

Abstract—This paper presents a novel method for detecting brain tumors using the YOLOv9 object detection framework. Brain tumors are among the most serious diseases, making accurate early detection crucial for improving patient outcomes, brain tumor identification by manually is time-consuming and prone to mistakes, which highlights the need for effective automated solutions. Leveraging the high accuracy and speed of YOLOv9, our approach aims to enhance the precision and efficiency of brain tumor identification in medical imaging. We utilized a comprehensive dataset of MRI scans for training and evaluation, implementing various preprocessing techniques to boost model performance. Our experimental results demonstrate that YOLOv9 effectively detects brain tumors. These findings indicate that YOLOv9 could be a valuable tool for early and accurate brain tumor diagnosis in clinical settings. Future work will focus on further optimizing the model and exploring its application to other medical imaging tasks.

Keywords—brain tumor detection, deep learning, medical imaging, MRI, object detection, YOLOv9