

Multi-loss CNN ensembles for aneurysm segmentation

KUBIAC team

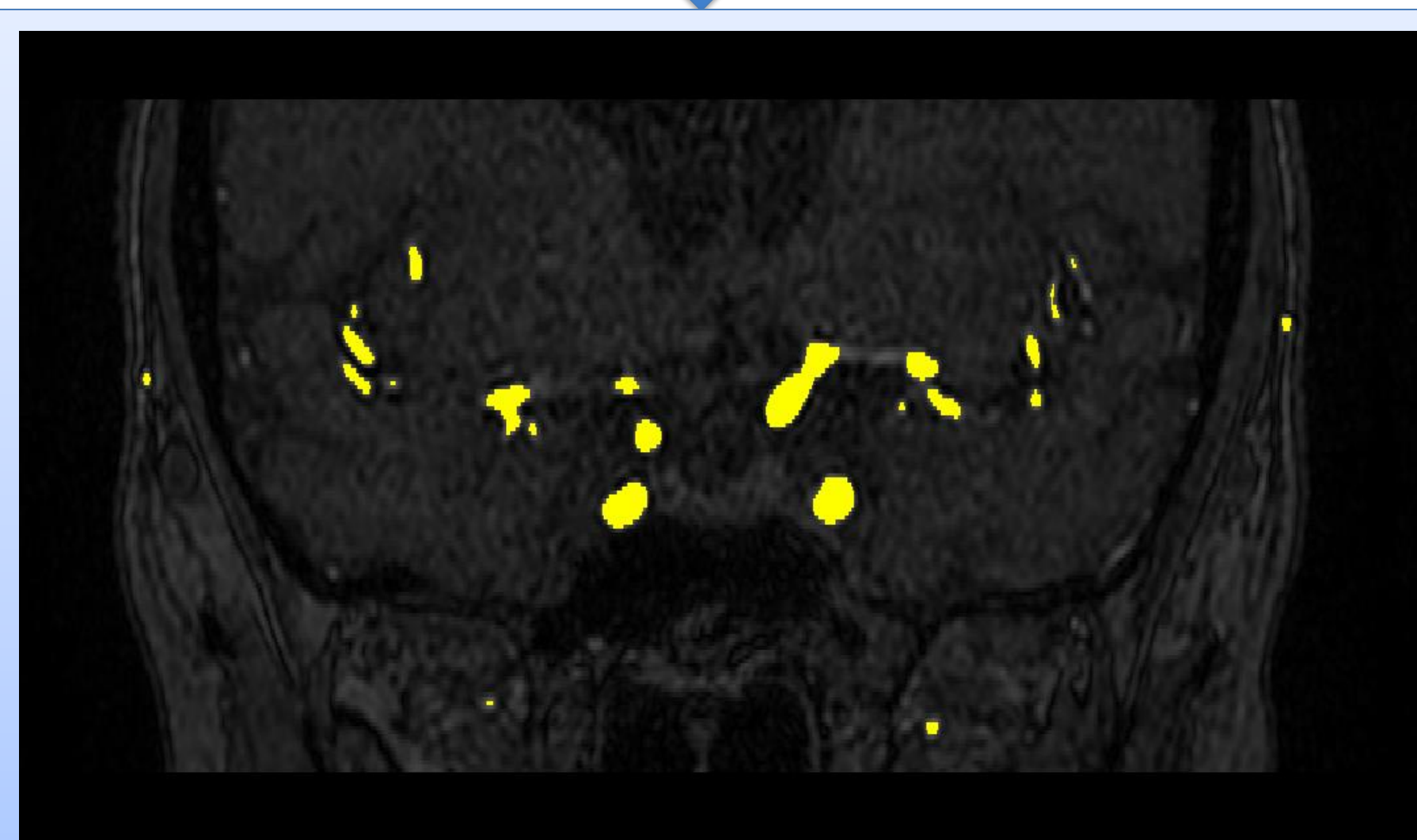
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We trained an ensemble of 18 neural networks using the ADAM challenge dataset of 113 samples.

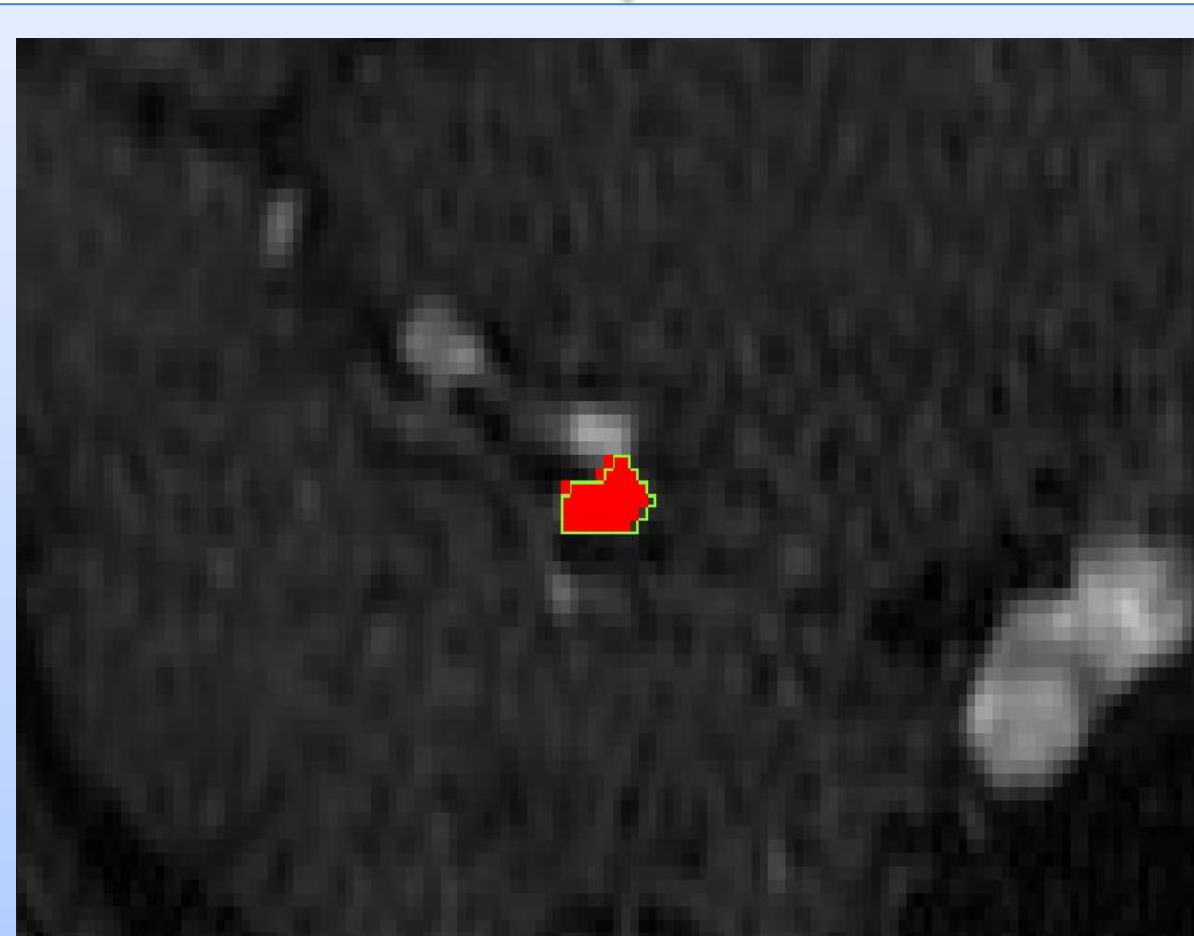
Input: a 64x64x64 patch and a context patch with 50% resolution, with structural and TOF MRI on 2 different channels.

Standardize to 0.357x0.357x0.5 voxel size



Select patches from top 0.25% voxels by intensity

Weighted average of individual predictions



Back to original voxel size (ground truth outlined)

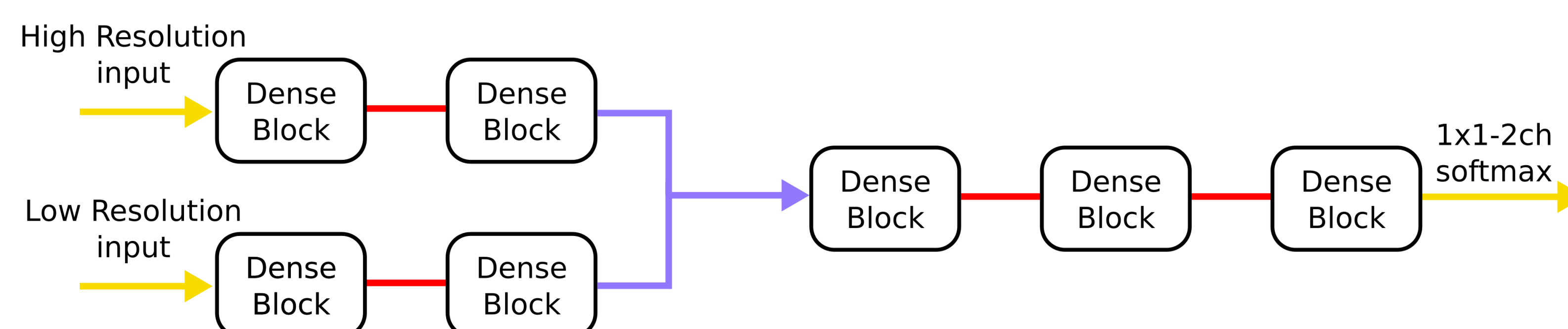
Loss

Cross entropy + Generalized Dice¹ + Boundary² loss

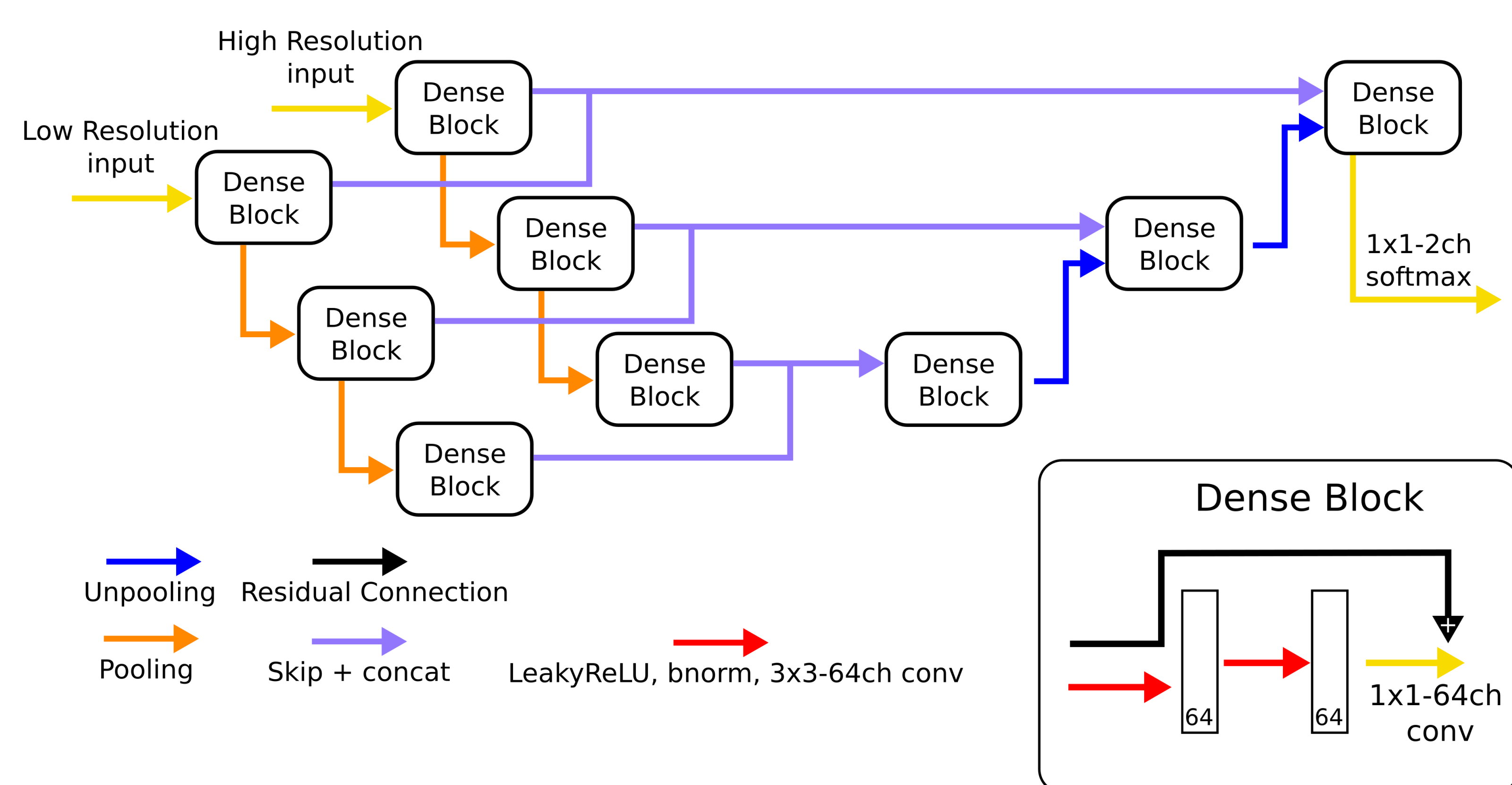
Networks

- 6 random validation groups of 5 samples
- 3 network variants

➤ CNN:



➤ Encoder/Decoder³:

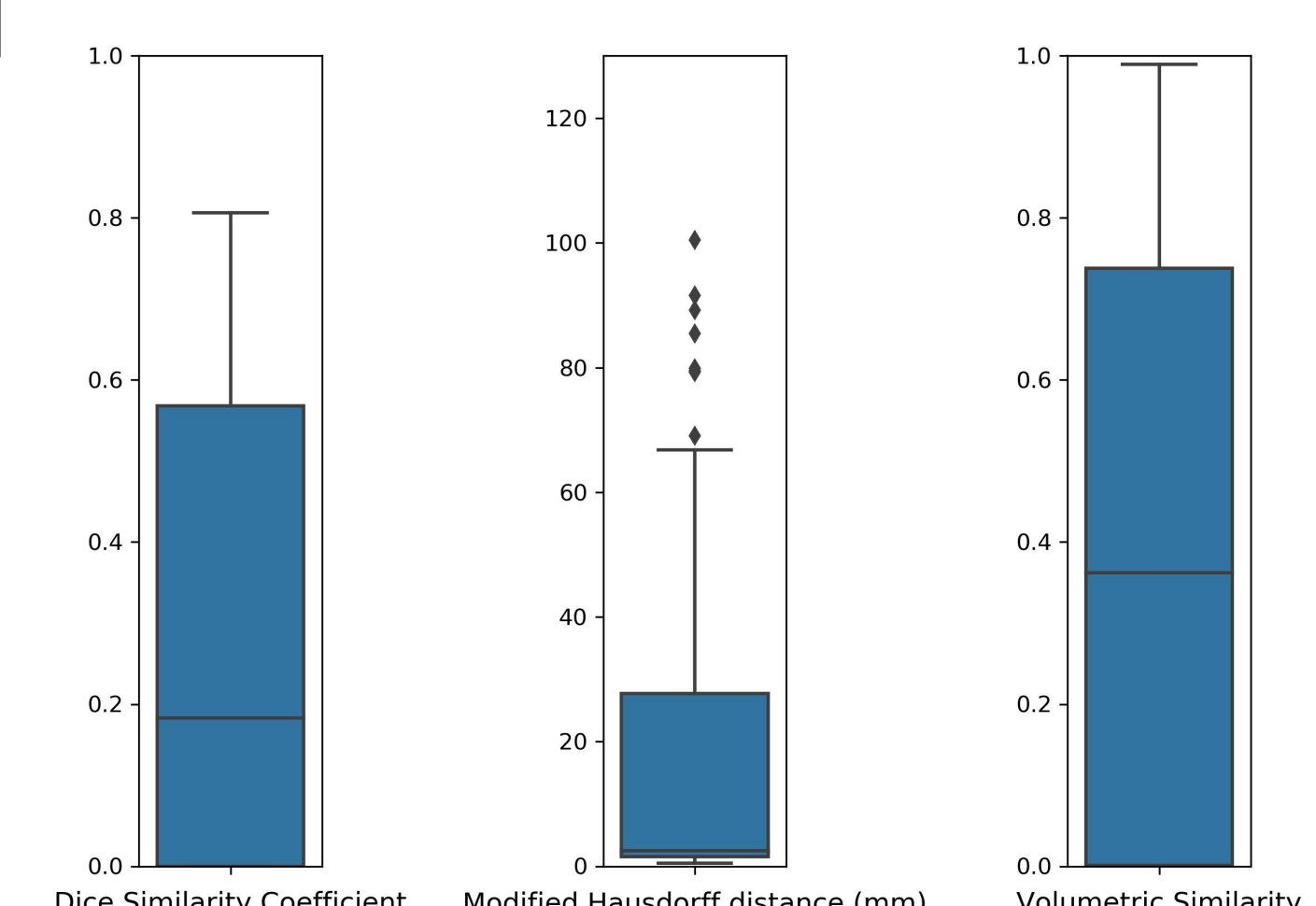


➤ Encoder/Decoder, replacing GD loss with simple Dice loss

Team: Kubiak Task 1 Rank: 0.08 Task 1 Place: 4 th
Task 2 Rank: 0.24 Task 2 Place: 3 rd

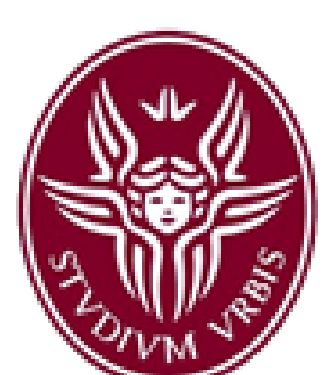
Task 1	False Positives	Sensitivity
Average	0.36	0.6
Rank	0.02	0.14

Task 2	Dice Coefficient	Modified Hausdorff Distance (mm)	Volumetric Similarity
Average	0.28	18.13	0.39
Rank	0.32	0.17	0.22



References:

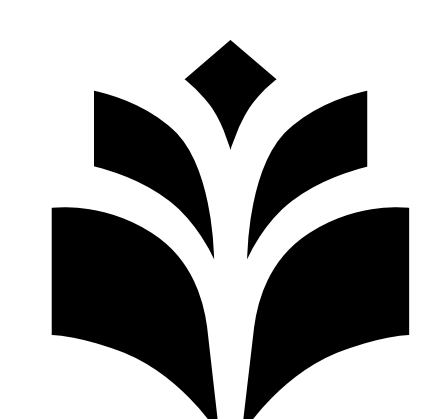
- [1] Sudre et al., 2017
- [2] Kervadec et al., 2019
- [3] Inspired by Hilbert et al., 2020



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Elinkeino-, liikenne- ja
ympäristökeskus

Leverage from
the EU
2014–2020



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