DEEP LEARNING HYBRID APPROACH FOR GASTROLOGICAL ABNORMALITY CLASSIFICATION AND VISUALIZATION

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ABSTRACT

The digestive system is one of the most complex systems within the human body. it plays a vital role in the maintenance of life and growth of a human being. Therefore, early detection of illnesses is critical in this organ. The current best working method which is screening the GI tract for abnormalities is using endoscopy examinations, solely depending on the doctor's ability to identify the early signs of abnormalities. However, since existing systems mostly depends on high technical work it is difficult to use and understand by the non-technical personnel, especially doctors and medical staff. The use of modern interpretability methods to open this "black box" would not only help to create trust and understanding among medical experts but could also be used to generate high-quality endoscopy reports. In detecting serious diseases, AI can play a critical role and thus help medical personnel. However, endoscopists must consider AI principles in order to address the lack of trust in the method. Recently, detecting gastrointestinal (GI) tract disease is highly considered in research areas. Though mostly GI tract disease classification created on image processing techniques and machine learning techniques, a classification method with high accuracy level which could deliver a report as an output of the system is not available in current practice among doctors and medical staff. Therefore, in this research, the author proposed a hybrid approach with visualizations and creating report including patient details by uploading a traditional endoscopic image based on eight diseases, then identify the disease through classification techniques and visualization which highlights the identified disease area. The system is with remarkable validation accuracy level 98.5% and precision 97%.

Keywords: Gastrointestinal Tract Disease Detection, Deep Learning, Convolutional Neural Network (CNN)