[Brain tumor segmentation using deep learning](http://projects.ee.bgu.ac.il/zf/public/projects/projinfo/id/s-2018-104)

סגמנטציה של גידולים מוחיים באמצעות למידה עמוקה

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Glioma is the most common brain tumor type among adults nowadays. In order to evaluate the disease’s progression and give suitable treatment a 3D MRI scans are wildly used.

In current clinical routine, the resulting images are evaluated manually. Replacing the current procedure with an automated analysis has great potential for improving the patient’s treatment and will allow to utilize the physicians time better.

In this project we propose a fully automated technique for segmentation of Glioma tumors from MR images using convolutional neural networks.

The proposed technique comprises of two cascaded neural networks. The first one performs detection of the whole tumor area and the second performs classification of the sub-tissues of the tumor. The detection network is a deep convolutional neural network based on “Unet” architecture fed with 2D slices from the MR image. The classification network is based on “VGG-16” architecture and is fed with patches of the tumor area from the first network.

The model developed using Tensorflow framework, trained over a verity of MR images and tested over unseen scans. In conclusion, the model reached the compatible dice of ### for the whole tumor area (state of the art algorithm stands for 0.87).