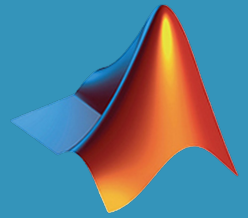


Motion Tracking in Matlab

For use with the file "MBMOTracker.m"



Caution

- Using Matlab to perform motion tracking is **not** recommended for anyone without prior experience with Matlab or other programming experience.
- Compared to Adobe After Effects, Matlab can process footage faster and perform both object detection and object tracking.
- However, Matlab's detection is not 100% accurate and false identification or missing identifications are difficult to correct after processing has finished.

Original Sample File

Matlab offers sample code for motion-based multiple object tracking:

<https://www.mathworks.com/help/vision/examples/motion-based-multiple-object-tracking.html>

- Press "Try it in Matlab" to download the file
- Read the comments to understand what each section is doing
- Certain parameters can be adjusted/customized

Modified File

The file "MBMOTracker.m" has been modified to perform the following additional* actions:

- **Saves an output video file (.avi)** of your footage with yellow bounding boxes overlaid on the identified objects, frame by frame
- **Saves an output text file (.txt)** of the bounding box locations in the format:

Object ID #	Top Left X Coordinate	Top Left Y Coordinate	Width	Height
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For example: 2 50 120 75 75

Refers to a bounding box around Object 2 with top-left corner located at x=50, y=120, with a width and height of 75 pixels.

The output text can then be **copied and pasted into an excel file** and **sorted by ID** to obtain information on frame by frame changes in movement for each object

- Paste > Excel Text Import Wizard > Delimitate by Space

	A	B	C	D	E	F
1	3	675	470	138	45	
2	6	1436	287	96	44	
3	3	750	458	60	45	
4	6	1445	279	96	44	
5	9	2382	510	55	54	
6	11	2132	697	241	224	
7	17	492	1506	81	39	
8	19	1173	413	194	140	
9	21	1986	703	72	89	
10	3	746	477	39	44	
11	6	1456	276	96	44	
12	9	2369	505	77	53	
13	11	2231	802	140	130	
14	17	529	1521	53	29	
15	19	1169	363	193	163	
16	21	2025	677	72	89	
17	27	978	730	165	162	

Without Sorting

	A	B	C	D	E	F
1	3	675	470	138	45	
2	3	750	458	60	45	
3	3	746	477	39	44	
4	3	713	515	92	29	
5	3	693	501	107	40	
6	3	678	457	98	60	
7	3	701	406	91	93	
8	3	703	413	90	81	
9	3	703	393	89	101	
10	3	704	380	89	110	
11	3	726	375	67	113	
12	3	729	382	65	106	
13	3	726	400	66	87	
14	3	727	383	64	103	
15	3	692	400	74	77	
16	3	701	386	62	95	
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Each row corresponds to a different frame

After Sorting: now all these rows show data for Object 3

*Please note that no lines of code were deleted from the original sample file



Tips

Matlab's tracker **depends on movement**. If your objects are still for multiple frames, then Matlab's detection algorithm will **not** identify the object.

- If your subjects move infrequently or slowly, **speeding up your footage** beforehand is recommended (see the DMC Guide "Motion Tracking Small Organisms")

If Matlab cannot run the code in "MBMOTracker.m"

- Make sure Matlab's Computer Vision apps are installed on your computer
- Check if your footage is in the Current Folder (left hand panel). If not, either change the current folder or move your footage into the current folder

If your output video file cannot open

- Make sure you let Matlab finish running the **entire** code in MBMOTracker
- The file calls the line "close(v)" **at the end**; if omitted, the video may not be complete
- The output text file, on the other hand, has no issues with terminating the code early