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CHARACTERIZATION OF OPTIMAL SPREADING OF FECAL SEDIMENTS PRODUCED BY HELMINTEX METHOD TO OPTIMIZE AUTOMATED IMAGE ANALYSIS DETECTION OF *Schistosoma mansoni* EGGS

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This study aimed to evaluate the impact of sample distribution on glass slides for microscopic analysis of sediment in the Helmintex (HTX) method used to diagnose *Schistosoma mansoni* eggs. The images were obtained from slides containing fecal samples, considered of low quality under the microscope. Prior to microscopic analysis, the slides were prepared to ensure a homogeneous distribution of the sediment for adequate visualization. The photographs were cropped to focus only on the slides, ensuring that the model could concentrate on areas of interest. To standardize the model input, all images were converted to RGB format and resized to a fixed size of 512x1536 pixels, in accordance with the slide dimensions. Padding was applied to maintain the correct aspect ratio without information loss. A total of 361 images were used in the study. Of these, 85% (306 images) were used for model training, with 15% allocated for validation. The final test set consisted of 55 images, all obtained from distinct slides and samples. Various convolutional neural network architectures were tested for classifying sediment distribution adequacy on the slides, including ResNext101, InceptionV4, EfficientNetB2, ResNet50, MobileNetV3, ViT (Vision Transformers), and Swin Transformers. These architectures are renowned for their performance in image classification, employing a range of feature extraction techniques from deep convolutional blocks to attention mechanisms used in transformer models. The model's performance was evaluated based on accuracy, sensitivity, and specificity with respect to the test dataset. InceptionV4 yielded impressive results in validation with an accuracy of 1.0 and a loss (BCE) of 0.033. It also achieved perfect sensitivity of 1.0, confirming its capacity to efficiently classify slide images. For the test dataset, ResNet50, MobileNetV3, and Swin Transformers demonstrated superior classification abilities, with accuracies also reaching 1.0 and sensitivity levels of 1.0. The results enabled the identification of the most efficient architecture for classifying slide images, contributing to the automation of the process for assessing sample suitability for microscopic analysis.

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