

Chronical Subdural Hematoma Segmentation Based on Computed Tomography Images Analysis

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Abstract — The aim of the demo is to show our developed system for chronical subdural hematoma segmentation based on analysis of computed tomography images. We used convolutional neural networks to automate the process of subdural hematoma segmentation from DCOM images got from computer tomography device and made a plugin for importing the masks to the OsiriX that one of the most famous DCOM viewer. A training dataset was assembled containing a total of 41 scans consisting of 3306 DCOM images. The presence or absence of subdural hematomas and their area was determined by the radiologist (ground truth). Two architectures are being tested: Unet and FPN (Feature Pyramid Network). For each architecture there are two training options were considered: (1) on separate images, when each image is considered as a separate unit; and (2) pseudo-3D, when images were viewed in blocks and the neural network could make predictions based on predictions for neighboring images. Our best model achieved an average DICE score of 0,7949 on the validation set. We integrated the pretrained model into OsiriX DICOM Viewer as a plugin. The plugin passes images to the model, which returns the segmentation predictions. The plugin converts them to ROI (region of interest) and transfers them to OsiriX, where, if necessary, the radiologist can edit them and get information about hematoma characteristics (such as volume).