

This paper is related to reviewing the manuscript titled " **ALL-Net: Integrating CNN and Explainable-AI for enhanced diagnosis and interpretation of Acute Lymphoblastic Leukemia**"

The new ALL-Net model for the precise diagnosis of acute lymphoblastic leukemia (ALL) is presented in this publication. Using a unique Convolutional Neural Network (CNN) architecture combined with Explainable Artificial Intelligence (XAI) approaches, ALL-Net successfully classifies pictures of peripheral blood smears (PBSs) into three ALL subtypes (Early B, Pre-B, and Pro-B) and one benign category (hematogones). Three thousand six hundred PBS pictures make up the dataset used to train and assess the algorithm.

Firstly, Although the proposed study is successful in terms of organization, presentation, content and results, major revision given in the following items need to be performed.

- 1) Provide the major numerical findings and conclusions of the study in the abstract section another than accuracy performance criterion.
- 2) Use abbreviations after the first use in the text, in the abstract and throughout the paper, and for example XAI (Explainable AI) is used twice.
- 3) There seems to be no need to use the title "Leukemia" in the introduction.
- 4) The standard CNN architecture is depicted in Fig. 5. I think the graphical scheme of the proposed CNN-XAI method should be given.
- 5) The title "DATA AUGMENTATION" is used twice in the article. It should be checked.
- 6) Instead of the general explanation of Explainable AI (XAI), its mathematical model should be given and how it is integrated with CNN should be verified with mathematics and equations.
- 7) While explaining the "Data augmentation" method in Fig.6, it would be more meaningful if leukemia images were shown instead of a dog image and exemplified in this way. For example, how can an Ealy-b diseased image be evaluated in different angular ways?
- 8) It would be better to include Fig.8 in the data collection and/or data augmentation section. Similarly, Fig. 10 should be placed in the methodology section, not in the results section.
- 9) In the results and performance analysis, classical accuracy and loss graphs were drawn and interpreted. Why was the loss function not defined? Performance results should be increased by other important metrics. In addition, more professional code designs such as heatmap should be used and graphs should be obtained for the representation of the confusion matrix. In this sense, figs 15 and 16 seem very simple and do not comply with the quality of the journal.
- 10) The segmentation results in Fig. 18 and 19 need to be verified numerically. How can we understand how accurate this segmentation is?

My decision is major revision. I do not see any harm in publishing the manuscript once the above revisions are made.

Best regards.