COMP9800 Project

Thick Data Analytics for Detecting Inflammatory Bowel Diseases (IBD) Based on Vision Transformers: A Comparative Approach

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Abstract—

This project explores of different thick data techniques and their performance when applied to the task of Inflammatory Bowel Disease (IBD) detection. We focus on the application of Vision Transformers (VIT) for the detection of IBDs from medical imaging data. We investigated threee distinct approaches to enhance vision transformers performance. Siamese neural networks for one-shot learning. YOLO-inspired region f interest (ROI) detection, and adaptive transformers for dynamic token processing. Our Siamese neural network implementation revealed counterintuitive results where one-shot learning (75% accuracy) significantly outperformed multi-shot approaches. For ROI detection, our optimized implementation incorporating enhanced contour analysis and addptive edge detection achieved 78.5 % accuracy across eight –llagnostic classes. Our adaptive transformer implementation, inspired by AdaVi. demonstrated 76.2% accuracy while dynamically reducing computational load by selectively processing image patches. These thlck data approaches demonstrate promising results for medical image analys. particularly in scenarrios with limited labeled training data.

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