Intelligent Data Analytics for Bioinformatics and Biomedical Systems

Chapter 8

Advances in Brain Tumor Detection and Localization

A Comprehensive Survey

Krishnangshu Paul, Arunima Patra, Prithwineel Paul

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Summary

Brain tumors present a formidable challenge in modern medicine. These diverse growths require early detection and precise localization for effective treatment. Recent medical imaging innovations, including magnetic resonance images (MRI) and computed tomography scan (CT) scans, offer detailed insights into the tumor characteristics. Various algorithms, such as K-means and convolutional neural networks (CNNs), enhance the detection and localization accuracy. Support vector machine (SVM) have emerged as effective classifiers and innovative approaches such as the Fractional Harley transformation show promise. Multi-CNN architectures improve accuracy, while combining algorithms such as K-means and Fuzzy K-means enhance segmentation. Moreover, Convolutional Neural Networks consistently excel in brain tumor detection. Deep learning, particularly CNNs, offers superior performance, although complexities and resource constraints should be considered. This survey highlights the evolving landscape of brain tumor detection and localization, highlighting the power of deep learning in improving diagnostics and treatment planning.

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