LocoTracker User Manual

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1 Introduction

LocoTracker is a software designed for tracking and classifying the moving parts of fixed-position honey-bees. Moreover, it allows user interactively modify the automatically generated output to get a better performance. For details of the algorithm please refer to [1,2].

2 Installation details

All the used library files are in the zip file. Please unzip the file and click on the "LocoTracker.exe", the software will start up.

3 Getting started

"130529_ok_Trace Conditioning_part1_shot2.avi" is the default video file of the software, please DO NOT delete/rename/move it. If the folder of the same name as the default file does not exist, the program will first automatically generate it and put the files (e.g. positions of the bounding boxes and corresponding feature values, etc.) which could be used next time into it, then start up . Otherwise the program will load the existing data and start up immediately.

3.1 Training data selection

The default training data for antenna, mandible and proboscis are stored in files named "ann.txt", "man.txt" and "probs.txt", respectively. Users can click the "Load Training Data" button to use the default training data. If users want to select training samples by themselves, please click the "Train Data" button, as illustrated in Fig.1.

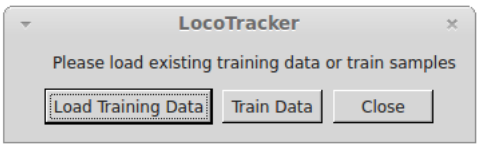

Fig. 1: Start up of LocoTracker

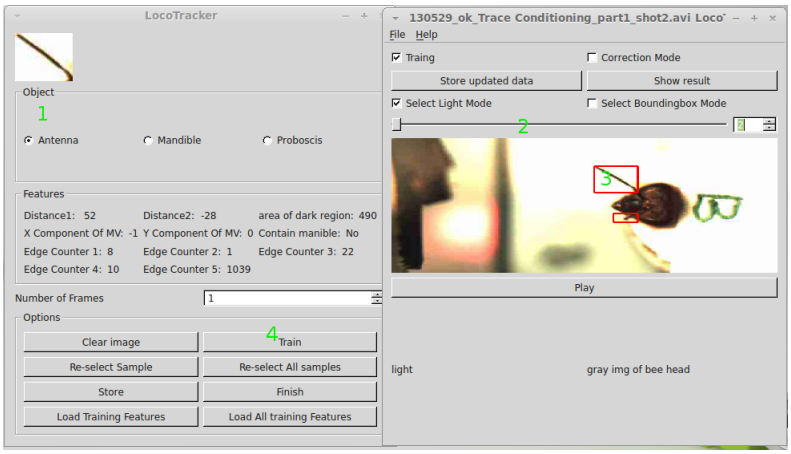

Fig. 2: Training sample selection

Fig.2 shows how user can select the training samples. Steps of selecting the training data:

1.Users need to specify the type of the training data.

2.Then user can drag the slider or set the value of the spin-box to see if there are some proper bounding boxes.

3.The next step is right-click on the selected bounding box, the copy of the bounding box will be shown on the other widget.

4.Click the "Train" button to store the training sample.

The software needs user to select 10 samples for each type of object, steps 1-4 should be repeated until all the training samples are selected. After the training samples are selected, user can click the "Store" button to store the selected training data, then click the "Finish" button to generate the classification result. Note that the training data could be selected for only once, and the file names for the training data must be the same as the default ones, i.e., the default training data is replaced by the user selections.

3.2 Initial classification result

After the training step, the software will classify the moving objects in the video automatically. Fig.3 illustrates the initial classification result, one can check the classification results by dragging the slider or setting the value of the spin-box or just click the "Play" button.

3.3 Correction of the classification result

The initial classification result is not perfect due to the visual similarity of the objects, the software allows user to manually modify relatively less number of frames to get a better performance.

Fig. 3: Initial classification result

One can toggle the "Correction Mode" check-box to get into the correction mode. Label 1 in Fig.4 indicates the number of key frames the user need to modify. If current key frame is modified, user can click the "Go to the next KF" button.

In correction mode, user can

1. modify the mis-labeled bounding boxes by right click on it and assign it the correct label,

2. remove the mis-detected bounding boxes by right click on the it and

3. add new bounding boxes by using mouse to drag a rectangle area and right click on it.

There is a screen shot of how to use the correction mode on Youtube (https://www.youtube.com/watch?v=PF2FALawKV0).

Users can store their modifications by clicking on the "Store updated data" button if they want to continue this modification next time.

Note that users need to do the above steps for several rounds until the value of the "Number of Key Frames" is 0.

3.4 Final result

If user also want to track the light in the frame, one can use the mouse to drag a rectangle area on the frame to indicate the position of the light in normal mode(not training/correction mode). After the correction step is finished, user can click on the "Show result" button. Then the tips of the objects are also drawn, users can play the video to see the result. Moreover, users can go to the file menu to export the experiment data to a csv file of the same name or write the final result to another video file.

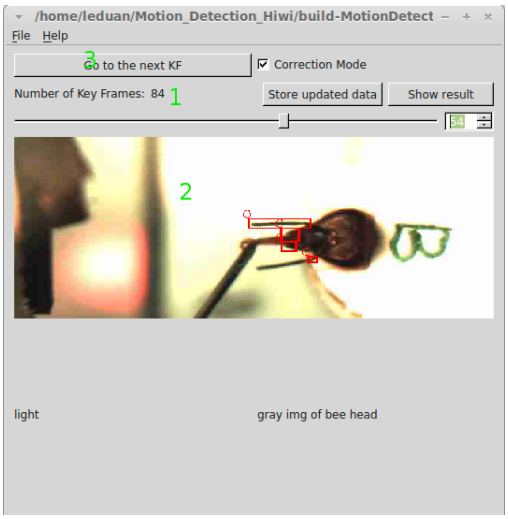

Fig. 4: Correction mode

4 Summary

Here is a brief summary of how user can use this software:

1. Load in the training data. (Could be done automatically or manually)
2. Auto-classification.
3. User interaction for rectifying the classification result.
4. Store the results and export data.

Since this software is designed and implemented by limited number of persons, if you find some bugs, please contact Le Duan(duan.le@uni-konstanz.de).

References

[1] Minmin Shen, Chen Li, Wei Huang, Paul Szyszka, Kimiaki Shirahama, Marcin Grzegorzek, Dorit Merhof, and Oliver Duessen, "Interactive Tracking of Insect Posture," Pattern Recognition, accepted.

[2] Minmin Shen, Paul Szyszka, Oliver Deussen, C. Giovanni Galizia, Dorit Merhof, “Automated Tracking and Analysis of Behavior in Restrained Insects”, Journal of Neuroscience Methods, vol. 239, pp. 194-205, Jan. 2015.