Multiclass Classification of Brain MRI using Deep Learning Algorithm

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Abstract: *A brain tumor is one of the deadliest, most frequent, and most aggressive diseases. As a result, early detection and treatment of these illnesses are critical in averting mortality. In this procedure, MRI images are utilized to identify brain abnormalities. Manually identifying brain tumors is time-consuming and may result in a human mistake. As a result, precise analysis in a short period is essential. This approach includes an automated brain tumor classification system that employs a highly accurate Convolutional Neural Network (CNN) to categorize brain MRIs into normal and malignant categories. The brain is first segmented using a thresholding approach, then morphologically operated on. The classification strategy for glioma and meningioma classification using CNN and Vgg19 is presented in another approach.*

Keywords: MRI, Brain tumor, vgg16, vgg19, machine learning

REFERENCES

[1]. J. D. Power, A. L. Cohen, S. M. Nelson, et al., "Functional network organization of the human brain," Neuron, vol. 72, no. 4, pp. 665–678, 2011.

[2]. N. P. Q. T. Ostrom, G. Cioffi, K. Waite, C. Kruchko, and J. S. Barnholtz-Sloan, "CBTRUS statistical report: primary brain and other central nervous system tumors diagnosed in the United States in 2013–2017," Neuro-Oncology, vol. 22, Supplement_1, pp. iv1–i96, 2020.

[3]. Metastatic Cancer: When Cancer Spreads. Available: https://www.cancer.gov/types/metastatic-cancer

[4]. Sunita M. Kulkarni and G. Sundari, "A Framework for Brain Tumor Segmentation and Classification using Deep Learning Algorithm," International Journal of Advanced Computer Science and Applications, 11(8), 2020. http://dx.doi.org/10.14569/IJACSA.2020.0110848

[5]. S.Ajikumar, Dr.A.Jayachandran Early Diagnosis of Primary Tumor in Brain MRIImages using Wavelet as the input of AdaBoost classifier 2014 International Conference on Contemporary Computing and Informatics (IC3I)

[6]. Carlos Arizmendi, Alfredo Vellido, Enrique Romero Binary Classification of BrainTumours Using a Discrete Wavelet Transform and Energy Criteria 978-1-4244-94859/11/$ 26.00 2011 IEEE

[7]. Salim Lahmiri and Mounir Boukadoum, Classification of Brain MRI using the LHand HL Wavelet Transform Sub-bands 978-1-4244-9474-3/11/$ 26.00 2011 IEEE

[8]. D. Lu, Y. Sun and S. Wan, "Brain tumor classification using non-negative and local non-negative matrix factorization," 2013 IEEE International Conference on Signal Processing, Communication and Computing (ICSPCC 2013), 2013, pp