References Section

1. Brain tumor classification using Convolutional Neural Network

Link: <http://proficientsolutions.in/wp-content/uploads/2022/09/BPJ_Vol_11_No_3_p_1457-1461.pdf>

Writers: **J. Seetha1 and S. Selvakumar Raja2**

Proposed Models:

SVM

Convolutional Neural Network (My Proposed Model)

Conclusion: **The main goal of this research work is to design efficient automatic brain tumor classification with high accuracy, performance and low complexity. In the conventional brain tumor classification is performed by using Fuzzy C Means (FCM) based segmentation, texture and shape feature extraction and SVM and DNN based classification are carried out. The complexity is low. But the computation time is high meanwhile accuracy is low. Further to improve the accuracy and to reduce the computation time, a convolution neural network based classification is introduced in the proposed scheme. Also the classification results are given as tumor or normal brain images. CNN is one of the deep learning methods, which contains sequence of feed forward layers. Also python language is used for implementation. Image net database is used for classification. It is one of the pre-trained models. So the training is performed for only final layer. Also raw pixel value with depth, width and height feature value are extracted from CNN. Finally, the Gradient decent based loss function is applied to achieve high accuracy. The training accuracy, validation accuracy and validation loss are calculated. The training accuracy is 97.5%. Similarly, the validation accuracy is high and validation loss is very low.**

1. Deep learning For Brain tumor classification

Link: <https://www.spiedigitallibrary.org/conference-proceedings-of-spie/10137/1013710/Deep-learning-for-brain-tumor-classification/10.1117/12.2254195.full?SSO=1>

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Conclusions**: Convolutional neural networks demonstrate that a general method can outperform specialized methods using image dilation and ring-forming subregions when classifying brain tumors. Training convolutional neural networks to detect tumor types in brain images improves classification accuracy, requires only images to understand brain tumor types, and provides steps into introducing deep learning into medicine. Furthermore, the per patient accuracy metric consistently remained at the levels of per image accuracy results, implying the neural network is providing both consistent brain tumor predictions and similar accuracies across images of the same patient. While performing similarly well in per image accuracy, random forests did not meet the same consistency across images of the same patient. Future work can add upon this research by exploring neural networks that train on coronal and sagittal images. Combining patient images across planes can increase dataset size and provide insights into tumor type that is difficult to view from only one plane. Furthermore, adding brain images without tumors may help distinguish tumors further in classifications. Lastly, decreasing image size improved efficiency of training neural networks greatly.**

1. **Brain tumor classification using Deep CNN features via transfer learning**

**Link:** [**https://www.sciencedirect.com/science/article/abs/pii/S0010482519302148**](https://www.sciencedirect.com/science/article/abs/pii/S0010482519302148)

**Writers:** S.Deepak, P.M.Ameer

**Conclusion**

This paper presents an accurate and fully automatic system, with minimum pre-processing, for brain tumor classification. The proposed system applied the concept of deep transfer learning to extract features from brain MRI images. The features were used with proven classifier models for an improved performance. The system recorded the best classification accuracy compared to all the related works. The performance was evaluated using other metrics also, to ascertain the robustness of the system.