

Deep neural network models for colon cancer screening

ABSTRACT

Early detection of colorectal cancer can significantly facilitate clinicians' decision-making and reduce their workload. This can be achieved using automatic systems with endoscopic and histological images. Recently, the success of deep learning has motivated the development of image- and video-based polyp identification and segmentation. Currently, most diagnostic colonoscopy rooms utilize artificial intelligence methods that are considered to perform well in predicting invasive cancer. Convolutional neural network-based architectures, together with image patches and preprocesses are often widely used. Furthermore, learning transfer and end-to-end learning techniques have been adopted for detection and localization tasks, which improve accuracy and reduce user dependence with limited datasets. However, explainable deep networks that provide transparency, interpretability, reliability, and fairness in clinical diagnostics are preferred. In this review, we summarize the latest advances in such models, with or without transparency, for the prediction of colorectal cancer and also address the knowledge gap in the upcoming technology.