Colon Cancer Detection Using Deep Learning: A Comprehensive Review

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Abstract: *Colon cancer (CRC) is a leading cause of cancer-related deaths globally, emphasizing the need for accurate and timely detection methods. In this study, we apply deep learning techniques, specifically transfer learning with VGG16, MobileNet, and ResNet architectures, to classify Colon cancer from histopathological images. By leveraging pre-trained models, we aim to improve detection accuracy and reduce computational complexity, facilitating early diagnosis in clinical settings. The dataset, sourced from Kaggle, comprises a diverse collection of histopathological images representing both benign and malignant Colon tissues. Each model was fine-tuned on this dataset after applying pre-processing techniques to standardize and enhance image quality. The performance of VGG16, MobileNet, and ResNet was evaluated using metrics such as accuracy, sensitivity, specificity, and F1 score, demonstrating the effectiveness of transfer learning in Colon cancer detection. Our results show that deep learning models, particularly ResNet, achieve high accuracy in detecting Colon cancer, offering a promising solution for improving diagnostic practices. The integration of these models into healthcare systems has the potential to accelerate early detection, reduce diagnostic errors, and improve patient outcomes.*

Keywords: Colon cancer, deep learning, transfer learning, VGG16, MobileNet, ResNet, histopathological images, Kaggle dataset, cancer detection, early diagnosis