

SegTHOR challenge: Segmentation of Thoracic Organs at Risk in CT images - Part II

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Overview of methods

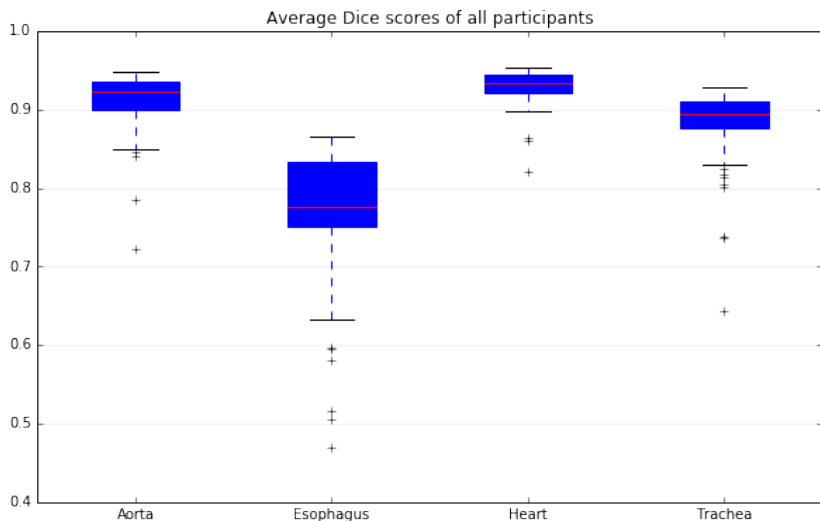
In **blue**, participants that presented their method today:

Rank	Authors	nD	
1	Miaofei Han	3D	Vnet, Multiresolution, generalized Dice loss
2	Tao He	2.5D	Unet, Multitask
5	Qin Wang	3D	Vnet, Multiscale
9	S Vesal	2D	Unet, Dilated res Training in 2 steps Tversky loss
13	L van Harten	2/3D	Combining 2D and 3D CNN
16	D Lachinov	3D	Unet, Pixel shuffle, Dice loss
18	Ming Feng	3D	Dense VNet, DicePlusXEnt loss
20	Li Zhang	3D	2 stage approach
21	Pan Chen	3D	Unet, multiresolution
26	Kondratenko	2/3D	Unet (Tnet), surface dice score
32	Sekeun Kim	2/3D	Selection network, and 3 parallel Thor-net, Xent loss
47	Manoj Satya	2D	Dilated UNet applied independently on each organ

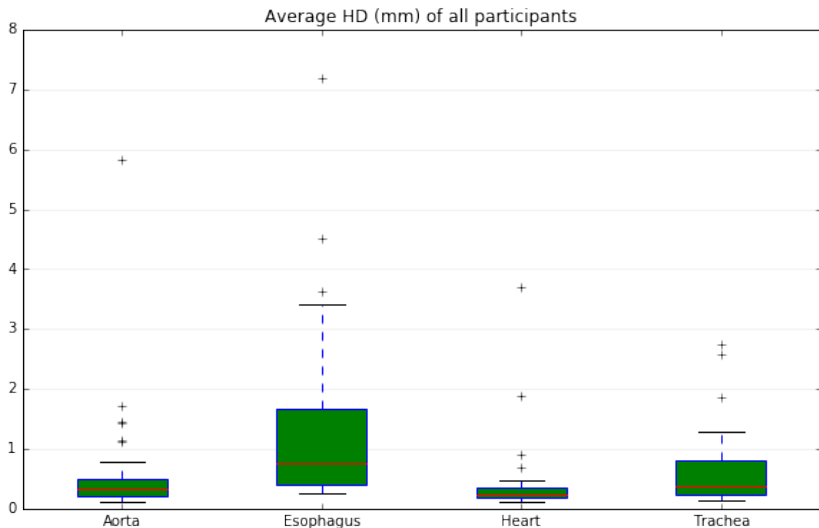
Challenge results

- Results on the 50 test set submissions
- Results with the 12 participants

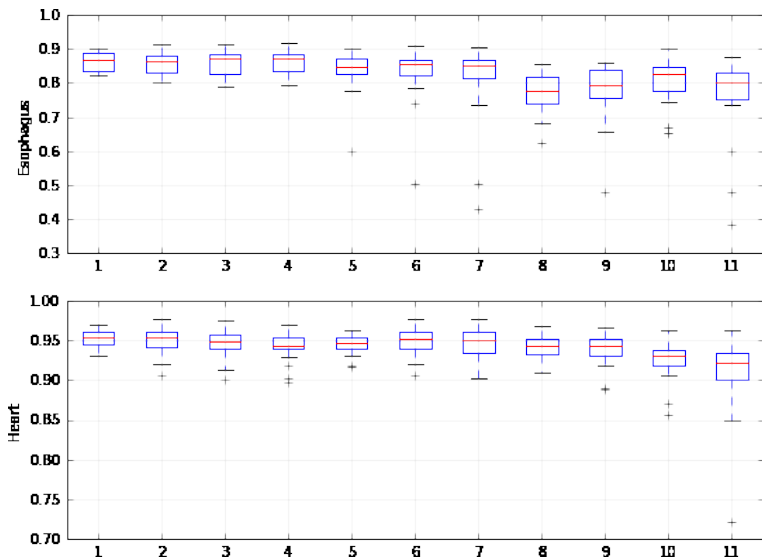
Challenge results: average Dice scores for all 50 participants



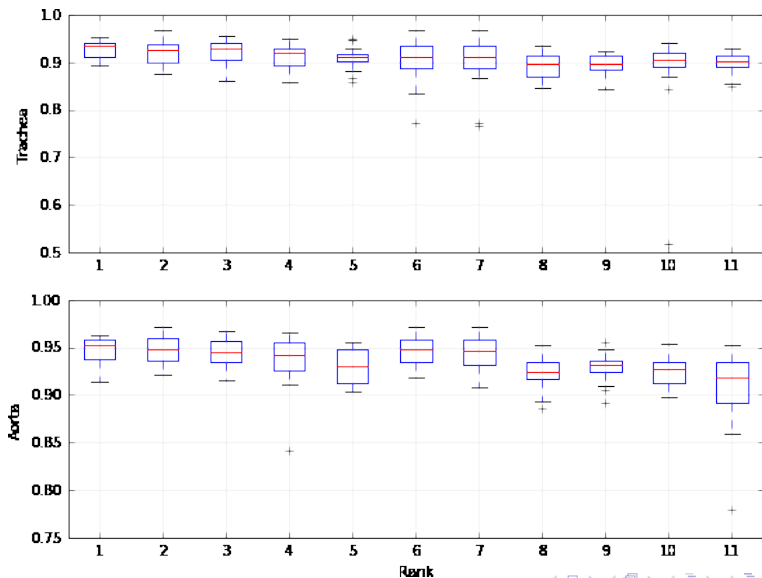
Challenge results: average HD (mm) for all 50 participants



Average Dice metric for 12 participants: esophagus & heart



Average Dice metric for 12 participants: trachea and aorta



Comparing to baseline work

	Baseline work*	Top-1 method
Esophagus	0.67-0.71	0.86
Heart	0.90	0.95
Trachea	0.82-0.83	0.92
Aorta	0.86	0.94

*Results not obtained on the SegTHOR dataset!

Substantial improvement in segmentation accuracy has been obtained by many participants!

Analysis and future works

What we've learnt:

- Segmentation CNN: definitely the state-of-the-art!
- 2D vs 3D vs a mix?
- Loss functions: Dice, Cross-Entropy, others?
- Post-processing: a necessary step?
- Esophagus and trachea: still room for improvement?

What we need to do now:

- Assess variability of manual segmentation
- Compute statistical significance between methods
- 2D metrics \rightarrow 3D metrics?

What's next?

- Our presentations will be soon online
- Proceedings will be soon online
- Test results will re-open on April 10th and remain open
- Write a collaborative paper with in-depth result analysis

Acknowledgements...

- to all participants! especially those who submitted a paper 😊
- to ISBI Workshop and Challenge chairs and co-chairs

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<https://competitions.codalab.org/competitions/21012>