RandAug Algorithm on Brain Classification Data

Luke Benham LNB6GRP@VIRGINIA.EDU
Navian Francis NAF7NH@VIRGINIA.EDU
Kunsh Singh BCA2NK@VIRGINIA.EDU

Abstract

Classification is a vital process within the realm of image analysis, it is widely applicable, determining whether a brain may have a tumor or other object detections. Throughout this paper, the team will experiment with the efficiency of RandAugment, a classification algorithm that delivers state-of-the-art accuracy while using less computational resources than the current methods. RandAugment achieves these improvements by eliminating the need for a separate search phase and reducing the overall search space.

Keywords: Machine Learning, Image Processing, Classification, Search Space

1. Experimental Results

Best Accuracy of 76%
Hyperparameters: Batch size = 256, Epochs = 4, Image size = 256
RandAugment parameters: Number of Augmentations (N) = 3, Magnitude (M) = 4

The RandAugment algorithm is robust and was able to solid results. The epochs had to remain low to overfitting. Larger RandAugment parameters also led to overfitting and lower accuracy so N=3 and M=4 were chosen. When the image size was reduced the accuracy went down but only slightly. The Batch size had small varying effects but generally the larger sizes trained faster.

2. Code Instructions

The randAug256.ipynb Jupyter notebook relies on relative pathing to gather the data. It is all contained in the zipped folder but depending on the users system it may require a slight adjustment to ensure the pathing is correct. The code in the Jupyter notebook can be run in succession to create the classification model. It takes less than 5 minutes (on Rivanna) due to the efficiency of the RandAugment algorithm. The testing accuracy is printed after the training is complete.

3. Conclusion

When we finally were able to get RandAugment running, it a lot less time to work than the other methods that we tried. Where it took 1 hour for AutoAugment to run 256 images for training, RandAugment was able to do the same thing about 30 seconds with higher accuracy.