

REPORT ON FINAL PROJECT

AIM : To observe the immature lymphoblast cells from normal lymphoblast cells

APPROACH : By using inception V3 pretrained deep convolutional network for object classification .

Data Citation

Gupta, A., & Gupta, R. (2019). ALL Challenge dataset of ISBI 2019 [Data set]. The Cancer Imaging Archeive

- Gupta, A., & Gupta, R. (2019). ALL Challenge dataset of ISBI 2019 [Data set]. The Cancer Imaging Archive. <https://doi.org/10.7937/tcia.2019.dc64i46r>

Publication Citation

- Anubha Gupta, Rahul Duggal, Ritu Gupta, Lalit Kumar, Nisarg Thakkar, and Devprakash Satpathy, "GCTI-SN: Geometry-Inspired Chemical and Tissue Invariant Stain Normalization of Microscopic Medical Images," , under review.
Ritu Gupta, Pramit Mallick, Rahul Duggal, Anubha Gupta, and Ojaswa Sharma, "Stain Color Normalization and Segmentation of Plasma Cells in Microscopic Images as a Prelude to Development of Computer Assisted Automated Disease Diagnostic Tool in Multiple Myeloma," 16th International Myeloma Workshop (IMW), India, March 2017.
- Rahul Duggal, Anubha Gupta, Ritu Gupta, Manya Wadhwa, and Chirag Ahuja, "Overlapping Cell Nuclei Segmentation in Microscopic Images Using Deep Belief Networks," Indian Conference on Computer Vision, Graphics and Image Processing (ICVGIP), India, December 2016.
Rahul Duggal, Anubha Gupta, and Ritu Gupta, "Segmentation of overlapping/touching white blood cell nuclei using artificial neural networks," CME Series on Hemato-Oncopathology, All India Institute of Medical Sciences (AIIMS), New Delhi, India, July 2016.
- Rahul Duggal, Anubha Gupta, Ritu Gupta, and Pramit Mallick, "SD-Layer: Stain Deconvolutional Layer for CNNs in Medical Microscopic Imaging," In: Descoteaux M., Maier-Hein L., Franz A., Jannin P., Collins D., Duchesne S. (eds) Medical Image Computing and Computer-Assisted Intervention – MICCAI 2017, MICCAI 2017. Lecture Notes in Computer Science, Part III, LNCS 10435, pp. 435–443. Springer, Cham.

MY APPROACH :

Simply this model can be explained as follows :

I have taken data set from the cited network and have used to list the training data and validation data along with labels.

FEATURE EXTRACTION :

This data is used by Inception v3 pretrained advanced CNN model with image net weights

CLASSIFICATION :

the flatten input from inception v3 model has been used in Fully connected network with dropout rate of 0.3 .This classification model was just tested with using SVM

classifier (for which the code was given in another notebook) to show the difference in accuracy of classifying the models. As said in the abstract I tried to use many ways of image classifying models. This VGGnet Network architecture with SVM classifier has been used taking reference from

[Deep Transfer Learning in Diagnosing Leukemia in Blood Cells Mohamed Loey , Mukdad Naman * and Hala Zayed Computer Science Department, Faculty of Computer Artificial Intelligence, Benha University, Benha 13511, Egypt; mloey@fci.bu.edu.eg (M.L.); hala.zayed@fci.bu.edu.eg (H.Z.)]

ANALYSIS :

The model has given an accuracy of 60-65.399% validation accuracy with around 78% test accuracy. The early stopping command was given to stop at an earlier epoch for no improvement in the accuracy.

This model helps in using the detecting the leukemic patients earlier in the life to have better treatment. It is also analysed that classification of ALL subtypes is somewhat ignored in the literature. Most researchers have neglected the identification of subtypes of acute lymphoblastic leukaemia because of their interclass similarity and intraclass variability. These subtypes are difficult to classify but play a vital role in precise diagnosis of disease and are very crucial for the medical treatment of the disease.

RESULT : It is successful in identifying the Immature blood cells by this advanced learning model