

- for segmentation of breast tumor images using a U-shaped pyramid-dilated network. *119718: 0957-4174* [DOI:10.1016/j.eswa.2023.119718]
- Ibtehaz N and Rahman M S. 2020. MultiResUNet : Rethinking the U-Net architecture for multimodal biomedical image segmentation. *Neural Networks*, 121:74-87 [DOI:10.1016/j.neunet.2019.08.025]
- Jai-Andaloussi S, Sekkaki A, Quellec G, Lamard M, Cazuguel G and Roux C. 2013. Mass segmentation in mammograms by using Bidimensional Empirical Mode Decomposition BEMD. 35th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC), IEEE:5441-4 [DOI:10.1109/EMBC.2013.6610780]
- Kaku A, Hegde C V, Huang J, Chung S, Wang X Y, Young M, Radmanesh A, Lui Y W and Razavian N. 2019. DARTS: DenseUnet-based automatic rapid tool for brain segmentation [DOI:10.48550/arXiv.1911.05567]
- Kirillov A, Mintun E, Ravi N, Mao H Z, Rolland C, Gustafson L, Xiao T, Whitehead S, Berg A C, L W Y, Dollár P and Girshick R. 2023. Segment Anything DOI:10.48550/arXiv.2304.02643]
- Ke L, He W and Kang Y. 2009. Mass auto-detection in mammogram based on wavelet transform modulus maximum. Annual International Conference of the IEEE Engineering in Medicine and Biology Society, Minneapolis, IEEE:5760-5763 [DOI:10.1109/IEMBS.2009.5332615]
- Lin T Y, Dollár P, Girshick R, He K M, Hariharan B and Belongie S. 2017. Feature pyramid networks for object detection. In Proceedings of the IEEE conference on computer vision and pattern recognition, IEEE: 2117-2125 [DOI:10.48550/arXiv.1612.03144]
- Liu Z , Lin Y T, Cao Y, Hu H, Wei Y X, Zhang Z, Lin S and Guo B N. 2021. Swin Transformer: Hierarchical Vision Transformer using Shifted Windows. *Computer Vision and Pattern Recognition* [DOI:10.48550/arXiv.2103.14030]
- Ma J Q, Zhao S M and Kong F H. 2022. Semantic image segmentation by using multi-scale strip pooling and channel attention. *Journal of Image and Graphics*, 27(12):3530-3541 (马吉权, 赵淑敏, 孔凡辉. 2022. 多尺度条形池化与通道注意力的图像语义分割. *中国图象图形学报*, 27(12):3530-3541) [DOI:10.11834/jig.210359]
- Nelson A D and Krishna S. 2023. An effective approach for the nuclei segmentation from breast histopathological images using star-convex polygon. *Procedia Computer Science*, 218: 1778-1790 [DOI:10.1016/j.procs.2023.01.156]
- Ronneberger O, Fischer P and Brox T. 2015. U-net: Convolutional networks for biomedical image segmentation. in *Medical Image Computing and Computer-Assisted Intervention (MICCAI)*, 9351: 234-241 [DOI:10.1007/978-3-319-24574-4_28]
- Ruan X L, Liu Q, Guo Z H and Yan J F. 2022. Research on breast cancer prediction model construction. *Journal of medical informatics*, 43(05):34-39. (阮旭凌, 刘琦, 郭志恒, 晏峻峰. 乳腺癌预测模型构建研究. *医学信息学杂志*, 43(05):34-39)
- Sun H, Li C, Liu B Q, Liu Z Y, Wang M Y, Zheng H R, Feng D D and Wang S S. 2020. Aunet: attention-guided dense-upsampling networks for breast mass segmentation in whole mammograms. *Physics in Medicine & Biology*, 65(5): 55005 [DOI:10.18550/arXiv.18.10151]
- Saad G, Khadour A and Kanafani Q. 2016. ANN and Adaboost application for automatic detection of microcalcifications in breast cancer. *The Egyptian Journal of Radiology and Nuclear Medicine*, 47(4):1803-1814 [DOI:10.1016/j.ejrmm.2016.08020]
- Salih A M and Kamil M Y. 2018. Mammography image segmentation based on fuzzy morphological operations. 2018 1st Annual International Conference on Information and Sciences (AiCIS), 40-44 [DOI:10.1109/AiCIS.2018.00020]
- Wu H K, Zhang J, Huang K Q, Liang, K M and Yu Y Z. 2019. Fastfcn: Rethinking dilated convolution in the backbone for semantic segmentation. *Computer Vision and Pattern Recognition* [DOI:10.48550/arXiv.1903.11816]
- Wen K, Jin X, An H, He J and Wang J. 2023. CentroidNet : a light-weight , fast nuclei centroid detection model for breast Ki67 scoring. *Journal of Image and Graphics* , 28 (04) : 1119-1133 (文可, 金旭, 安虹, 何杰, 王珏. 2023. CentroidNet : 轻量快速的乳腺癌 Ki67 细胞核中心点检测模型. *中国图象图形学报* , 28 (04) : 1119-1133) [DOI : 10.11834/jig.211207]
- Xiang L, Wang W, Hu X L and Yang J. 2019. Selective Kernel Networks. 2019 IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), IEEE: 510-519 [DOI:10.1109/CVPR.2019.00060]
- Xiao X, Lian S, Luo Z and Li S. 2018. Weighted res-unet for high-quality retina vessel segmentation. 9th International Conference on Information Technology in Medicine and Education (ITME), IEEE: 327-331 [DOI:10.1109/ITME.2018.00080]
- Xu L, Song H H and Liu Q S. 2023. Super-resolution reconstruction of binocular image based on multi-level fusion attention network. *Journal of Image and Graphics* , 28 (04) : 1079-1090 (徐磊, 宋慧慧, 刘青山. 2023. 多层次融合注意力网络的双目图像超分辨率重建. *中国图象图形学报* , 28 (04) : 1079-1090) [DOI : 10.11834/jig.211119]
- Yang X, Wang R, Zhao D, Yu F H, Heidari A A, Xu Z Z, Chen H

L,Algarni A D, Elmannai H and Xu S L.2023.Multi-level threshold segmentation framework for breast cancer images using enhanced differential evolution.Biomedical Signal Processing and Control,80(2):104373 [DOI:10.1016/j.bspc.2022.104373]

Zhao H H,Shi J P,Qi X J,Wang X G and Jia J Y.2017. Pyramid scene parsing network.IEEE Conference on Computer Vision and Pattern Recognition (CVPR),6230–6239 [DOI:10.48550/arXiv.1612.01105]

Zhang Y,Tomuro N,Furst J and Raicu D S.2010.Image Enhancement and Edge-based Mass Segmentation in Mammogram. Medical Imaging,11(2):33 [DOI:10.1117/12.844492]

Zhou Z W,Rahman Siddiquee M M,Tajbakhsh N and Liang J M.2018.UNet++: A Nested U-Net Architecture for Medical Image Segmentation.Computer Vision and Pattern Recognition [DOI:10.48550/arXiv.1807.10165]

作者简介

徐旺旺，男，硕士研究生，主要研究方向深度学习与医学影像交叉领域 E-mail: ww Xu@mail.hfut.edu.cn

律娜，女，副主任医师，主要研究方向医学影像和机器学习应用。E-mail: lvna@ahmu.edu.cn

许良凤，女，副教授，主要研究方向深度学习与医学影像交叉领域。E-mail: 1903723035@qq.com

李博凯，硕士研究生，主要研究方向微表情检测定位及识别。E-mail: 18756526100@163.com

周曦，男，讲师，主要研究方向计算机视觉人工智能机器学习应用。E-mail:45937753@qq.com

詹曙，男，教授，主要研究方向深度学习与医学影像交叉领域。E-mail: shu_zhan@hfut.edu.cn