

How to label Tongue, Hyoid and Mandible in DeepLabCut for training.

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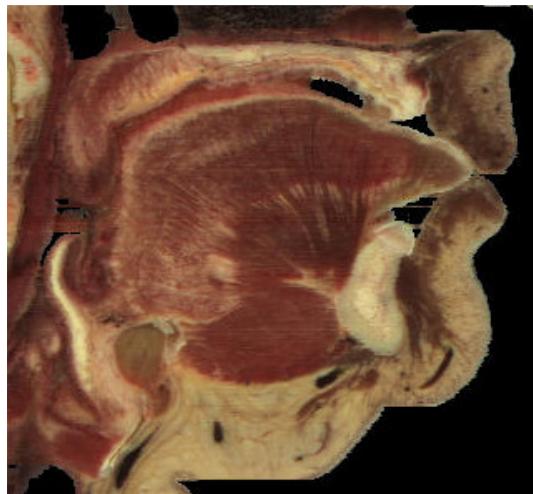
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The DeepLabCut (DLC) GUI

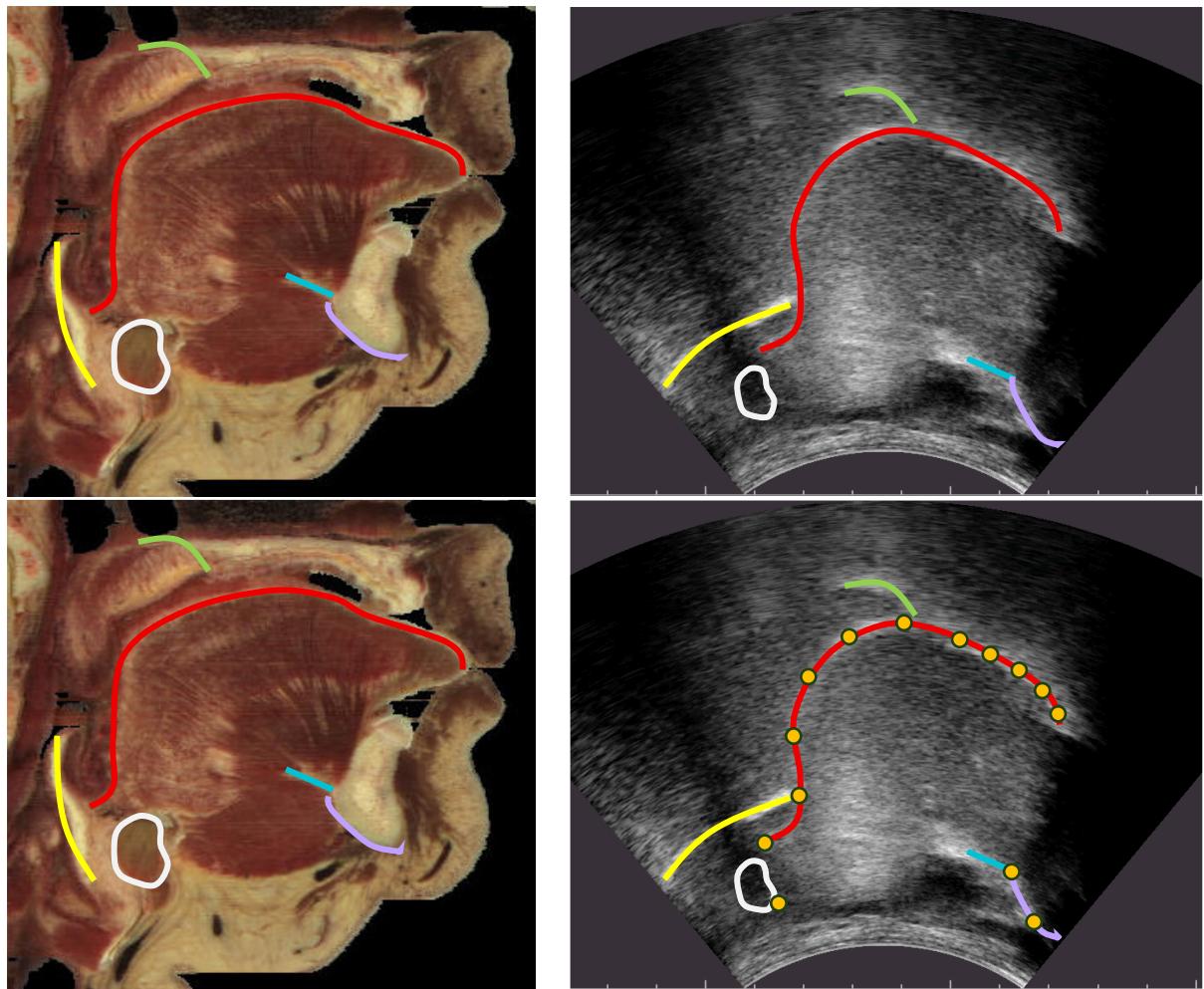
In the DLC GUI (Mathis et al,2018; Mathis et al, 2020; Mathis et al, 2021)

- Select the videos from which the ultrasound frames will be extracted
- Select Frames to be labelled from the videos. Manual selection of variable tongue shapes is better than kmeans as some of the complex shapes only last a few frames in the video.
- In the labelling tab select the first frame or a later frame if the extent of the tongue tip and root is clearer. Position the 11 keypoints as in the guide below.

Identifying and labelling ultrasound features



Visible Human Female (Ackerman, 1998; Spitzer et al., 1996) Good quality ultrasound image



Yellow – Epiglottis. Edge trackers nearly always trace the epiglottis instead of the tongue root.

Red – Tongue Contour.

Green – Upper surface of the soft palate at the palate to air boundary in the nasal cavity.

Cyan – Short Tendon

Mauve – Lower Edge of the Mandible. Produces ultrasound shadow.

White – Hyoid. Produces ultrasound shadow

Labelling rules

11 Tongue keypoints

- Starting at Valecula
- Evenly spaced until keypoint 7 (Valecula, Root1, Root2, Back1, Back2, Dorsum1, Dorsum2)
- Then half spaced so that point 11 is on the tip. (Blade 1, Blade 2, Tip1, Tip2)

Hyoid keypoint is placed at the anterior of the hyoid shadow.

Short Tendon keypoint is placed at the posterior mandible shadow. Sometimes outside field of view.

Mandible keypoint placed at the bright point towards the anterior mandible shadow. NOTE: Short tendon to mandible distance should be constant for every image.

To label the next image click <ctrl>C to copy all the keypoints and adjust the ones that have moved. This also helps check continuity as for example the tongue tip cannot suddenly become longer. It may be necessary to go back and review the original placements.

References

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