

Model Metrics

Model: Convolutional Neural Network (CNN)

- **Accuracy:** 0.96
- **Precision= (Glioma): 0.97, (Meningioma): 0.97, (No Tumor): 0.98, (Pituitary): 0.98**
- **Recall=(Glioma): 0.92, (Meningioma): 0.87, (No Tumor): 0.99, (Pituitary): 0.97**
- **F1-Score=(Glioma): 0.94, (Meningioma): 0.89, (No Tumor): 0.98, (Pituitary): 0.97**

Confusion Matrix:

- **Glioma**
 - **True Positives:** 316
 - **False Positives:** 27
 - **True Negatives:** 1310
 - **False Negatives:** 34
- **Meningioma**
 - **True Positives:** 274
 - **False Positives:** 20
 - **True Negatives:** 1375
 - **False Negatives:** 27
- **No Tumor**
 - **True Positives:** 386
 - **False Positives:** 2
 - **True Negatives:** 1402
 - **False Negatives:** 4
- **Pituitary**
 - **True Positives:** 330
 - **False Positives:** 5
 - **True Negatives:** 400
 - **False Negatives:** 2

Hyperparameter Tuning Results:

- **Best Batch Size:** 16
- **Best Epochs:** 20
- **Best Learning Rate:** 0.001
- **Best Dropout Rate:** 0.25 (Conv layers), 0.5 (Dense layers)