

## Isolation and Classification of Red Blood Cells in Anemic Microscopic Images

**Authors :** Jameela Ali Alkrimi, Abdul Rahim Ahmad, Azizah Suliman, Loay E. George

**Abstract :** Red blood cells (RBCs) are among the most commonly and intensively studied type of blood cells in cell biology. The lack of RBCs is a condition characterized by lower than normal hemoglobin level; this condition is referred to as 'anemia'. In this study, a software was developed to isolate RBCs by using a machine learning approach to classify anemic RBCs in microscopic images. Several features of RBCs were extracted using image processing algorithms, including principal component analysis (PCA). With the proposed method, RBCs were isolated in 34 second from an image containing 18 to 27 cells. We also proposed that PCA could be performed to increase the speed and efficiency of classification. Our classifier algorithm yielded accuracy rates of 100%, 99.99%, and 96.50% for K-nearest neighbor (K-NN) algorithm, support vector machine (SVM), and neural network ANN, respectively. Classification was evaluated in highly sensitivity, specificity, and kappa statistical parameters. In conclusion, the classification results were obtained for a short time period with more efficient when PCA was used.

**Keywords :** red blood cells, pre-processing image algorithms, classification algorithms, principal component analysis PCA, confusion matrix, kappa statistical parameters, ROC

**Conference Title :** ICSRD 2020 : International Conference on Scientific Research and Development

**Conference Location :** Chicago, United States

**Conference Dates :** December 12-13, 2020