Brain lesion image segmentation using modified U-NET architecture

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ABSTRACT

Detecting stroke is important to reduce the likelihood of permanent disability and increase the chance of recovery. Brain stroke lesion segmentation is an important procedure, especially when a specific brain portion needs to be analyzed. In this project, a brain stroke lesion segmentation algorithm using a modified U-Net (MUN) architecture will be developed. The MUN has a dimension-fusion capability, in which the images are analyzed separately using 2D U-Net and 3D image downsampling processes, before being fused at two points during the downsampling processes. The MUN accuracy is then compared with a regular 3D U-Net (UN). Three training options are further developed and compared. It is found that the MUN architecture produces higher training accuracy, but slower training duration compared to UN. Despite the capabilities of MUN, it cannot be further validated due to software limitations. Further improvement on the algorithm using other libraries is essential to enhance the capability of the MUN.