**Convolutional Neural Network (CNN) Binary Brain Tumor Classification**

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**Introduction**

Intercranial neoplasms (brain tumors) are among the most devastating diseases that result in a significant reduction of quality of life or life expectancy. Often symptoms such as headaches, changes of personality, irritability and other symptoms are not correctly diagnosed as being brain tumors. In addition, some tumors may be difficult to identify on MRI imagery and are overlooked in the diagnostic process. Furthermore, the golden-standard of care brain tumors is 100% resection (removal) to prevent reoccurrence . Therefore, being able to accurately interpret and diagnose residual tumor from postoperative MRI brain images is essential to treating brain tumors.

Many Kaggle studies have been conducted to classify brain tumors using convolutional neural networks (CNN)s, but most of these focused on classifying the type of tumor into for groups: glioma, meningioma, pituitary, and no tumor (Roy, et al., 2024). In this study the emphasis will be in developing a CNN that can examine MRI images and determine if a tumor exists or not. The goal is to use this model as diagnostic tool that can be used in the initial examination or postoperative evaluation to determine if any residual tumor remains.

**Methods**

A review of literature was conducted to determine the current state of using CNNs for image classification. Several peer-reviewed articles were reviews and the methods discussed were included in the model the author produced. The main hurdle for this study was obtaining enough brain MRI images from reliable sources. Many public brain MRI datasets contained mistakes and were of unknown origins. The dataset used in this analysis is a combination of two sources, Cheng (2024) and Bhuvaji (2020). The Cheng dataset contains