

DAF3D implementation in MONAI

Project Management and Software Development
for Medical Applications

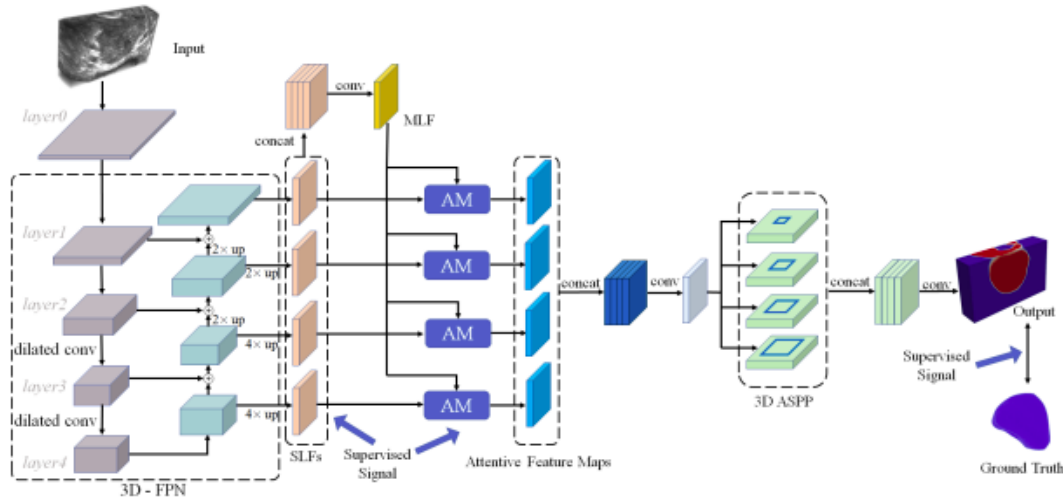


Fig. 3. The schematic illustration of our prostate segmentation network equipped with attention modules. FPN: feature pyramid network; SLF: single-layer features; MLF: multi-layer features; AM: attention module; ASPP: atrous spatial pyramid pooling.

General Info

The goal of this project is to implement [DAF3D](#)[1] in Monai, in order to contribute to [Monai ZOO](#) library [2]. To successfully complete the project, the student needs Pytorch/Monai knowledge, as well as time management skills. The students who attended the monai workshop will have priority in the selection process.

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Project Abstract

Segmentation of prostate in 3D ultrasound volumes is time consuming and user dependent. DAF3D is a 3D deep neural network equipped with attention modules that exploit the complementary information encoded in different layers of the convolutional neural network (CNN). The architecture proposed by Yi Wang and his team is available in github on Pytorch [3]. It needs Monai adaptation. One prostate dataset similar to the paper's dataset is available in our hospital server and the GPUs resources will be given in person or distantly. Good results on this project could open the possibility of a Master thesis in the laboratory.

Background and Motivation

It exists many semantic segmentation networks for medical images. Nevertheless each time a researcher wants to compare his/her architecture with the state it the art, he/she spends hours **re-implementing** the network because code is not available in an easy format. **Monai** zoo solve the gap, providing architectures and pretrained weights.

Student's Tasks Description

1. Understand the network,
2. Run the pytorch code on the GPUs,
3. Adapt the code to monai,
4. Contribute to the library
5. Create a google colab tutorial.

Technical Prerequisites

Languages: Pytorch, Monai. IDE: visual Studio or pycharm. Not needed but appreciated: Git

References

- [1] Wang, Y., Dou, H., Hu, X., Zhu, L., Yang, X., Xu, M., ... & Ni, D. (2019). Deep attentive features for prostate segmentation in 3D transrectal ultrasound. *IEEE transactions on medical imaging*, 38(12), 2768-2778.

[2] <https://github.com/wulalago/DAF3D>

[3] <https://github.com/Project-MONAI/model-zoo>