
11. Patil, A. M., Patil, M. D., & Birajdar, G. K. (2021). White blood cells Image classification using deep learning with canonical correlation Analysis. Irbm, 42(5), 378-38