Medical Informatics: Segmenting post-stroke lesions with Deep Learning

Problem Statement

Stroke is a leading cause of disability in the US. It is the 5th most frequent cause of death in the United States, killing nearly 130,000 people a year (128,978). That’s one in every 20 deaths. (Stroke Association).

Manually segmenting post-stroke lesions requires technical knowledge and it is highly time consuming (up to one hour per MRI).

Dataset

- To design and train the algorithm ATLAS (Anatomical Tracings of Lesions After Stroke), an open source dataset of 229 manually segmented lesions.
- Image input size: [232, 196, 1]

Results

Baseline model

8-layer Convolutional Neural Network

Features

- Learning rate = 0.001
- Dropout factor: 0.15
- Mini-batch size = 100
- Sigmoid cross entropy function
- Adam optimizer

Residual Network model

References

