

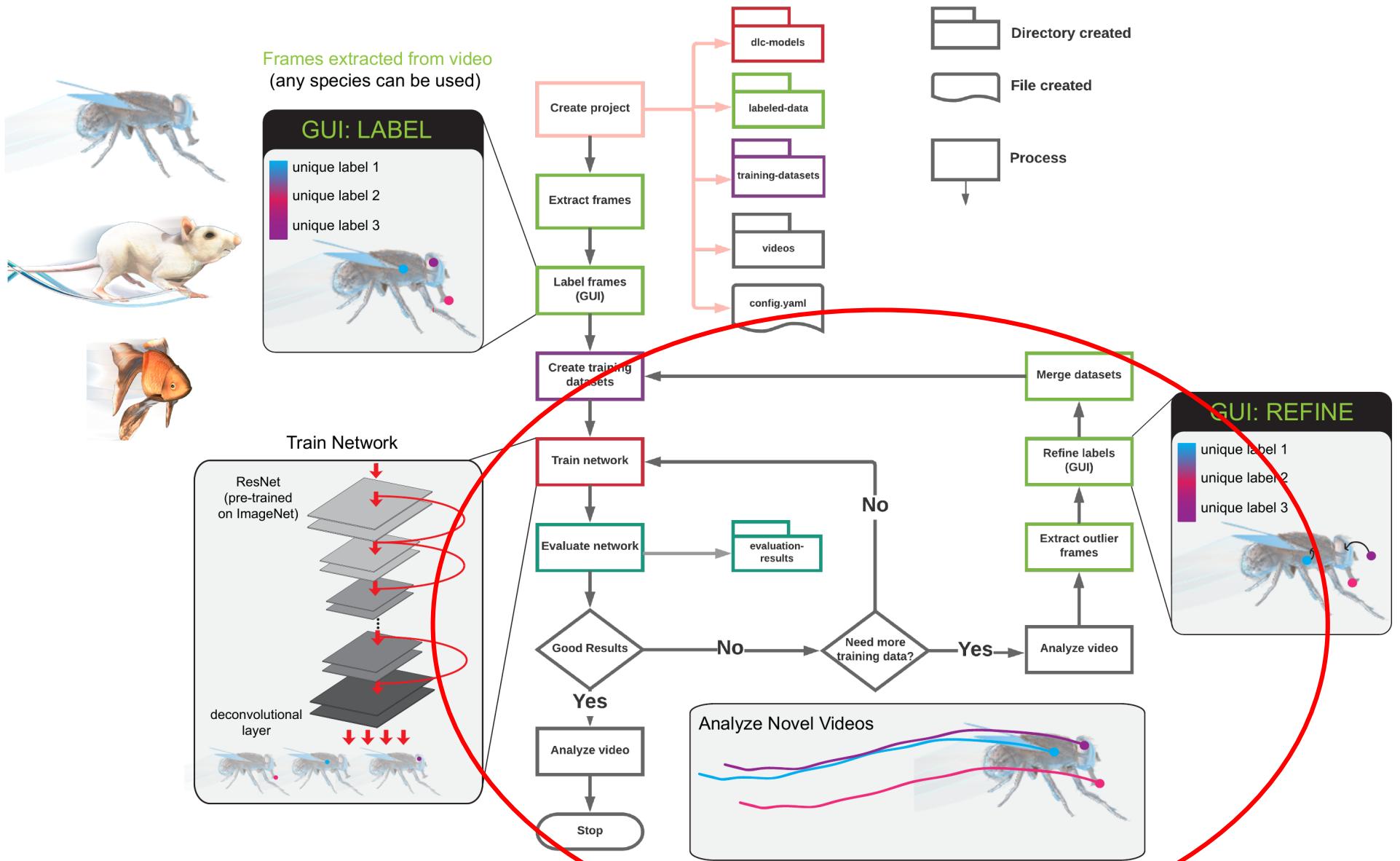
DeepLabCut workshop demo section 2

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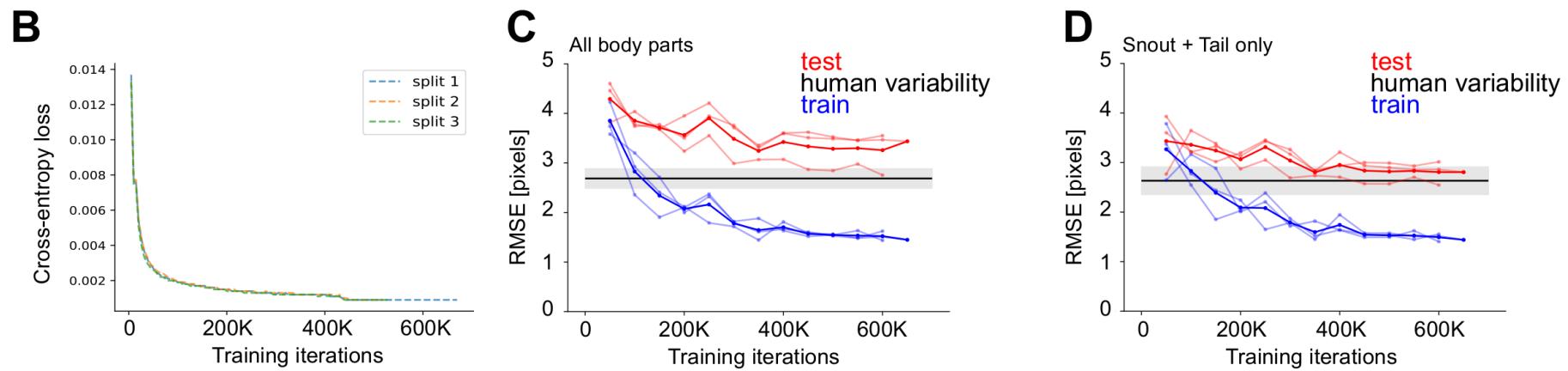


DeepLabCut 2.0 workflow



Nath*, Mathis*
BioRxiv 2018

Evaluation considerations



Evaluation >> look at test images!

a

Example of the terminal output

```
deeplabcut.evaluate_network('<path of the proj. config file>', shuffle = [1], plotting=True)

Assessing accuracy of shuffle # 1 with 99 % training fraction.
Found the following training snapshots: [(200000, 0)]
You can choose among those for analysis of train/test performance.
Results for 200000 training iterations: 99 1 train error: 4.81 pixels. Test error: 7.02 pixels.
With pcutoff of 0.1 train error: 3.3 pixels. Test error: 5.2 pixels.
```

b

Examples of **training images** with Human and DeepLabCut labels



c

Examples of **test images** with Human and DeepLabCut labels



d

Examples of **test images** with Human and DeepLabCut labels

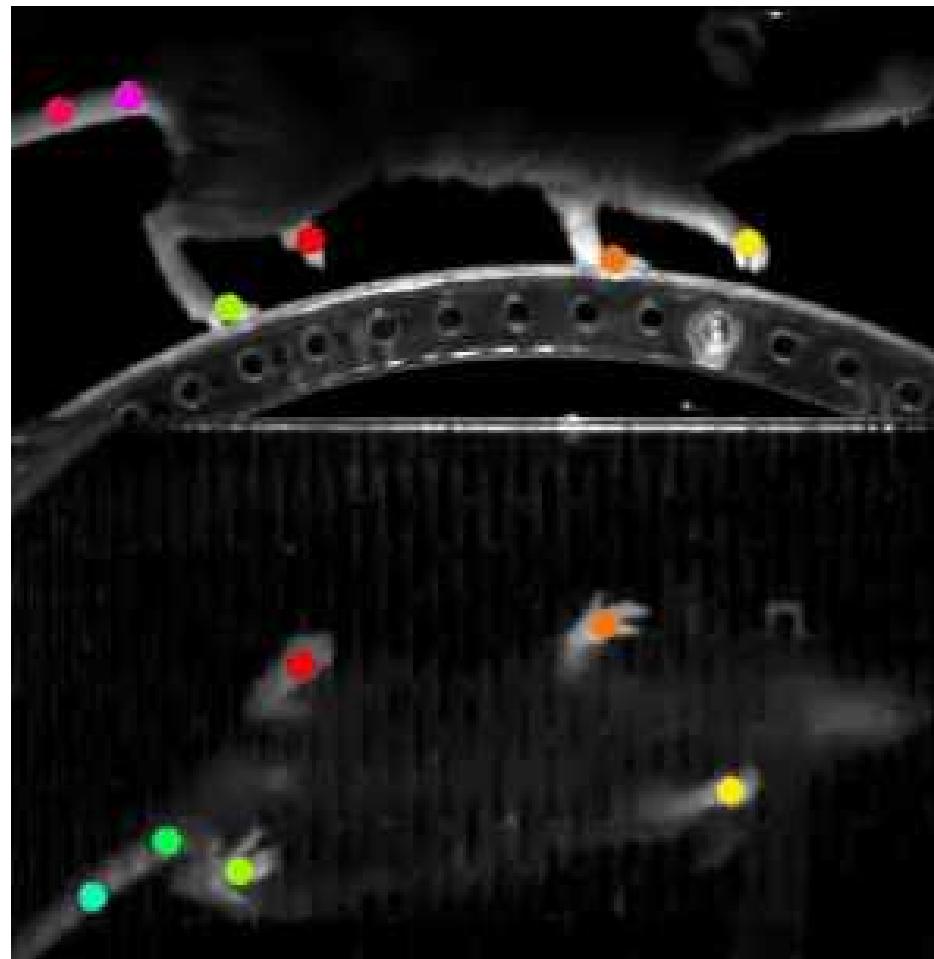


Demo

- Let's have a look at your trained networks!

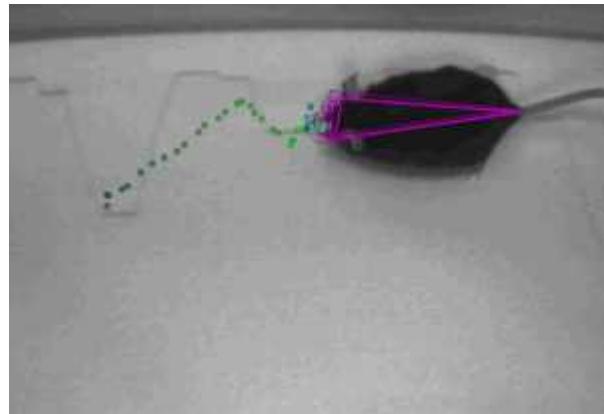
Analyze and label videos

- Here is the standard output:



You can also change the plotting code (per frame)

- Plotting based on *matplotlib*, so you can just create skeletons by connecting body parts, etc.



Demo

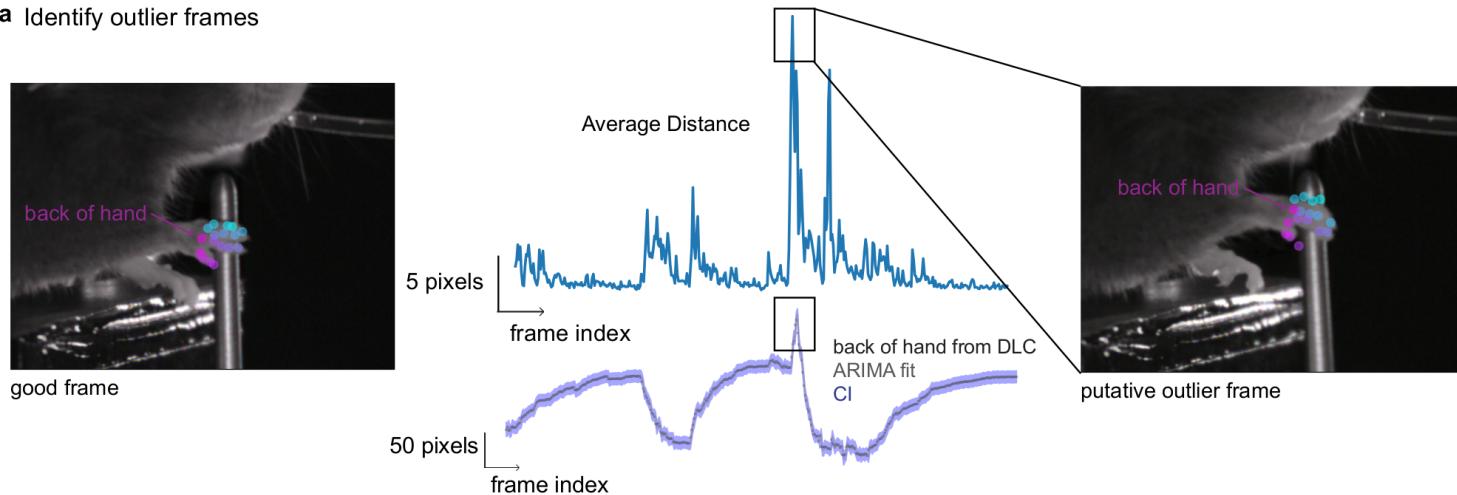
- Create annotated video
- Create trajectory plots

Generalization

- If there are errors in analyzed videos, you can correct those manually and re-train!
- Note you do not need to correct all errors (presumably some are fixed due to generalization)
- **Current automatic methods for “outlier” detections:** jumps in trajectories, low confidence, and (large) deviation from state-space model fit

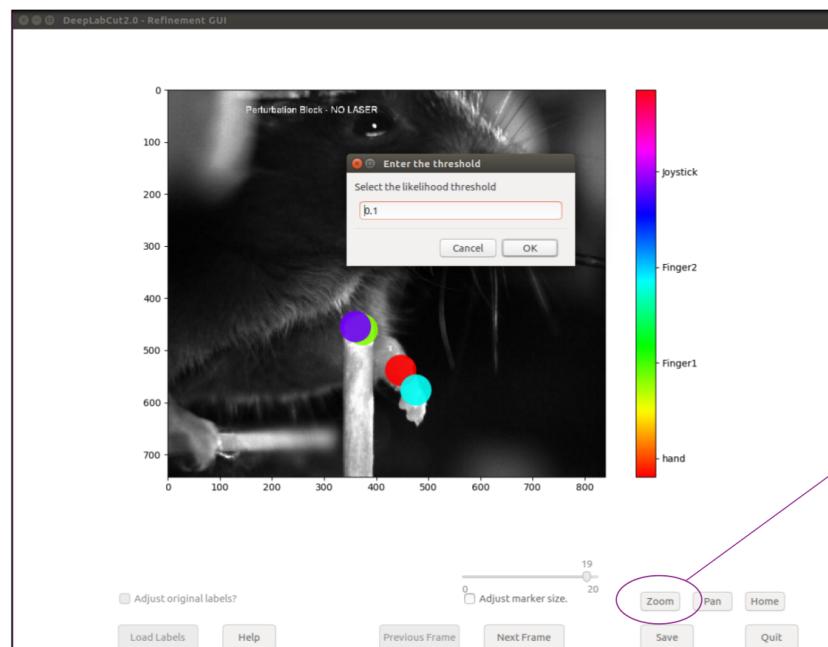
Outlier detection & human feedback

a Identify outlier frames

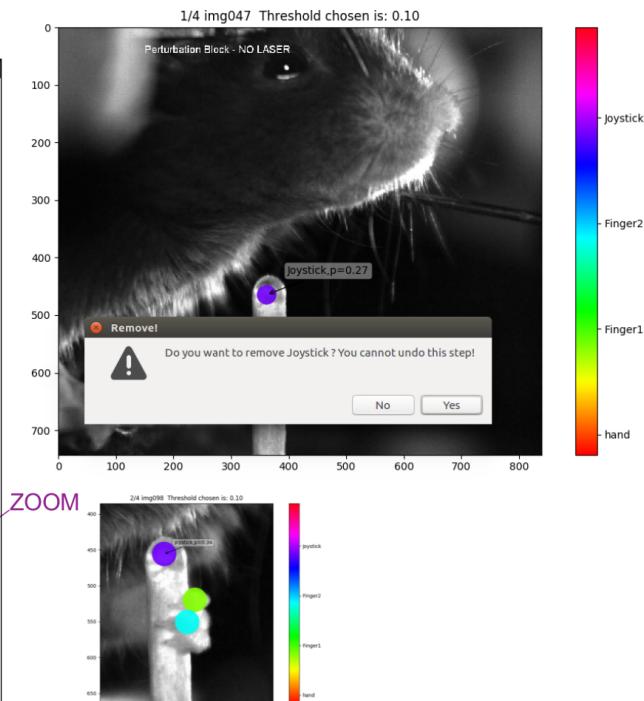


b Refine DLC applied label location(s)

```
deeplabcut.refine_frames(config_path)
```



c Remove label i.e. from an occluded point



Next steps

- Merge the data sets and train again!
- The weights will (again) be initialized from ImageNet weights! (because w.l.o.g. e.g. #body parts could have changed).
- You can manually link the *init_weights* in *pose_cfg.yaml* to the snapshot from previous iteration before starting to train

Demo

- Extract outlier frames and correct them
- Merge data sets and create new training set
- Start training