



# From Images to Insights: Advanced CNN Architectures for Accurate Malaria Cell Classification

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## Abstract

This paper presents a comparative analysis of different approaches for classifying malaria-infected cells, including pre-trained models, mutual information techniques, and a custom-designed Convolutional Neural Network (CNN). Malaria, a life-threatening disease, necessitates precise and swift diagnosis. The study uses a publicly available dataset of malaria cell images, applying preprocessing and data augmentation to enhance the models' performance. The proposed CNN architecture was evaluated using 5-fold cross-validation and compared against DenseNet121 and mutual information techniques. The proposed model achieved the highest accuracy of 96.15% on the test dataset, outperforming the others. This work demonstrates that the custom CNN model provides a superior solution for automated malaria detection, especially in low-resource environments.

**Keywords:** 5fold cross-validation, Mutual information, and Pretrained models

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