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# A Survey of Brain Tumor Detection and Classification Based on Machine, Deep Learning and CNN Based Transfer Learning Techniques

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##### Abstract:

When brain tumors are not treated in their early stages, they can cause uncontrolled proliferation of brain cells. Early detection of lesions in the brain is critical for treatment planning and patient survival. Over the last few years, detection algorithms based on deep learning (DL) and machine learning (ML) have exhibited cutting-edge performance. These algorithms have been successfully utilized to classify, segment, and identify medical images. In this work, many deep learning (DL) and machine learning (ML) methodologies, as well as transfer learning approaches, were evaluated. The proposed Transfer Learning (TL) approach for detecting brain tumors outperformed the existing algorithms. Since deep learning approaches offer the most cutting-edge findings and are better suitable for dealing with this issue than other methods, automated detection based on these techniques has lately gained popularity. When compared with different techniques, such as Deep Learning (DL) or Machine Learning (ML), the Transfer Learning approach provides the highest precision. This helps in the diagnosis of brain tumors at an earlier stage of development.

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## ☰ Contents

### I. Introduction

The diagnosis, prognosis, and therapy of brain tumors all benefit from the automatic segmentation and categorization of medical images. Early detection of brain tumors indicates a speedier response to therapy, thereby increasing the patient survival rate. It requires a significant amount of time and effort to manually identify and categorize brain malignancies in large medical image collections obtained during routine clinical duties. It is desirable to implement an automated detection, localization, and categorization technique [1]. Figure 1 shows examples of these three types of tumors. Figure 1.

(a) Meningioma tumor, (b) Glioma tumor and (c) Pituitary tumor

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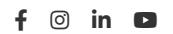
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