NueROX: A Visual Diagnosing System Using a Fully Optimized Convolutional Neural Network Architecture for Rapid and Efficient Classification of Tumorous and Non-Tumorous Brain MRI's and a Model for the Segmentation, Dimension, and Severity Estimation of Brain Tumors

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Brain tumors are a significant and growing health concern in the United States, with an estimated 700,000 people living with a primary brain tumor. Misdiagnosis is a major issue with brain tumors, as radiologists often examine 30-60 MRIs per patient, making human error a potential factor. In developing countries, a lack of trained neurologists makes diagnosing complicated brain tumors difficult, costly, and time-consuming. Computer-Aided Diagnosis (CAD) has emerged as a promising tool to aid medical professionals in diagnosing and tracking tumors, cancers, and fractures. With the rapid advancements in machine learning and artificial intelligence, CAD has the potential to revolutionize medical diagnosis and improve patient outcomes. “NueROX” is a real-time diagnosing tool that uses an optimized convolutional neural network architecture to diagnose, segment, and estimate the dimensions and severity of brain tumors from MRIs. Experimentation results show that NueROX has an accuracy rate of 99.3% in diagnosing brain tumors , an average area accuracy of 71.88% in segmenting tumors, and is able to estimate the dimensions and type of brain tumor as well . By leveraging the power of machine learning and artificial intelligence, NueROX has the potential to help decrease the number of missed brain tumor diagnoses, ultimately improving patient outcomes. This technology can help bridge the gap between developed and developing countries regarding access to high-quality medical diagnosis and care, and help modern medical professionals diagnose and keep track of brain tumors more efficiently.