Guiding Brain Anomaly and Segmentation Using Labels

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Abstract

In this project, we aim to improve the segmentation of tumor areas in 2D MRI brain scans by autoencoder (and variant) models by first creating an unsupervised anomaly segmentation, then a supervised, then a semi-supervised model. Currently, the models are trained to reconstruct images using healthy brain scans, then the model is made to reconstruct unhealthy brain scans and the difference between the two is analyzed. If you know the labels of the brain scans beforehand and make a model that knows what a healthy and unhealthy brain looks like, accuracy should be improved. By adding labels, we hope to improve the accuracy of anomaly detection. However, there are two challenges to overcome: the constraint optimization problem and how to segment anomalies using post processing techniques. We hope to demonstrate that labelling images can improve anomaly detection.

Preprint. Under review.