Automatic Malaria Detection

Using Microscopic Images and CNN

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Introduction

Malaria is a serious infectious disease that demands fast and accurate diagnosis. This study employs Convolutional Neural Networks (CNN) to create a model for automatic detection of malaria-infected red blood cells from microscopic images.

Methods

We used a dataset of red blood cell images, labeled as "infected" and "uninfected." The images were resized to 128x128 pixels. Data augmentation techniques such as rotation and flipping were applied to enhance the model's performance.

The CNN model was built using Conv2D, MaxPooling2D, and Dense layers, and trained with the Adam optimizer and Binary Crossentropy loss function. The model was trained on 1000 images (500 infected, 500 uninfected).

Results

The model achieved strong results:

- Accuracy: 92%
- Precision: 91%
- Recall: 93%
- F1-Score: 92%

The model accurately classified images, demonstrating high performance in identifying malaria-infected cells.

Discussion

This preliminary model shows a strong ability to distinguish between infected and uninfected cells. However, further improvements in the dataset and sample size are necessary to enhance accuracy.

Conclusion

The CNN-based model proves to be an effective tool for malaria detection. This initial application paves the way for the development of faster and more accurate diagnostic tools using AI in resource-limited areas.