Few Shot Learning Framework to Reduce Inter-observer Variability in Medical Images

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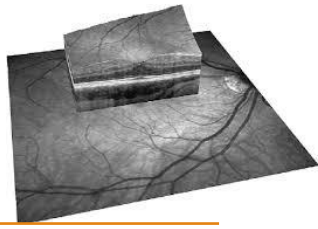


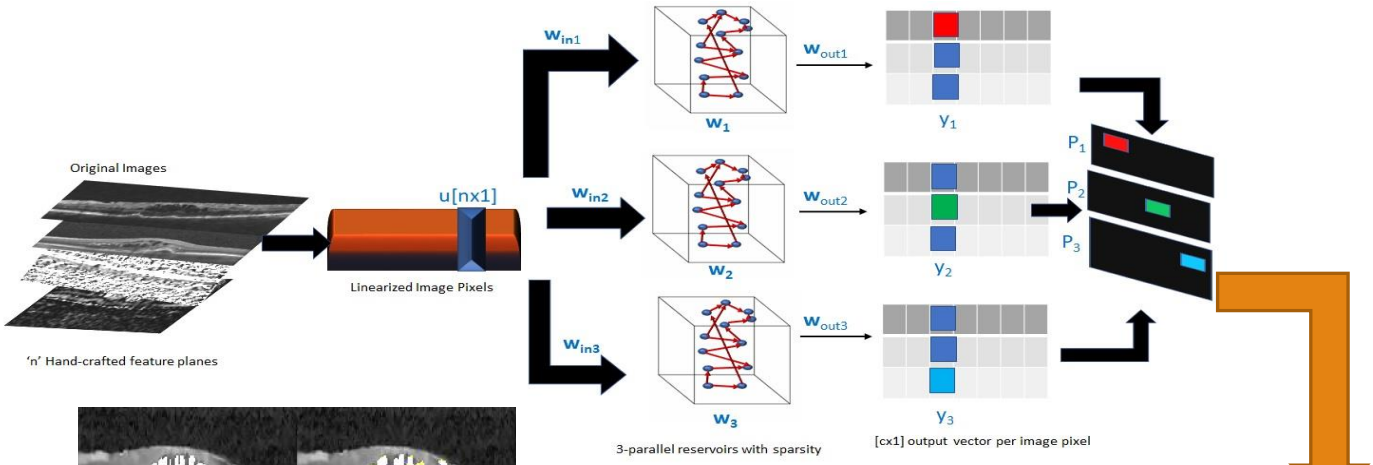
Objective:

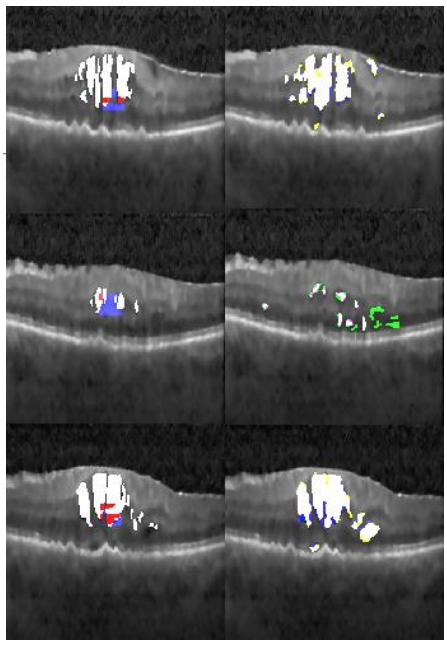
- Automated assessment of manually labelled medical images [1].
- Aids manual segmentation process.
- Reduces manual quality assurance by 60-97%.

Methods:

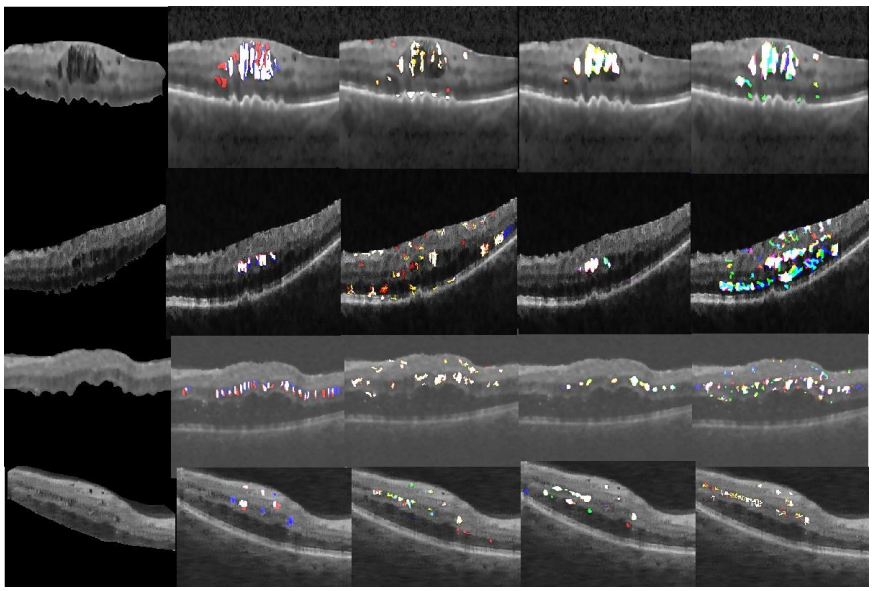
- Global Thresholding (1-training image per stack)
- U-net with dropout at test time (5 training images). [3]
- Parallel Echo State Networks (ESN, 5 training images).

Parallel ESN Model based on [2]





Verification by noisy Label Generation



Examples of Region Proposals per OCT image

References:

[1] Source: https://www.researchgate.net/figure/Optical-coherence-tomography-OCT-volume-scan-co-registered-with-fundus-image-from_fig6_263289543
[2] S. Roychowdhury and L. S. Muppirisetty, "Fast proposals for image and video annotation using modified echo state networks," in 2018 17th IEEE International Conference on Machine Learning and Applications (ICMLA). IEEE, 2018, pp. 1225–1230.
[3] G. Girish, B. Thakur, S. R. Chowdhury, A. R. Kothari, and J. Rajan, "Segmentation of intra-retinal cysts from optical coherence tomography images using a fully convolutional neural network model," IEEE journal of biomedical and health informatics, vol. 23, no. 1, pp. 296–304, 2018.