***Abstract*— Brain tumors are one of the leading causes of cancer deaths in children. Although advanced imaging technologies such as Magnetic Resonance Imaging (MRI) have developed, the process of manual analysis of MRI images by radiologists is still very challenging. The need for more efficient diagnostic methods and early detection has driven the development of automated detection techniques. In this study, several latest versions of the YOLO model were used, namely YOLO11m, YOLOv10m, YOLOv9m, and YOLOv8m, to detect types of brain tumors such as Glioma, Meningioma, and Pituitary Tumor in MRI images. The hyperparameter tuning process was carried out using the Bayesian Optimization and HyperBand (BOHB) search algorithm with Ray Tune through 16 trials. Based on the experimental results, the YOLO11m model showed the highest accuracy with an mAP50 of 0.934 and an inference speed of 70.550 FPS. On the other hand, YOLOv8m produced the fastest inference speed, which was 80.471 FPS.**

***Keywords*— brain tumor detection, computer vision, MRI, object detection, yolo**