AIBasedSegmenta

Sonia Pujol, Ph.D.

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Segmentation basée sur l'IA dans 3D Slicer

Manual vs AI-powered Segmentation

Cliquez sur Add Data dans le module Welcome to Slicer

Slicer charge l'ensemble de données IRM de la prostate

In the past decade, image segmentation has been powered by the development of deep learning algorithms (e.g. nnUnet by the German Cancer Research Center (DKFZ)/Helmholtz Research).

AI-powered segmentation tools can reduce the segmentation time and provide more reproducible results.

AI Terminology

A is an AI algorithm that was trained to perform a specific task (e.g. brain tumor segmentation model).

The Weights of an AI model are small numbers that determine how much importance the model gives to different image features.

During the Training phase, a Model learns patterns from data labelled by experts and adjusts its weights to improve its predictions.

During the Validation/Test phase, the model is evaluated on a separate set of data not used during the Training phase.

During Inference, the model is applied to new datasets to perform the specific task it was trained for.

3D Slicer AI Workshop

This tutorial focuses on running inference tasks using various pretrained AI models for automated segmentation of anatomical and pathological structures.

MONAIAuto3DSeg Slicer extension

This tutorial uses the pre-trained models of the MONAIAuto3DSeg Slicer extension.

The tool is designed to work on laptops or on average desktop computer without a GPU.

MONAIAuto3DSeg Slicer extension

Cliquez sur Create new segmentation sur Apply

Slicer AI Tutorial: Segmentation Tasks

Segmentation Task #1: Prostate.

Segmentation Task #2: Brain Glioma.

Segmentation Task #3: Whole Body Segmentation.

Slicer affiche le résultat de la segmentation de la prostate basée sur l'IA

Chargez dataset4_BrainMRI_Glioma

AI-based Segmentation of Peripheral Zone (PZ) and Transition Zone (TZ) of the prostate on T2-weighted MRI Images.

Dataset:

msd_prostate_01-t2

msd_prostate_01-adc

AI Segmentation Task #2: Brain Glioma

Slicer affiche le résultat de la segmentation basée sur l’IA en utilisant le modèle Whole Body Segmentation TS1-quick

AI-based Segmentation of Neoplasm, Necrosis and Edema in Brain MRI images.

Datasets:

1) BraTS-GLI_00005-000-t1n (T1-weighted)

2) BraTS-GLI_00005-000-t1c (T1-weighted post-Gd)

3) BraTS-GLI_00005-000-t2w (T2-weighted)

4) BraTS-GLI_00005-000-t2f (T2-FLAIR)

AI Segmentation Task #3: Whole Body Segmentation

AI-based Segmentation of the whole body.

Dataset:

CT_ThoraxAbdomen

Conclusion

The 3D SlicerMONAIAuto3DSeg extension provides fast AI-based segmentation of anatomical and pathological structures.

The module can run on standard laptop and desktop computers with no GPU.

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