Artificial Intelligence in Brain Tumors

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Abstract

The introduction of "intelligent machines" goes back to Alan Turing in the 1940s. Artificial intelligence (AI) is a broad umbrella covering different methodologies, such as machine learning and deep learning. Deep learning, characterized by multilayered computational models, has revolutionized data representation across various abstraction levels. Deep learning can unravel complex structures within extensive datasets by guiding computer algorithms to adjust internal parameters for successive data representation layers.Specifically, deep convolutional networks have advanced image, video, and audio data analysis, while recurrent networks have offered insights into sequential data, notably in medical imaging. Radiomics involves extraction and quantification of features from medical images and has emerged as an important field of research. Interesting predictions can be made with the help of radiomics features and machine learning algorithms. This chapter reviews the applications of AI methodologies in brain tumors. We highlight the significance of data preprocessing and augmentation and explore deep learning models for brain tumor segmentation and the fusion of clinical and imaging data.

Keywords: Artificial intelligence; Brain tumor; Deep learning; Glioma; Machine learning.

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