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Colon Cancer Detection using Vision Transformers and Explainable AI

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Abstract: *Colon cancer is a type of cancer in the large intestine. It usually starts from noncancerous growths called polyps. Symptoms include changes in bowel habits, blood in stool, and stomach pain. Histopathology is the field focused on diagnosing and studying tissue-related diseases by analyzing tissues and cells through a microscope. This paper introduces a method of identifying colon cancer from histopathology images through Vision Transformers (ViT) and highlight the cancer regions through Gradient-weighted Class Activation Mapping(GradCAM).Vision Transformers, a cutting-edge approach harnessing the self-attention mechanism initially designed for transformers in Natural Language Processing (NLP) tasks, are applied for image classification in this study. ViTs involve usage of self attention mechanism that allows model to focus on relevant regions and features, this is essential incase of histopathology images for understanding complex pattern in images. ViTs are more suitable for histopathology image classification because it captures global features effectively by understanding relationship between all image pixels. This method is compared with 2D Convolutional Neural Network . This method is highly useful for detecting colon cancer cells in the tissue.*

Keywords: Colon cancer; Vision Transformers; GradCAM; 2D Convolutional Neural Network; Natural Language Processing.

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